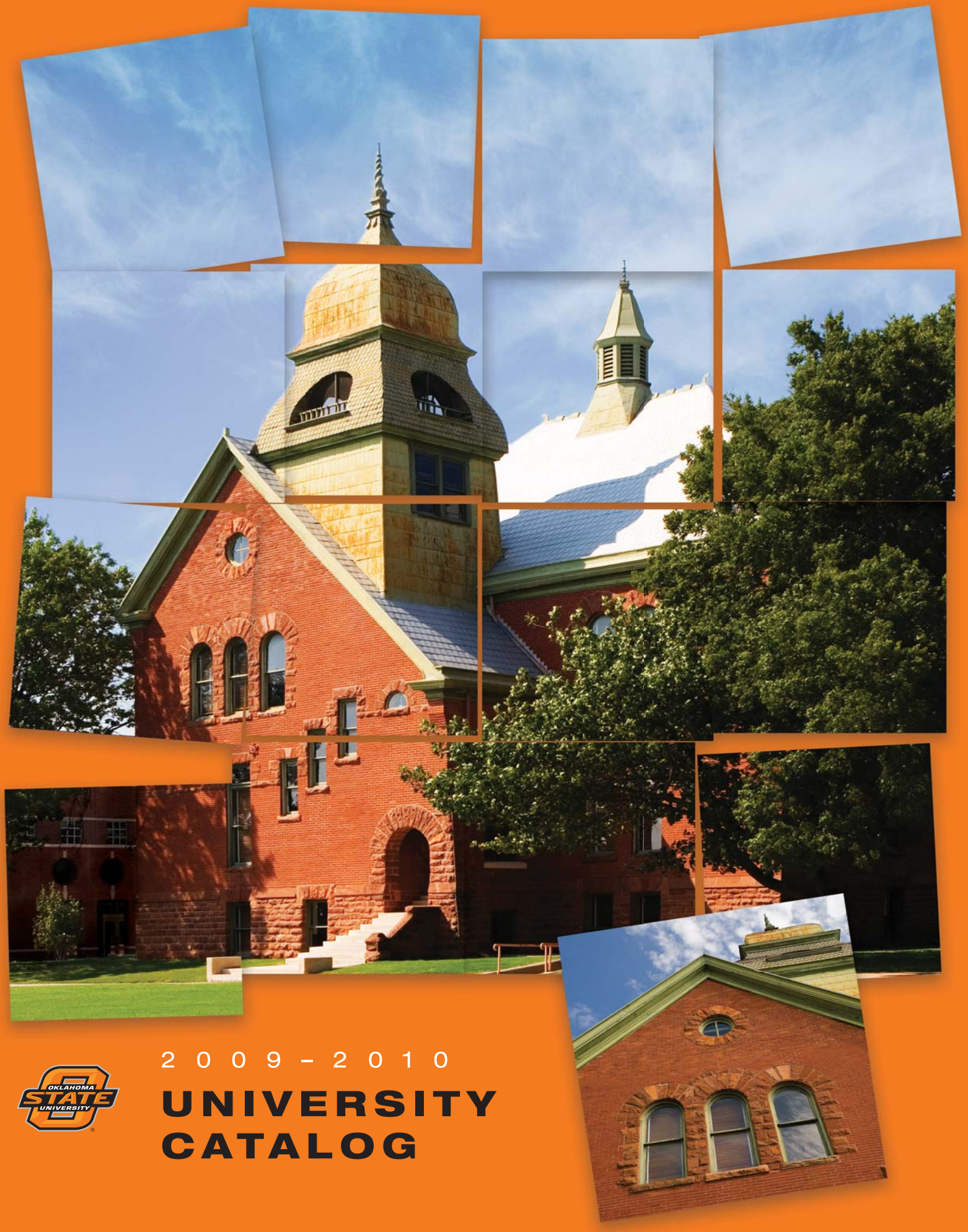
OKLAHOMA STATE UNIVERSITY



2009–2010

UNIVERSITY CATALOG

2009-2010 University Catalog

An Oklahoma State University education is about providing choice and value. It's about people gathering together to investigate and discover, uncover opportunities and take on challenges. With over 200 undergraduate and graduate degree programs, OSU is the flagship land-grant institution of Oklahoma with a world-wide reach. Our faculty includes leaders in their fields and an array of nationally published authors and scientists. Oklahoma State University provides world-class education to all students: full-time, part-time, adult and traditional.

Our investment in teaching and research creates an educational experience that is intellectually challenging and has practical value far beyond the classroom. OSU students learn hands-on while working with world-class scientists, artists and intellectuals on cutting-edge research that is changing the way we live.

OSU has been recognized as one of America's Best College Buys in the annual U.S. News & World Report rankings. Plus, the Princeton Review named OSU as one of the best higher educational institutions in the western United States.

OSU is also home to nearly 1,400 valedictorians, multiple Rhodes, Truman, Marshall, Udall, Goldwater, and Phi Kappa Phi Scholars. The most frequent GPA of incoming freshman is 4.0.

With more choices, top faculty and cutting-edge resources all at a great value, Oklahoma State University is the place to make your own life STATEment with a world-class education.

Oklahoma State University is accredited by the Higher Learning Commission (HLC)
A Commission of the North Central Association of Colleges and Schools
and programs within the colleges are also accredited.

Higher Learning Commission (HLC)
30 N. LaSalle Street, Suite 2400
Chicago, IL 60602
800.621.7440
www.ncahigherlearningcommission.org

www.okstate.edu

This *Catalog* offers information about the academic programs and support services of the University. This *Catalog* is as accurate as possible, but the information may not remain current for all of the academic year. Circumstances may prompt changes in courses, course content, credit, fees, regulations, semester calendar, curriculum, degrees offered, and other University matters. Such changes authorized by the University apply both to prospective students and to those previously enrolled, unless the latter are specifically exempted.

For information, write to Oklahoma State University, Stillwater, OK 74078, or call **(405)744-5000**; in Oklahoma, call toll free 1-800-233-5019. Send electronic mail requests to registrar@okstate.edu. Publications concerning a number of topics are also available upon request.

OSU information is available via the Internet:

Main Page: http://osu.okstate.edu
Admission: http://admissions.okstate.edu
Catalog: http://registrar.okstate.edu/Catalogs/Catalog.html
Schedule: http://registrar.okstate.edu/ClassSchedule/ClassSchedule.html

The summer and fall class schedules are available in February and the spring class schedule in October and each may be obtained via the Internet at the link above.

An application packet and viewbook, with information for prospective students on admission, residence halls, financial aid, scholarship, and the Honors College, is available from the Office of Undergraduate Admissions.

The OSU *Catalog* may be obtained by new students in the form of a CD, free of charge, during their new student orientation session prior to their first semester at OSU. Other persons may purchase the *Catalog* through the Student Union Bookstore by mail. The current catalog is made available at the website address above prior to the beginning of the fall term.

To purchase a copy of the OSU *Catalog* contact the Student Union Bookstore at **1-800-831-4678**. The domestic rate is $8.00 (includes $5.00 for the *Catalog* and $3.00 for first class/priority postage). The international rate is USD ($5.00 for the *Catalog* plus actual postage costs.

In addition to these publications, many of OSU's colleges, schools and departments have printed material concerning their programs. Contact the individual departments for specific information.

Photographs are courtesy of various OSU administrative offices and colleges. Cover artwork courtesy of University Marketing.

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Message From The President

Welcome to Oklahoma State University!

We are delighted you are pursuing your higher education degree at OSU.

This catalog shows the incredible breadth of academic offerings available to you at OSU. With more than 350 undergraduate and graduate degrees and options, as well as professional degree programs in medicine and veterinary medicine, OSU provides outstanding choice and value at a comprehensive research university.

Oklahoma State University is proud of its heritage as one of our nation's land-grant universities and remains fully committed to the land-grant mission of teaching, research and outreach. Today, we have a bold vision of a modern land-grant university; one that cuts across disciplines to form a truly new structure. We envision a creative, innovative, collaborative learning environment that better prepares students for future success.

We are glad you are here at Oklahoma State University and wish you all the best as you prepare for a world of possibilities.

Sincerely,

V. Burns Hargis
President of Oklahoma State University

The Administration

OKLAHOMA STATE REGENTS FOR HIGHER EDUCATION

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Julie Carson - *Secretary, Claremore*
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Bill W. Burgess Jr. - *Member, Lawton*
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Dr. Glen D. Johnson - *Chancellor*

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Dr. W. Douglas Wilson - *Executive Secretary, Edmond*

OSU SYSTEM EXECUTIVE TEAM

V. Burns Hargis, JD - *President*
Marlene I. Strathe, PhD - *Provost and Senior Vice President, Academic Affairs*
Joseph Alexander, DVM - *President, Center for Innovation and Economic Development*
Lee E. Bird, PhD - *Vice President for Student Affairs*
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Gary C. Clark, JD - *Vice President for University Relations*
Mike Holder, MBA - *Vice President for Athletic Programs and Director, Intercollegiate Athletics*
Kirk Jewell, PhD - *President and CEO, OSU Foundation*
Stephen W.S. McKeever, PhD - *Vice President for Research and Technology Transfer*
Larry Shell - *President, OSU Alumni Association*
Robert Whitson, PhD - *Vice President for Agricultural Programs and Dean of the Division of Agricultural Sciences and Natural Resources*

ACADEMIC DEANS

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Sara M. Freedman, PhD - *Dean of the William S. Spears School of Business*
Pamela G. Fry, PhD - *Dean of the College of Education*
Sheila G. Johnson, MLS - *Dean of Libraries*
Michael D. Lorenz, DVM - *Dean of the College of Veterinary Health Sciences*
Karl N. Reid, ScD - *Dean of the College of Engineering, Architecture and Technology*
Peter M.A. Sherwood, PhD, ScD - *Dean of the College of Arts and Sciences*
Robert Whitson, PhD - *Dean of the Division of Agricultural Sciences and Natural Resources and Vice President for Agricultural Programs*
Stephan M. Wilson, PhD - *Dean of the College of Human Environmental Sciences*

Selected administrators directly responsible for academic and service programs for students:

Laurie Beets, MS - *Bursar*
Charles W. Bruce, PhD - *Director of Scholarships and Financial Aid*
K. Celeste Campbell, PhD - *University Registrar*
Robert E. Graalman, PhD - *Director of Scholar Development and Recognition*
Robert L. Spurrier, PhD - *Director of The Honors College*
Kyle Wray, MA - *Associate Vice President for Enrollment Management and Marketing*

University Academic Calendar

Add, drop, withdrawal and refund dates listed below are for courses that extend through the entire term. Proportionate dates apply to block and short courses. See the class schedule page of the Registrar Web site (http://registrar.okstate.edu).

2009-2010 and 2010-2011*

	FALL 2009	SPRING 2010	SUMMER 2010 (8 wk session #2)	FALL 2010	SPRING 2011	SUMMER 2011 (8 wk session #2)
Late enrollment fee assessed after this date	Aug. 14	Jan. 8	June 4	Aug. 20	Jan. 7	June 3
Class work begins	Aug. 17	Jan. 11	June 7	Aug. 23	Jan. 10	June 6
University Holiday (spring)		Jan. 18			Jan. 17	
Last day to add a course (nonrestrictive)	Aug. 24	Jan. 19	June 9	Aug. 30	Jan. 18	June 8
Last day to drop a course with 100% refund and no grade	Aug. 24	Jan. 19	June 9	Aug. 30	Jan. 18	June 8
Last day to withdraw from all courses with 100% refund and no grade	Aug. 24	Jan. 19	June 9	Aug. 30	Jan. 18	June 8
Last day to add a course (restrictive: requires instructor and adviser approval)	Aug. 28	Jan. 22	June 11	Sep. 3	Jan. 21	June 10
Last day to drop a course with 50% refund and grade of "W"	Aug. 28	Jan. 22	June 11	Sep. 3	Jan. 21	June 10
Last day to withdraw from all courses with 50% refund (withdrawal noted on transcript)	Aug. 28	Jan. 22	June 11	Sep. 3	Jan. 21	June 10
University Holiday (fall)	Sep. 7			Sep. 6		
Six week grades due from faculty	Sep. 29	Feb. 23		Oct. 5	Feb. 22	
Students' Fall Break	Oct. 9			Oct. 15		
Students' Spring Break		Mar. 15-19			Mar. 14-18	
Deadline to file diploma application (for name to appear in **fall** commencement program)	Nov. 2			Nov. 1		
Deadline to file diploma application (for name to appear in **spring** commencement program)		April 1	April 1 (2010)		April 1	April 1 (2011)
University Holiday (summer)			July 5			July 4
Last day to drop a course (grade of "W") drop by petition only after this date	Nov. 6	April 9	July 16	Nov. 12	April 8	July 15
Last day to withdraw from all courses with automatic grade of "W"	Nov. 6	April 9	July 16	Nov. 12	April 8	July 15
Last day to withdraw from all courses with assigned grades of "W" or "F"	Nov. 20	April 23	July 23	Dec. 3	April 22	July 22
Students' Thanksgiving break	Nov. 25-27			Nov. 24-26		
University Holiday (fall)	Nov. 26-27			Nov. 25-26		
Pre-Finals Week	Nov. 30-Dec. 4	Apr. 26-30		Dec. 6-10	Apr 25-29	
Class work ends	Dec. 4	April 30	July 30	Dec. 10	April 29	July 29
Final examinations	Dec. 7-11	May 3-7		Dec. 13-17	May 2-6	
Commencement weekend	Dec. 11-12	May 7-8		Dec. 17-18	May 6-7	
Grades due electronically from faculty	Dec. 15	May 11	Aug. 3	Dec. 21	May 10	Aug. 2
University Holiday (fall)	Dec. 24-Jan. 1			Dec. 24-Jan. 2		
INTERSESSIONS AND PRESESSIONS						
Fall Presession	Aug. 3-14			Aug. 2-20		
Winter Intersession		Dec. 14-Jan. 8			Dec. 20-Jan.7	
Summer Pre-session (summer session #1)			May 17-June 4			May 16-June 3
SUMMER 4-WEEK SESSIONS						
4-week session (summer session #3)			June 7-July 2			June 6-July 1
4-week session (summer session #4)			July 6-July 30			July 5-29

*tentative

The University

The Mission

Proud of its land-grant heritage, Oklahoma State University advances knowledge, enriches lives, and stimulates economic development through instruction, research, outreach and creative activities.

The History

Oklahoma State University was founded on December 25, 1890, as Oklahoma Agricultural and Mechanical College, just twenty months after the Land Run of 1889. When the first students assembled for class on December 14, 1891, no buildings, books or curriculum existed. Since its beginning as a land-grant institution, OSU has held true to the land-grant mission of instruction, extension and research.

In 1894, two and one-half years after classes began in local churches, 144 students moved into the first academic building, later named Old Central, still located on the southeast corner of campus. In 1896, Oklahoma A&M held its first commencement with six male graduates.

On July 1, 1957, Oklahoma A&M College became Oklahoma State University. Technical branches were established in Okmulgee in 1946 and in Oklahoma City in 1961. In 1990 these two technical branches were renamed OSU-Okmulgee and OSU-Oklahoma City. OSU-Tulsa was formed from a consortium of universities that were originally established in 1982. In July of 1988, the Oklahoma College of Osteopathic Medicine and Surgery (in Tulsa) became the College of Osteopathic Medicine of OSU. In 2001, it became part of the OSU Center for Health Sciences which also has an affiliation with its primary teaching hospital, the OSU Medical Center.

OSU is located in Stillwater, a north-central Oklahoma community with a population of more than 45,000. Stillwater is approximately 60 miles from the Tulsa and Oklahoma City metropolitan areas and is readily accessible from other major population centers by interstate highway and air.

This coeducational University has an enrollment of over 32,000 students on five campuses. It offers bachelor's, master's and doctor's degrees in a large number of fields, as well as the professional Doctor of Osteopathic Medicine and Doctor of Veterinary Medicine degrees. Specialist in Education degrees are also offered in selected fields.

Although OSU is a large, comprehensive university, its size does not minimize the personal attention given to each student. The individual is more than just a number at this university. OSU encourages all students, when they first enroll, to identify the college in which they wish to major. Once the student has identified his or her major department, he or she becomes a very important individual to the faculty and advisers of that department. Because the average number of students majoring in any one department is less than 150, the student can count on personal attention in a friendly environment.

As a comprehensive land-grant institution, OSU offers students many distinct advantages. It has 2 million volumes in the library, modern research laboratories and equipment, excellent physical education, recreation and student union facilities, nationally-recognized residence halls programs, outstanding cultural events, and 36 nationally-affiliated fraternities and sororities that provide a stimulating educational and social environment.

Student Profile

Oklahoma State University has a diverse student body. Students come not only from Oklahoma, but from across the nation and world. Of OSU's more than 32,000 students, approximately 71 percent are on the Stillwater campus, (including students at the Center for Veterinary Health Sciences). The remaining student population is spread throughout the OSU System's four campuses: OSU-Oklahoma City, OSU Institute of Technology (formerly OSU-Okmulgee), OSU-Tulsa and the OSU Center for Health Sciences in Tulsa. Eighty-one percent of the undergraduate enrollment is from Oklahoma; 16 percent from other states; and three percent from 114 foreign countries. Of the undergraduate population, 52 percent are men and 48 percent are women. Minorities make up approximately 20 percent of the undergraduate student body. The graduation rate of full-time, degree-seeking undergraduate students is 60 percent.

There are more than 4,400 graduate students throughout the OSU System. Of those, 52 percent are from Oklahoma; 20 percent from other states; and 28 percent from foreign countries. Fifty-four percent of graduate students are men and 46 percent are women. Minorities make up 40 percent of the graduate student body.

An annual report regarding gender equity in OSU's athletic programs is available upon request from the Athletic Department.

Research

Research has been one of the three essential components of the OSU mission since the University's inception. It adds richness and depth to the other mission components of teaching and outreach. Research findings improve quality of life by bringing new products, processes and medicines to the marketplace. Research through innovation is the engine that drives economic development. Research through the social sciences and humanities improves our well being. Research through creative artistry enhances our view and appreciation of the world.

Research at OSU also focuses on critical national and state initiatives. Long before the tragic events of September 11, 2001, OSU researchers were engaged in sensor-related research that would protect food, environment and first responders. OSU was already positioned to respond to a national research effort, so the 2002 Oklahoma Legislature allocated $19 million over a four-year period for research in homeland security. OSU used these funds to build infrastructure, renovate and build laboratories, purchase equipment and hire new faculty. OSU has also leveraged these funds with external monies to augment existing capabilities. Currently, the return on the state investment is approximately 4:1. This success has been pivotal in allowing OSU to create the new sensor testing and evaluation facility at the University Multispectral Laboratories (see next page).

OSU's researchers are engaged in research across the full spectrum of human endeavor and inquiry. Research in plant and animal science places OSU at the forefront of agricultural biotechnology research.

OSU researchers participate in initiatives to understand and advance the role of sustainability in all aspects of our lives. Research into many aspects of aerospace, from control engineering to human space flight, enables OSU to support the growing aerospace economy of the state. These and many other research areas are currently active within our university community, each contributing to the enhancement of the quality of all our lives.

The Office of Vice President for Research and Technology Transfer (www.vpr.okstate.edu) administers research across the OSU System. This office is responsible for a number of units and activities, as follows:

The Oklahoma Technology and Research Park (www.oktechpark.com) is an initiative of OSU, Meridian Technology Center, and the City of Stillwater. The 160-acre Park is uniquely designed for collaboration among tenants while providing custom facilities for technology-based or knowledge-driven companies in all stages of development. The Park's first tenant has expanded its original facilities and is currently expanding once again into the Venture I multi-tenant building. The latter building now consists of OSU labs and three private sector labs. The Park has recently completed the Michael S. Morgan Accelerator Building, a facility created to support technology-based economic development in the region. Plans continue to expand the Park's facilities and capabilities.

The Office of Intellectual Property Management (www.vpr.okstate.edu/ipm) manages OSU's innovative technologies and other intellectual property for the benefit of the University and the public. In carrying out this mission, personnel work with faculty, staff, administrators and students to protect OSU's intellectual property and license it to commercial firms.

The Office of University Research Compliance (http://compliance.vpr.okstate.edu) ensures compliance with federal, state and University regulations that set forth requirements for the responsible conduct of research. Working through faculty committees, it oversees research involving human subjects, animal models, radiological materials, certain hazardous agents and recombinant DNA.

The Office of University Research Services (www.research.okstate.edu) is the document control center for the routing of all proposals and awards throughout the University. It provides support to faculty and staff (through information about funding opportunities, and training seminars), posts online research expenditure, abstracts and video highlights; and provides guidance for compliance with federal export control regulations that govern the conduct of research and export of specific technologies that may have an impact on national security and trade.

The Institute for Sustainable Environments (http://environ.okstate.edu) promotes sustainable development through interdisciplinary research. It strives to bring the expertise of diverse disciplines to bear on today's most difficult environmental problems through identifying environmental research needs and funding opportunities, coordinating collaborative research teams and facilitating proposal preparation. The Institute is also home to the Oklahoma Water Resources Research Institute, which sponsors water-related research in Oklahoma. In addition, the Environmental Institute sponsors conferences, speakers, publications and environmental awards.

The OSU Center for Health Sciences (www.healthsciences.okstate.edu) includes several comprehensive professional and graduate programs. The College of Osteopathic Medicine enrolls approximately 360 medical students in Tulsa and another nearly 200 medical interns and residents located at its affiliated hospital, Oklahoma State University Medical Center (formerly known as Tulsa Regional Medical Center) and other health centers across Oklahoma and Arkansas. The Center for Health Sciences also has approximately 70 students enrolled in graduate programs (Biomedical Science, Forensic Sciences and Health Care Administration), offering PhD, MS and MFSA as well as combination degrees such as DO/PhD and DO/MBA. OSU-CHS began administering the Health Care Administration Master's program in July of 2006. Comprehensive Centers for Integrative Neuroscience as well as Biomedical Diagnostics have been established, with many biomedical science and clinical faculty members actively engaged in independent and collaborative research in a variety of biomedical disciplines.

The University Multispectral Laboratories (UML) are a self-supporting "trusted agent" Research, Development, Test, and Evaluation (RDT&E) complex certifying a wide variety of fully tested and reliable sensor and security systems for government, industry, and academia. The UML is uniquely positioned to fuse academic, technical, and tactical perspectives for RDT&E systems integration to better advance transitional technology from bench top to the end user. The UML has comprehensive capabilities for Homeland Security and Defense that include:

- Chemical, Biological, Radiological, Nuclear, Explosives (CBRNE)
- Command, Control, Communications, Computers and Intelligence for Surveillance and Reconnaissance (C4ISR)
- Biometrics

The UML also provides a wide variety of sensor RDT&E service capabilities for domestic and international industries that include:

- Petrochemical and refining
- Agricultural
- Aerospace

The Center for Innovation and Economic Development (CIED) is responsible for working with both the public and private sectors to provide expansion of the economy especially in rural Oklahoma. CIED manages large-scale and classified research contracts and grants, as it holds security clearance for the University's classified research. It is the contracting unit of the University that participates in the Oklahoma Technology and Research Park.

—Research Centers. OSU has multiple research centers and facilities throughout the state. For detailed information, consult the Internet www.vpr.okstate.edu/researchcenters.htm.

—Oak Ridge Associated Universities. Since 1980, students and faculty of Oklahoma State University have benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of 96 colleges and universities and a contractor for the U.S. Department of Energy (DOE) located in Oak Ridge, Tennessee. ORAU works with its member institutions to help their students and faculty gain access to federal facilities throughout the country; to keep its members informed about opportunities for fellowship, scholarship and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education (ORISE), the DOE facility that ORAU operates, undergraduates, graduates, postgraduates, as well as faculty enjoy access to a multitude of opportunities for study and research. Students can participate in programs covering a wide variety of disciplines including business, earth sciences, epidemiology, engineering, physics, geological sciences, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry and mathematics. Appointment and program length range from one month to four years. Many of these programs are especially designed to increase the number of underrepresented minority students pursuing degrees in science- and engineering-related disciplines. A comprehensive listing of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the *ORISE Catalog of Education and Training Programs*, which is available at www.orise.orau.gov/index.htm, or by calling either of the contacts below. ORAU's Office of Partnership Development seeks opportunities for partnerships and alliances among ORAU's members, private industry and major federal facilities. Activities include faculty development programs, such as the Ralph E Powe Junior Faculty Enhancement Awards, the Visiting Industrial Scholars Program, consortium research funding initiatives, faculty research and support programs as well as services to chief research officers.

For more information about ORAU and its programs, contact:

Stephen W.S. McKeever
Vice President for Research and Technology Transfer
ORAU Councilor for Oklahoma State University

Monnie E. Champion
ORAU Corporate Secretary
(865-576-3306); or
Visit the ORAU home page at www.orau.org

Outreach

International Education and Outreach

Oklahoma State University's legacy as a land-grant institution has produced a long history of active engagement with state, national, and international communities beginning in 1950 when OSU President Henry Bennett was appointed Director of President Truman's Point IV Program (currently USAID). Today the OSU student body represents more than 110 countries and its academic instruction, research and service activities.

Continuing its commitment to provide superior internationalization strategies and outreach programs and services, OSU formed the Office of International Education and Outreach (IE&O). IE&O endeavors to provide for the timely exchange of knowledge between the university and society; to facilitate the integration of instruction, discovery, and service; to implement international education strategies; to use OSU faculty and staff expertise; to deliver responsive and innovative programs; to apply new modes of learning and technologies; and to pursue quality of service, accountability, and efficiency. The office of the Director of IE&O - http://ieo.okstate.edu - is responsible for the following units and activities:

The School of International Studies (http://sois.okstate.edu) dedicated in April 1999, is an interdisciplinary and multifaceted unit that draws resources from OSU Stillwater's eight academic colleges/schools. The rich multicultural and multidisciplinary expertise at OSU is reflected by the diversity in professional experience and academic disciplines of more than 145 faculty members who contribute to the School. Faculty members extend themselves above and beyond the academic disciplines they represent to demonstrate their commitment to internationalizing OSU. School components include:

Graduate Program offers the Master of Science in International Studies, the Master's International Program (MIP), and the Certificate of International Studies. The MS is an interdisciplinary degree program drawing on the resources of OSU's academic colleges/schools. The program's five focus areas include International Trade and Development; International Business and Economic Relations; International Human Development, Society and Education; Preservation of Environmental and Ecological Resources; and Culture, Heritage, and Tourism Development. The Master's International Program (MIP) provides the opportunity to incorporate Peace Corps service into the MS in International Studies degree plan with academic credit being granted for Peace Corps service. The Certificate of International Studies enables students or working adults who have completed a bachelor's degree at OSU or another accredited university to receive a graduate certificate by taking selected international-focused graduate courses.

Study Abroad programs offer students the opportunity to experience different people, languages, and customs and to gain essential global competence. OSU has a goal that every undergraduate student will have a study abroad experience. The OSU Study Abroad Office provides individualized study abroad advising; information on financial aid, grants and scholarships; a comprehensive reference library of study and travel materials; liaison between international universities and study abroad students; orientations for inbound and outbound students and their families; study abroad fairs and seminars; national student exchange advising; speakers bureau for campus and community needs; and a mentor program for international and study abroad students.

International Outreach serves as an international resource center to support the needs of public and private sectors, both locally and globally. Activities support state economic growth by providing outreach programs and services in support of the Oklahoma International Strategic Plan, which includes building a global network of contacts and relationships that extend the influence of OSU and Oklahoma worldwide. OSU maintains agreements with over 150 countries worldwide. Each year internationally known speakers are brought to campus for the Global Briefing Series and the Wes Watkins Distinguished Lectureship. The School also maintains Country Focus Areas that actively pursue and support academic, cultural, and business exchanges between various countries and Oklahoma. Primary goals include increasing the number of international students attending OSU; increasing and expanding teaching, training, and research opportunities for OSU faculty and staff; and increasing and expanding study abroad and other academic exchange programs with world neighbors.

English Language Institute is an intensive English program designed to help non-native English speakers achieve the level of proficiency necessary to begin their studies at the university level. The program is also suitable for individuals who wish to learn English for business or personal reasons. English language and culture programs can be tailored to meet the needs of educational institutions, businesses, and government sponsoring agencies. The Institute can also partner with OSU academic departments to provide noncredit programs with English as a Second Language component.

Fulbright Resource Center introduces students and faculty to the variety of opportunities offered by the Fulbright Program and helps them prepare successful application proposals. Fulbright is the largest U.S. international exchange program offering opportunities for students, scholars, and professionals to undertake international graduate study, advanced research, university teaching, and teaching in elementary and secondary schools worldwide.

Phi Beta Delta is the first honor society in the U.S. dedicated to recognizing scholarly achievement in international education. The mission of the OSU Epsilon Upsilon Chapter of Phi Beta Delta, chartered in 2003, is to serve as a means of encouraging interdisciplinary international programming and promoting the exchange of information among a network of faculty, staff, and students involved in international endeavors.

OSU-Mexico Liaison Office (MLO) established in 2006, promotes and supports academic programs in Mexico to increase the number of OSU students abroad, advances bilateral exchanges between the United States and Mexico and promotes OSU in Mexico to increase the number of Mexican students attending OSU. The MLO supports OSU academic units and departmental programs and contacts in Mexico; connects OSU to Mexican universities, institutions and governmental entities; and hosts or co-hosts students, faculty and administrators in Mexico and Oklahoma to promote collaboration and better cultural understanding between our nations.

—Independent Study (http://is.okstate.edu/) utilizes a variety of media, to provide higher education learning opportunities for individuals across the state, nation, and world. Students may enroll any day of the year that campus offices are open and have one year to complete their course work. In addition, campus-based students may enroll in semester long courses when scheduling conflicts make it difficult to attend on-campus classes.

—Academic Outreach (http://osuoutreach.okstate.edu) activities offered by OSU academic colleges and IE&O, enable students away from campus, as well as those on campus, to enroll in distance learning Master's programs, a number of online undergraduate courses, study abroad opportunities, and a diverse array of noncredit training opportunities for business executives, engineers, school teachers, day care workers, health care personnel, etc. Outreach programs and services flow

primarily from decentralized program units and are delivered by college faculty, adjunct faculty and staff.

—The Wes Watkins Center Conference and Meeting Services (http://wwc.okstate.edu) is available for rent to businesses, organizations, and individuals for meetings, conferences, and teleconferences - all at attractive rates. Facilities include an auditorium, exhibit hall, tiered seminar rooms, and break-out rooms. All rooms are enclosed to offer maximum privacy. For more information about the services see the Web site above.

For more information about IE&O, contact:

James G. Hromas, Director
International Education & Outreach
(405) 744-6606
or visit the IE&O Web site at http://ieo.okstate.edu

General Education

Oklahoma State University is committed to producing graduates who have a depth of knowledge in their major fields of study and a breadth of general knowledge to address issues in a complex society. OSU graduates have a mastery of a specific subject matter and solid, diversified general education. With a commitment to breadth in general education, the following philosophy was adopted in 2001.

General Education at Oklahoma State University provides students general knowledge, skills and attitudes conducive to lifelong learning in a complex society. Specifically, general education at Oklahoma State University is intended to construct a broad foundation for the student's specialized course of study; develop the student's ability to read, observe and listen with comprehension; enhance the student's skills in communicating effectively; expand the student's capacity for critical analysis and problem solving; assist the student in understanding and respecting diversity in people, beliefs and societies; and develop the student's ability to appreciate and function in the human and natural environment.

General education courses are aligned with one of four content areas: analytical and quantitative thought (A), humanities (H), natural sciences (N), and social and behavioral sciences (S). In addition, OSU students must participate in an international dimension course (I) and in natural sciences courses that include a lab component and have a scientific investigation (L) designation. As of Fall 2008, all new students are required to complete a diversity (D) course. A course is qualified to be part of the general education curriculum if it meets the needs of students in all disciplines without requiring extensive specialized skills and satisfies all the criteria for a specific general education area. The criteria for each general education area follow:

Analytical and quantitative thought (A) courses incorporate the study of systems of logic and the mathematical sciences and place primary emphasis on the development of the intellect through inductive and/or deductive processes. Their aim is broader than proficiency in techniques and includes appreciation of how the processes can supplement intuition and provide ways to analyze concrete problems. Goals of "A" courses are to prepare students to critically analyze and solve problems using quantitative, geometric or logical models; form inferences using logical systems and mathematical information and communicate them in writing; give appropriate multiple representations (symbolical, visual, graphical, numerical or verbal) of logical or mathematical information; and estimate, analyze, or check solutions to problems to determine reasonableness, alternative solutions, or to determine optimal methods or results.

Diversity (D) courses emphasize one or more socially constructed groups (e.g. racial, ethnic, religious, gender, age, disability, sexual orientation) in the United States. Goals of "D" courses are to prepare students to critically analyze historical and contemporary examples of socially constructed groups in American society or culture and the distribution of political, economic, and/or cultural benefits and opportunities afforded to these groups; to understand how these groups relate to the student's academic discipline and American culture; and demonstrate their understanding through written work that provides them the opportunity to enhance their writing skills.

Humanities (H) courses concentrate on the expression, analysis and interpretation of ideas and the aesthetics or values that have formed and informed individuals and societies; and emphasize diversity in the expression of human ideas and aesthetic or cultural values. Goals of "H" courses are to prepare students to critically analyze the relationships of aesthetics, ideas, or cultural values to historic and contemporary cultures; develop an understanding of how ideas, events, arts or texts shape diverse individual identities; and demonstrate their understanding through written work that provides them the opportunity to enhance their writing skills.

Contemporary international culture (I) courses emphasize contemporary cultures outside the United States. Goals of "I" courses are to prepare students to critically analyze one or more contemporary cultures external to the United States; understand how contemporary international cultures relate to complex, modern world systems; and demonstrate their understanding through written work that provides them the opportunity to enhance their writing skills.

Scientific investigation (L) courses include the equivalent of at least one semester credit hour of laboratory experience aimed at interpreting scientific hypotheses and emphasize scientific inquiry and experimental methodology. Goals of "L" courses are to prepare students to critically analyze scientific problems, formulate hypotheses, conduct appropriate experiments, and interpret results; solve problems using scientific inquiry and experimental methodology; communicate procedures, results and conclusions to others; and demonstrate their understanding through written work appropriate to the discipline that provides them the opportunity to enhance their writing skills.

Natural science (N) courses feature the systematic study of natural processes, and the mechanisms and consequences of human intervention in those processes; and place primary emphasis on the subject matter of one or more basic physical or biological sciences in a broadly integrative fashion. Goals of "N" courses are to prepare students to understand the scientific inquiry process; critically analyze the physical world using the language and concepts of science; use the methodologies and models of science to select, define, solve, and evaluate problems in biological and physical sciences; evaluate evidence, interpretations, results, and solutions related to the physical and biological sciences; understand the consequences of human intervention in natural processes and mechanisms; and demonstrate their understanding through written work appropriate to the discipline that provides them the opportunity to enhance their writing skills.

Social and behavioral sciences (S) courses propose theoretical constructs to explain human behavior and society in social and/or physical environments; and are based on empirical observation of human behavior rather than the study of aesthetics, ideas or cultural values. Goals of "S" courses are to prepare students to critically analyze generalizations about society and explore theoretical structures; understand the role of empirical observation in the social and behavioral structures; and demonstrate their understanding through written work that provides them the opportunity to enhance their writing skills.

Accreditation

Oklahoma State University is accredited by the Higher Learning Commission (HLC) (A Commission of the North Central Association of Colleges and Schools), and programs within the colleges are also accredited. (The HLC may be reached at 30 N. LaSalle Street, Suite 2400, Chicago, IL 60602, phone (800) 621-7440. The Internet address is www.ncahigherlearningcommission.org.

In the *College of Agricultural Sciences and Natural Resources*, the forestry curriculum is accredited by the Society of American Foresters. The landscape architecture program (Bachelor of Landscape Architecture) is accredited by the American Society of Landscape Architects. The landscape contracting program is certified by the Association of Landscape Contractors of America. In addition, the College's professional education program in agricultural education is accredited by the Oklahoma State Department of Education, and the Oklahoma State Department of Vocational-Technical Education. The Biosystems Engineering program is accredited by ABET as a component of associated engineering programs in the College of Engineering, Architecture and Technology.

In the *College of Arts and Sciences*, the chemistry program is accredited by the American Chemical Society; the program in communication sciences and disorders is accredited by the American Speech-Language-Hearing Association; the School of Journalism and Broadcasting, which offers programs in advertising, broadcast journalism, news editorial, public relations, and sports media, is accredited by the Accrediting Council on Education in Journalism and Mass Communications (ACEJMC); the Clinical Laboratory Sciences program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences; the music department is accredited by the National Association of Schools of Music; the program in clinical psychology is accredited by the American Psychological Association; and the theatre department is accredited by the National Association of Schools of Theatre.

In the *College of Education*, the aviation programs are accredited by the Federal Aviation Administration. OSU was the first university in Oklahoma with a program that received this designation. The counseling psychology and school psychology programs are both accredited by the American Psychological Association. The school counseling and community counseling programs are accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). The school psychology program is also accredited by the National Association of School Psychologists. The leisure studies program is accredited by the National Recreation and Park Association in partnership with the American Association for Leisure and Recreation, with accredited options in leisure service management and therapeutic recreation. Athletic training is accredited by The Commission on Accreditation of Athletic Training Education (CAATE). All professional education programs are accredited by the National Council for Accreditation of Teacher Education. Technical and industrial education is accredited by the Oklahoma State Department of Career and Technical Education.

In the *College of Engineering, Architecture and Technology*, bachelor's degree programs are accredited by nationally recognized accreditation organizations. Programs in aerospace engineering, architectural engineering, biosystems engineering, chemical engineering, civil engineering, electrical engineering, industrial engineering and management, and mechanical engineering are accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc., 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, phone (410) 347-7700, e-mail: accreditation@abet.org. Programs in construction management technology, electrical engineering technology, fire protection and safety technology, and mechanical engineering technology are accredited by the Technology Accreditation Commission (TAC) of ABET, Inc., (address above). The program in architecture is accredited by the National Architectural Accrediting Board (NAAB), Accreditation Director, National Architectural Accrediting Board, 1735 New York Ave. NW, Washington D.C. 20066, phone (202) 783-2007.

Programs culminating in a baccalaureate degree in the *College of Human Environmental Sciences* are accredited by specialized accreditation organizations. The Council for Interior Design Accreditation (CIDA) has accredited the undergraduate interior design program. The pre-production and the production management apparel curricula has received approval from the American Apparel and Footwear Association (AAFA), one of only 13 approved four-year programs in North America. The Child Development Laboratory is licensed by the state of Oklahoma Department of Human Services (DHS) and has received a Three Star Differential Quality Certification from the Department of Human Services. The Child Development Lab is also accredited by the accrediting branch of the National Association for the Education of Young Children (NAEYC). Program approval has been granted to the early childhood education program by the Oklahoma State Board of Education. The Early Childhood Education program is accredited by the National Council for the Accreditation of Teacher Education (NCATE). The Marriage and Family Therapy program is accredited by the Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE) of the American Association for Marriage and Family Therapy. The Didactic Program in Dietetics (DPD) and the Dietetic Internship program at OSU are both accredited by the Commission on Accreditation for Dietetics Education (CADE) of The American Dietetic Association. The School of Hotel and Restaurant Administration is accredited by the Accreditation Commission for Programs in Hospitality Administration (ACPHA).

The *William S. Spears School of Business* is fully accredited by AACSB International - The Association to Advance Collegiate Schools of Business, the premier accrediting agency for bachelor's, master's and doctoral degree programs in business administration and accounting. AACSB International accreditation represents the highest standard of achievement for business schools, worldwide. Institutions that earn accreditation confirm their commitment to quality and continuous improvement through a rigorous and comprehensive peer review process.

The *Center for Veterinary Health Sciences* is fully accredited by the American Veterinary Medical Association. The Oklahoma Animal Disease Diagnostic Laboratory is accredited by the American Association of Veterinary Laboratory Diagnosticians, and the Boren Veterinary Medical Teaching Hospital is accredited by the American Animal Hospital Association.

Programs at OSU's branch campuses have also received accreditation from national agencies.

The *College of Osteopathic Medicine at the Center for Health Sciences* is accredited by the Commission on Osteopathic College Accreditation (COCA) of the American Osteopathic Association.

OSU-Oklahoma City is accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools. In addition, other programs are accredited or certified by the following institutions: National Association for the Education of Young Children, State Health Department for Emergency Medical Technicians, Council on Law Enforcement Education and Training, National League for Nursing Accrediting Commission, 61 Broadway, 33rd Floor, New York, NY 10006, (212) 363-5555, Oklahoma Board of Nursing, American Veterinary Medical Association.

OSU Institute of Technology, Okmulgee is accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools. In addition, programs in automotive service technology and automotive collision repair technology are nationally certified by the National Automotive Technicians Education Foundation, Inc. (NATEF). The Orthotics and Prosthetics program is accredited by the National Commission on Orthotics and Prosthetics Education (NCOPE). The National League for Nursing Accreditation Commission, 61 Broadway, 33rd Floor, New York, NY 10006, (212) 363-5555, and the Oklahoma Board of Nursing both accredit the Nursing program. At the Bachelor of Technology level, the Information Assurance and Forensics program is ABET accredited by the Commission on Computing.

Programs at *OSU-Tulsa* are fully accredited by the Higher Learning Commission, carrying the same accreditation as programs on the Stillwater campus. Refer to individual colleges for the specific agencies.

Refer to the appropriate college sections in this *Catalog* for further information on accreditation of specific programs.

Athletics Program Mission

Oklahoma State University is committed to providing regionally and nationally competitive athletics programs as an integral part of the overall educational mission of the University. Sponsored programs comply with the highest recognized standards of the institution and the athletic governing bodies. Intercollegiate athletics operate in harmony with the University's stated mission and are committed to the intellectual, cultural, physical and social development of the student-athletes as individuals. Opportunities for student-athletes are provided without discrimination. OSU is a member of the highly competitive Big 12 Conference.

Facilities

The OSU campus is one of exceptional beauty, with modified Georgian style architecture in many of the buildings. The main campus encompasses 840 acres and more than 200 permanent buildings. These facilities include the Edmon Low Library, ranked first in the state of Oklahoma and one of the largest libraries in the entire Southwest. Other facilities include one of the nation's largest Student Unions, the Noble Research Center, the Bartlett Center for the Visual Arts and the Seretean Center for the Performing Arts.

In 2006, OSU launched its campus Master Plan 2025, calling for more than $850 million in projects to improve facilities in four areas: academics, student life, infrastructure and athletics. The historic and far-reaching plan is transforming the OSU campus.

The North Classroom Building, a joint project between OSU and Northern Oklahoma College and funded in part by the state's Higher Education Capital Bond Program, opened on the north side of the Stillwater campus in January 2009. The facility offers the latest in teaching technology and features an all-organic café.

The Multimodal Transportation Terminal and 1,100-space North Monroe Garage opened in the fall of 2008. The facilities provide a central point of contact for various modes of transportation serving the Stillwater and branch campuses, as well as the community and surrounding areas. Two-thirds of the funding for the facilities came from a Federal Transit Administration grant.

OSU started work in 2007 on its Interdisciplinary Science Research Building, the largest project in the state's Capitol Bond Program. The $70 million building will provide state-of-the-art laboratory space for a wide-range of disciplines and will encourage collaborative research. The facility is expected to be completed by Fall 2010.

Thanks to a gift from the Donald W. Reynolds Foundation, OSU is doubling the size of its School of Architecture building. Historic Old Central, built in 1894 and the first campus building, has been renovated and remodeled to house the Honors College. Murray Hall, which was built as a women's dormitory in 1933, has been renovated to house seven departments from the College of Arts and Sciences.

Other near-term projects in the Master Plan 2025 include new buildings for the William S. Spears School of Business and the College of Human Environmental Sciences. In addition, the OSU Student Union will undergo an $80 million facelift to greatly enhance facilities and services to students. In 1999, the Student Union added a new area for the Center for Services to Students. This area houses the offices of the Bursar, Registrar, Scholarship and Financial Aid, Undergraduate Admissions and University Academic Services in one convenient location to better serve students.

The renovation of the west end of Boone Pickens Stadium has expanded seating to 60,000 and created one of the premier collegiate football facilities in the country.

Prior to the launch of the Master Plan 2025, construction and renovation brought a number of enhancements to the campus. In 1995, Willard Hall was completely renovated and became home to the College of Education. Willard Hall was a 1939 vintage women's dormitory. For its efforts in the Willard Hall project, OSU received an architectural award for the historic preservation of the building.

The Robert M. Kerr Food and Agricultural Products Center, dedicated in 1996, undergirds the essential mission of the College of Agricultural Sciences and Natural Resources by allowing faculty and students the opportunity to investigate the ways and means of adding value to Oklahoma's raw foodstuffs.

The University opened its $31 million Advanced Technology Research Center within the College of Engineering, Architecture and Technology in 1997. This multidisciplinary building enhances the University's role of being a front runner in basic engineering and related research in a variety of fields that are relevant to Oklahoma, the United States and the world.

A renovation of the Classroom Building was completed in 1998. This building is the principal undergraduate classroom facility for the University. The Classroom Building remodeling effort gives students an updated facility with state-of-the-art teaching systems.

The first of four phases of apartments and suite-style accommodations for new student housing was completed in 2000. Phase II included family housing, apartments and suites and was completed in fall 2001. Phase III student housing opened in fall 2003 and the fourth phase of on-campus student housing was completed and opened in 2006. OSU expanded campus bus service for both the Stillwater community and the OSU-Stillwater campus to aid students, faculty and staff in their educationally related transportation needs.

In 2001, Gallagher-Iba Athletic Center was renovated to expand seating to approximately 13,000 for athletic, academic and entertainment activities. In 2004, a state-of-the-art academic center was built within the building.

Fall 2004 saw the reopening of the Colvin Recreation Center after a major renovation and expansion. The facility was originally constructed in the late 1960's, and was in need of modernization and more space. The project included a new outdoor pool, climbing wall, expanded workout and locker space, and indoor jogging track.

Improvements continue in the University's outdoor spaces as well. A series of landscape projects near student residential facilities has occurred in recent years. In the summer of 2005, the Edmon Low Library plaza was restored by installing a new surface on the main upper plaza and the lower area.

OSU is emerging as a leader in network computing resources. The University has applied the student technology fee in concert with other University resources to create a second-to-none networking system on campus that includes new computer laboratories, high speed inter-laboratory connectivity, and a virtually seamless interface to the Internet.

The Lake Carl Blackwell area, located eight miles west of Stillwater, is also owned by OSU. The area includes approximately 21,655 acres, including the 3,000-acre Lake Carl Blackwell that provides the water supply for OSU and the Stillwater community. It is also used for research activities, in addition to being a popular regional recreational area.

Additional properties include 1,900 acres in farm land and facilities in Payne County, as well as 2,900 acres and various structures devoted to research stations around the state.

Institutional Diversity

Jason F. Kirksey, PhD - *Interim Associate Vice President of Institutional Diversity*
Ivan Figueroa, EdD - *Director, Inclusion Center for Academic Excellence*
Jovette Dew - *Director, Diversity Academic Support*
Deborah Evers - *Director, Educational Talent Search*
Kay Porter - *Project Manager, OK-LSAMP*

408 Whitehurst • (405) 744-9154 • Web site: www.diversity.okstate.edu

The Office of Institutional Diversity focuses on the development of a more inclusive community of learners and leaders while striving to address all of the complexities that emerge. We value all voices in our community. We will serve every member of the OSU family.

Our Mission

To develop and support efforts that help the Oklahoma State University System achieve and maintain environments where all members are actively broadening their perspectives about differences; actively seeking to know individuals; actively including all members of the community in every aspect of the organization; and where students achieve academic excellence.

Key Action Steps

- Provide seminars, workshops, courses, and other activities that afford individuals (students, staff, faculty and community members) with opportunities to broaden their perspectives regarding differences and notions of inclusion.
- Recruit, retain, and provide internships for undergraduate and graduate students who actively promote the importance of an inclusively diverse community of learners and the world.
- Recruit and retain staff and faculty who actively promote the importance of an inclusively diverse community of learners and world.
- Promote and reward student academic excellence.
- Serve the surrounding communities in ways that actively promote the importance of an inclusively diverse community and world.
- Promote and reward student academic excellence.

At Oklahoma State University, we place great value on the differences of our people. Diversity in action should empower individuals to think and act in ways that will embrace and promote a more inclusive world.

The Division of Institutional Diversity begins its fifth year with an expanded team dedicated to better serving your needs. Each of our units will help us promote and sustain a more diversely inclusive community of learners at Oklahoma State University.

Please visit our Web site at www.diversity.okstate.edu for updates as our work continues to support the mission of this great University.

Affirmative Action

Oklahoma State University is committed to creating an environment for all students and employees that is fair and responsible—an environment where all members of the OSU community are treated with dignity and respect and distinctions are made on the basis of ability and performance. This commitment is based on our dedication to educational justice and the promise of each individual, as well as adherence to federal and state civil rights laws and University policies and procedures. It is the policy of OSU to be an equal opportunity University in all phases of operations, toward the attainment of the University's basic mission and goals.

OSU is committed to providing equal employment and educational opportunity on the basis of merit and in a manner which does not discriminate because of an individual's race, gender, national or ethnic origin, color, age, religion, disability, sexual orientation or veteran status. All students are provided equal educational opportunity in all phases of the academic program and in all phases of the student life programs. No known form of illegal discrimination and/or harassment will be condoned or tolerated. Procedures are in place that assures equal treatment and equal access to the facilities and educational benefits of the University for all the members of its community.

OSU also has a policy prohibiting sexual harassment of students, staff and faculty. The University subscribes to the principle of the dignity of all persons and their labors. In support of this principle, sexual harassment is condemned in the recruitment, appointment and advancement of employees and in the evaluation of students' academic performance. OSU is committed to promoting equal opportunity in employment and education for all persons within its constituency in an environment free from sexual harassment.

Respect for each member of the campus community is vital to the individual and community as a whole. OSU's Affirmative Action reflects the University's commitment to equal opportunity and nondiscrimination and complies with all applicable laws promoting equal educational and employment opportunity prohibiting unlawful discrimination.

The Office of Affirmative Action, 408 Whitehurst, may be contacted for information concerning unlawful discrimination and inquiries regarding OSU compliance with equal opportunity or affirmative action.

Title IX

Title IX of the Education Amendments and Oklahoma State University policy prohibit discrimination in the provision of services or benefits offered by the University based upon gender. Gender discrimination is unequal or disadvantageous treatment of an individual or group of individuals based on gender. Sexual harassment is a form of illegal gender discrimination. Any person (student, faculty or staff) who believes that discriminatory practices have been engaged in based upon gender may discuss their concerns and file informal or formal complaints of possible violations of Title IX with the OSU Title IX coordinator.

For more information, refer to the OSU Gender Discrimination/Sexual Harassment Policy & Title IX Grievance Procedure 1-0702, www.okstate.edu/osu_per/policy_proced.htm or contact the Office of Affirmative Action, 408 Whitehurst at (405) 744-9154.

Diversity Academic Support

Diversity Academic Support is a new unit in the Division of Institutional Diversity. Its mission is to provide resources and opportunities for academic, social, and emotional growth. This unit is engaged in

activities that are designed to help create a more inclusively diverse community of learners at OSU. DAS wants to work with all individuals interested in promoting this work. For more information, please contact DAS at (405) 744-2920 or contact by e-mail at diversityacadsupport@okstate.edu.

Diversity Education

The Diversity Education unit partners with colleges, departments and the OSU campuses in developing and implementing diversity education learning programs specific to their needs. For more information e-mail diversity@okstate.edu.

Educational Talent Search Program

The Educational Talent Search Program at Oklahoma State University is funded through the U.S. Department of Education. The program is designed to provide support and motivation to youths who have the potential for academic success and who meet government income requirements and/or whose parents have not graduated from college.

The Educational Talent Search program provides the following services: academic advisement, career counseling, college financial planning, college selection and admission, test preparation and score analysis, and tutoring. For more information on this program, contact OSU-ETS at (405) 744-4262.

ILP Program

The Inclusion Leadership Program (ILP) at OSU consists of a series of connected activities that will help OSU and students from high schools in Oklahoma City, Tulsa, and Stillwater to (1) broaden perspectives about themselves and others; (2) develop inclusive leadership skills; (3) increase knowledge regarding global networking; and (4) clear a pathway to successful living within a global society.

The Inclusion Leadership Program is a year-long leadership program designed to equip OSU students with the skills and knowledge to become effective leaders in a more diversely inclusive society. Students in the ILP program will share their understandings of leadership with teams of students selected from Classen and Northeast High Schools in Oklahoma City; Booker T. Washington and McLain High Schools in Tulsa; and Stillwater High School. The OSU and high school students will also be mentored by business leaders.

By becoming mentors to the high school students, the OSU students will be passing on what they are learning. They will be developing high school students to become leaders themselves. In essence, leaders will be developing leaders. For additional information on the ILP program, contact the coordinator by e-mail at diversityacadsupport@okstate.edu.

Inclusion Center for Academic Excellence

The Inclusion Center for Academic Excellence takes a holistic approach to empower Oklahoma State University students to think and act in ways that will embrace and promote a more inclusive world. The Inclusion Center for Academic Excellence actively promotes an inclusive approach to diverse ideas and perspectives that all students achieve academic excellence, develop their personal and professional character, and engage in the campus and greater community.

For more information on ICAE programs and services, visit our Web site at http://icae.okstate.edu, contact the Inclusion Center for Academic Excellence at 313 Student Union or e-mail us at icae@okstate.edu.

Oklahoma Louis Stokes Alliance for Minority Participation

The Oklahoma Louis Stokes Alliance for Minority Participation (OK-LSAMP) program is sponsored by the National Science Foundation. The Oklahoma Alliance was formed under the leadership of Oklahoma State University and the Oklahoma State Regents for Higher Education. The program was established to address the critical under-supply of minority students at state higher education institutions receiving degrees in science, technology, engineering and mathematics (STEM). Currently, Phase III of the program will last through 2009 and is comprised of ten partner institutions: OSU (Lead Institution), University of Oklahoma, Langston University, Cameron University, East Central University, University of Central Oklahoma, Northeastern State University, Northwestern Oklahoma State University, Southeastern Oklahoma State University, Southwestern Oklahoma State University and the University of Tulsa For more information e-mail at okamp@okstate.edu.

RISE Program

The Retention Initiative for Student Excellence program (RISE) is designed to assist students in their transition from high school to Oklahoma State University. The programs primary focus is to address all of the academic issues that might challenge RISE students. The program is also attentive to the variety of social and financial challenges that RISE students often face. The RISE program provides students with mentors, scheduled study group sessions, one on one tutorial as needed, opportunities to serve in leadership roles, and a number of social and cultural activities.

The objective is for all RISE students to end their first year of academic work at OSU with no less than a 3.0 GPA. The RISE program is designed for Excellence. Our expectations are high and our commitment is deep. We believe that these two principles form a foundation on which RISE students will achieve excellence at Oklahoma State University. For additional information on the RISE program, contact the coordinator by e-mail at diversityacadsupport@okstate.edu.

RISE Jumpstart Program

The Retention Initiative for Student Excellence (RISE) Jumpstart program is a five-week summer residential experience designed to afford incoming first-year student to Oklahoma State University opportunities to achieve a smooth transition to college life. Life skills seminars emphasizing social, emotional, physical health and wellness along with familiarity with the existing academic support networks that exist on campus will be intertwined throughout the program's schedule. For additional information on the RISE Jumpstart program, contact the coordinator at diversityacadsupport@okstate.edu.

Women's Programs

The Women's Programs unit develops programs that enhance gender equity and awareness of women's issues in the OSU community. The coordinator is partnering with departments to develop and co-sponsor activities, events and research regarding gender issues. For more information e-mail diversity@okstate.edu.

Undergraduate Admissions

219 Student Union • (405) 744-5358 • Toll Free: 1-800-233-5019, ext. 1
Web site: http://admissions.okstate.edu • e-mail: admissions@okstate.edu

Application Procedure

—When to Apply. It is advisable to apply for admission several months in advance of the first semester in which enrollment is desired. Applications for admission are processed on a "rolling basis."

—How to Apply. OSU requires a non-refundable application fee of $40 for U.S. citizens. The fee must accompany a student's Application for Admission/Scholarship.

—Freshman. All applicants seeking admission must complete and submit an Application for Admission. A student should request that his or her high school counselor send to the Office of Undergraduate Admissions a current official high school transcript that contains class rank and grade-point average. In addition, at the time of application, a request should be made to have the results of the ACT or SAT sent to the Office of Undergraduate Admissions, unless such a request was made at the time of testing.

—Transfers. Students who have enrolled in one or more colleges prior to applying to OSU must complete and submit an Application for Admission/Scholarship, and request that the registrar at each college send an official transcript of all work attempted to the Office of Undergraduate Admissions. Students who have earned 23 or fewer hours of college-level credit should also follow the procedure outlined above for first-time freshmen.

—Readmission. A student, who has attended OSU, but was not enrolled during the immediate past semester (except the summer session) must file an updated Application for Admission/Scholarship. A student who has enrolled in another college or university since last attending OSU, must submit a transcript from each school. Admission status will be determined after an evaluation of all previous work has been made.

—Residential Life. All freshmen are required to live on campus their first year. For exceptions, see the "Housing and Residential Life" section of the *Catalog*. The University offers a variety of living and food service arrangements to satisfy most students. A residence hall application can be found at the Housing and Residential Life Web site at www.reslife.okstate.edu. The application should be submitted early the year before housing is needed to better ensure a first-choice assignment. Opportunities also abound for transfer students who desire to experience life on campus.

—Freshman Admission. For purposes of admission, a freshman student is one who has earned no more than six hours of college level credit after graduation from high school. (This excludes credits earned concurrently with high school enrollment and credit earned by examination).

Freshman Admission Requirements

To be admitted in good standing a student must graduate from an accredited high school or have earned a General Education Diploma (GED) and meet both the performance and curricular requirements listed below. (Accredited high schools are those fully accredited by one of the six regional associations of schools and colleges or by the individual state department of education.)

—Performance Requirements. To be admitted in good standing, students must satisfy at least one of the following performance standards and all of the curricular requirements listed below.

1. Achieve a four-year high school GPA of 3.00 or higher (on a 4.00 grading scale), and rank scholastically among the top one-third (33.3%) of their graduating class, or
2. Achieve a GPA of 3.00 or higher (on a 4.00 grading scale) in the required 15 core high school courses and attain either an ACT composite score of 21 or higher or a total SAT score of 980 or higher. (See "Curricular Requirements," listed below), or
3. Attain an ACT composite score of 24 or higher or a total SAT score of 1090 or higher.
4. Achieve a GPA of 3.00 or higher in the required 15 core high school courses OR attain either an ACT composite score of 22 or higher OR a total SAT score of 1020 or higher and answers to the application questions.

—Curricular Requirements. All students must complete the following curricular requirements for admission:

SUBJECTS	YEARS
English (grammar, composition & literature)	4
Mathematics (algebra I & above)	3
History & Citizenship (American history required, plus additional units from economics, geography, government, history, or non-Western culture)	3
Laboratory Science	2*
Other (from any of the above or foreign language or computer science)	3

In addition to the above requirements, it is recommended that students also complete the following additional courses:

	YEARS
Fine arts (music, art, or drama); Speech	additional 2
Lab science	additional 1
Mathematics	additional 1

In addition to the requirements listed above, students who have earned any hours of college-level credit must also meet university retention standards to be admitted in good standing (see "Retention Standards" in Transfer Admission).

*Students graduating from high school in 2010 will need to have three units of laboratory science and two "other" courses.

—Unit of Credit. The unit of credit at Oklahoma State University is the semester hour. Credit hours earned at colleges or universities on the quarter-hour system will be multiplied by two-thirds to produce the semester-hour equivalent (i.e., one quarter-hour equals two-thirds of a semester hour; or a 5 hour quarter course equals 3.34 hours in semester credit). All other credit-hour systems listed on other college transcripts will be researched and converted to semester-hour equivalents.

—English Proficiency Requirement. All new applicants for undergraduate study for whom English is a second language are required to present either a minimum paper-based score of 500, a minimum computer-based score of 173 or a minimum Internet-based score of 61 on the Test of English as a Foreign Language (TOEFL), or a minimum score of 6.0 on the International English Language Testing System (IELTS).

In extraordinary and deserving cases, the President or the President's designee may admit a student who fails to meet the above requirements. In these situations, the applicant must have demonstrated proficiency in the English language prior to admission. For further details, contact the Office of Undergraduate Admissions.

Special Freshman Admission Programs

—Alternative Admission. Students whose high school achievement is below the standards specified in the performance requirements and/or who are deficient in no more than one curricular requirement may be eligible for admission under the Alternative Admission Program. Space is limited and only those applicants showing the best promise of academic success, consistent with OSU's enrollment goals and objectives, will be admitted. Priority will be given to those who apply early.

—Adult Admission. Adults 21 years of age or older or individuals on active military duty may be admitted, after careful consideration is given in determining the probability of academic success of the student. It is the opinion of Oklahoma State University that factors such as maturity of the individual, job skills and life experiences, motivation, ability to benefit, and access to educational programs should be considered in addition to past academic achievement in determining probability of academic success.

—Summer Provisional Admission. Individuals not meeting requirements for admission under another category may be eligible for enrollment in the summer session immediately following high school graduation. Students must have graduated from high school or have earned the GED, meet all 15 curricular requirements, and meet at least one of the following: HS GPA greater than or equal to 2.5 or ACT composite greater than or equal to 18 or SAT total score greater than or equal to 850.

Students must also "place" into college-level course work in the areas of English, Math, Reading and Science by earning a minimum ACT subscore of 19 in all areas or minimum SAT subscores of 460 verbal and 460 math or by passing required placement exams.

Students must enroll in both a college level mathematics and freshman composition course at Oklahoma State University and earn a "C" or better in each course to be fully admissible for the fall semester.

—Opportunity Admission Program. Students who have not graduated from high school but whose composite score on the ACT or combined verbal and mathematics scores on the SAT places them at the 99th percentile, may apply for full admission. Admissibility will depend on test scores, evaluation of maturity level, and whether the experience will be in the best interest of the student, both intellectually and socially.

—Home Study or Unaccredited High Schools. An individual who is a graduate of a private, parochial, or other non-public high school which is not accredited by a recognized accrediting agency is eligible for admission to the University if:

1. The student has graduated from high school or a home study program, and
2. The student has attained an ACT composite score of 24 or higher, or a total SAT composite score of 1090 or higher, and
3. The student has satisfied the high school curricular requirements as certified by the school official or, if home study, the parent.

—Independent Study Enrollment. Admission to the University is not required for enrollment in independent study courses. However, academic credit for these courses will not be applicable toward a degree until the student has been formally admitted to the University and has secured the approval of the appropriate academic officer for such credit.

—Non-Degree Option. Students who wish to enroll in courses without intending to pursue a degree may be permitted to enroll in up to nine credit hours without satisfying admission requirements. If a student wishes to enroll in additional course work (over the nine hours allowed) he or she will be required to satisfy admission requirements. Enrollment for this program opens two weeks prior to classes beginning.

—Concurrent Enrollment as a High School Student.

1. A senior student enrolled in an accredited Oklahoma high school may, if he or she meets the requirements below, be admitted provisionally as a special student.
   a. Achieve a current cumulative high school grade-point average of 3.00 or higher on a 4.00 scale and rank scholastically among the top third of his or her graduating class, or earn an ACT composite score of 24 or SAT of 1090 (math & critical reasoning subscores combined).
   b. Be eligible to complete requirements for graduation from high school (including curricular requirements for college admission) no later than the spring of the senior year, as attested by the high school principal. Students must also provide a letter of recommendation from their counselor, principal and written permission from their parents or legal guardian.
2. An eleventh grade student enrolled in an accredited Oklahoma high school may be admitted provisionally as a special student if he or she meets requirement 1.b. above and the additional requirements listed below.
   a. Attain an ACT composite score of 25 or higher or a total SAT score of 1130 or higher; or
   b. Achieve a current cumulative high school grade-point average of 3.50 or higher on a 4.00 scale.
3. A student receiving high school level instruction at home or from an unaccredited high school may be admitted provisionally as a special student if he or she meets requirement 1.b. above and the requirements below:
   a. Be 16 years of age and have achieved a composite score of 25 or higher on the ACT or a total SAT score of 1130 or higher.

A high school student admitted as a concurrent student may enroll in a combined number of high school and college courses per semester not to exceed a full-time college work load of 19 semester credit hours. For purposes of calculating work load, one high school credit course is equivalent to three semester credit hours of college work.

A student may enroll in a maximum of nine semester credit hours during a summer session or term at a college or university of the State System without the necessity of being concurrently enrolled in high school classes during the summer term. For purposes of calculating work load, one-half high school unit shall be equivalent to three semester credit hours of college work.

For calculation of work load for students in "blocked" courses, contact the Office of Undergraduate Admissions.

A student who is otherwise eligible under this policy may enroll in a maximum of nine semester credit hours during a summer session, without the necessity of being concurrently enrolled in high school classes during the summer term. The completion of the high school curricular requirements shall not be required of concurrently enrolled high school students for purposes of admission. However, students may only enroll in curricular areas where they have met the assessment requirements for college placement. Concurrently admitted high school students will not be allowed to enroll in any zero-level courses designed to remove high school deficiencies.

To help ensure that a student possesses the skills necessary to be successful in college, he or she must obtain a 19 ACT subject score(s) in science reasoning, mathematics, and/or English to enroll in course work in the respective subject area(s). The student must score 19 or higher in reading to enroll in any other collegiate course(s) outside the subjects of science, mathematics and English.

Once a student is concurrently enrolled at OSU he or she may continue enrollment, provided that during the concurrent enrollment period the student achieves a college grade-point average of 2.00 or higher, and upon graduation from high school meets both the performance and curricular requirements for admission.

—Credit by Exam. Oklahoma State University Testing and Evaluation Service is a national test site for the College Board's College Level Examination Program (CLEP). National CLEP testing centers offer two kinds of examinations: general examinations and subject examinations.

OSU only grants college credit for subject examinations. Credits earned through these examinations are normally recognized by other colleges and universities throughout the nation.

OSU grants credit for acceptable scores in the Advanced Placement Program (AP) as administered by the College Entrance Examination Board in Princeton, New Jersey. AP tests are taken by high school students while in high school.

Oklahoma State University recognizes credit earned through the International Baccalaureate (IB) Program in a limited number of subject areas. Credit will be awarded to students who have taken Higher Level courses through the International Baccalaureate Program and scored at least a 4 (on a seven point scale) on the Higher Level course examination. This credit will be awarded on a course-by-course basis.

Military personnel and veterans who wish to establish credit for military training should submit to the Office of Undergraduate Admissions a copy of their DD214, (Armed Forces of the United States Report of Transfer or Discharge) or their DD295 (Application for the Evaluation of Educational Experiences During Military Service), and any certificates of completion for military schools attended. OSU also accepts credits earned through the DANTES Subject Standardized tests for active military personnel.

Academic departments on campus at OSU may offer advanced standing examinations in subject areas not offered by the CLEP or AP. Any currently enrolled student whose travel, employment, extensive readings or educational experience appear to have given the student proficiency in a subject that is offered at OSU, equivalent to the proficiency ordinarily expected of those students who take the subject in a regular class, may apply for an examination on the subject.

Information pertaining to these examinations may be obtained from the Office of Undergraduate Admissions Web site at http://admissions.okstate.edu/pdf/CreditByExamination.pdf**.** See also the "University Academic Regulations" section of this *Catalog*.

Transfer Admission

OSU requires a non-refundable application fee of $40 for all applicants. The fee must accompany a student's Application for Admission.

For the purpose of determining admission, a transfer student is one who has earned a minimum of seven or more semester hours of college-level credit after graduation from high school. (Students with fewer than seven semester hours of college-level credit are classified as freshmen, and should refer to the "Freshman Admission" section.)

—Transfer Admission Requirements.

1. Students who have earned between 7-23 hours of college credit must satisfy both freshman admission requirements and achieve a minimum transfer GPA of 2.25 or higher in all college-level course work attempted.
2. Students who have earned 24-59 hours of college credit must achieve a minimum transfer GPA of 2.25 or higher in all college-level course work attempted.
3. Students who have earned 60 or more hours of college credit must achieve a minimum transfer GPA of 2.00 or higher in all college-level course work attempted.

—Transfer Credit Evaluation. Transfer credit evaluation in the Office of Undergraduate Admissions determines acceptable transfer credit on a course-by-course basis for college-level credit earned at institutions who are fully accredited by any of the six U.S. regional associations. The evaluation is based on course content, as described in the catalogs of those institutions and in consultation with appropriate academic units at OSU. All transferred courses are recorded on the student's academic record. No part of the previous collegiate record may be disregarded.

Courses completed at institutions located outside of the U.S. will be reviewed for transfer credit based on U.S. regional accreditation standards or postsecondary recognition in the country for which the institution is located. It is highly recommended that the program requirements and course syllabi be submitted for all courses completed overseas.

—Pre-Engineering (Nonresidents of Oklahoma). Engineering is a competitive program; therefore, enrollment preference is given to Oklahoma residents. In addition to the above requirements, a nonresident of Oklahoma applying for admission to pre-engineering must meet requirements determined by the College of Engineering. These requirements may exceed those required for residents of Oklahoma. (See "Admission Requirements" in the "College of Engineering, Architecture and Technology" section.)

—Readmission. A student who has attended OSU but was not enrolled during the immediate past semester (except the summer session) must file an updated Application for Admission/Scholarship and current application fee. A student who has enrolled in another college or university since last attending OSU must submit a transcript from each school. Admission status will be determined after an evaluation of the previous work has been made.

Additional Requirements for Admission or Continued Enrollment

—Enrollment Information. After admission is granted, all students will receive detailed information on new student orientation. The fall semester enrollment process for freshmen is completed during scheduled orientation sessions conducted on campus during the summer. Parents are welcome and are encouraged to participate in the enrollment process with the student.

—Immunization Requirements and Health History. All new students are required by Oklahoma law to provide evidence of having been immunized against measles, mumps, and rubella, (two shots), and against Hepatitis B, (three shot series). Read instructions carefully regarding the requirements to provide supporting documentation of these immunizations (copies of shot records). In addition, students are required to complete a brief medical history found on the Immunization and Health History form. This form is mailed to all new students or can be downloaded from the Internet at www.okstate.edu/UHS/. If this information is not received during the student's first semester, a hold will be placed on future enrollment until the requirement is met.

—Tuberculosis Testing. Certain students are required to comply with the OSU TB testing policy. This is explained in detail on the Immunization and Health History form. The students affected are those who:

- Hold a visa for study in the U.S.
- A U.S. born student who has resided overseas for more than eight continuous weeks.
- Have a medical condition that suppresses the immune system.
- Has been exposed to someone known to have TB disease.

To comply with this policy, the student must provide a copy of a TB skin test performed within the prior six months in the U.S., or if prior skin tests have been positive, documentation of a negative chest x-ray performed in the U.S. All records must include the dates and results of the tests. Specific instructions are on the Immunization and Health History form. Prior vaccination with BCG does not exempt the student from this testing requirement.

—Physical Examination. New students have a choice of 1.) submitting a physical examination performed in the prior six months; OR 2.) the student may complete the Health Risk Assessment provided by the Seretean Wellness Center. If students choose the physical examination option, their bursar accounts will be credited the $20 Health Risk Assessment fee.

Residence Status

Residence status refers to whether you are an in-state Oklahoma resident or an out-of-state resident, and this classification determines your tuition cost.

—Initial Classification. A student's initial residence status is determined by the Office of Undergraduate Admissions when you apply to OSU.

—Residence Reclassification. If you are a current OSU student classified as a non-resident and wish to be considered for in-state status, you must petition for a reclassification of your residence status through the Office of the Registrar.

Deadlines for submitting petitions to be considered for reclassification in a given semester are as follows:

Fall - October 31
Spring - March 31
Summer - June 30

Oklahoma residence status (and associated in-state tuition) is not granted on a retroactive basis. If you are receiving federal financial aid, please seek advice from the Office of Scholarships and Financial Aid on how a residency reclassification may affect your aid.

—Appeal Procedures. Students may appeal their residence classification decision. A Petition for Oklahoma Residency form must be submitted along with any additional supporting documentation to the Office of the Registrar. You will be notified in writing of the decision following the final review.

Regulations governing the residence status of students are the responsibility of the Oklahoma State Regents for Higher Education and apply to all colleges and universities of the Oklahoma State System of Higher Education.

—Basic Principles Governing Residence.
Article XIII-A of the Constitution of Oklahoma creates The Oklahoma State System of Higher Education and establishes the Oklahoma State Regents for Higher Education as the coordinating board of control for all public institutions supported by legislative appropriations. Title 70 O.S. 3218.9 authorizes the State Regents to establish the proposed fees to be charged at public institutions to Oklahoma residents and nonresidents alike. The policy statement set forth in the paragraphs to follow establishes principles, definitions, criteria, and guidelines to assist institutional officials in the classification of students as residents or nonresidents for fee and tuition-payment purposes. Also, the policy statement should be helpful to prospective students in the determination of their own residence status prior to enrollment or for those nonresident students seeking to be reclassified as residents of Oklahoma after having been classified originally as nonresidents. Determination of residence status for purposes of attendance at an institution in The Oklahoma State System of Higher Education is based primarily on the issue of domiciliary intent.

SECTION I. PHILOSOPHY
Since 1890 it has been public policy in Oklahoma to provide comprehensive, low-cost public higher education for citizens in order to make educational opportunities available for Oklahoma individuals to improve themselves, to help upgrade the knowledge and skills of the Oklahoma work force, and to enhance the quality of life in Oklahoma generally. Therefore, residents of Oklahoma are afforded subsidies covering a majority of their educational costs at all colleges and universities of The Oklahoma State System of Higher Education. Nonresidents of Oklahoma are also provided substantial educational subventions, although at lower levels than those provided for permanent residents of the state.

SECTION II. PRINCIPLES
1. Attendance at an educational institution, albeit a continuous and long-term experience is interpreted as temporary residence; therefore, a student neither gains nor loses residence status solely by such attendance.
2. Students attending an Oklahoma college or university may perform many objective acts, some of which are required by law (i.e. payment of taxes), and all of which are customarily done by some nonresidents who do not intend to remain in Oklahoma after graduation but are situationally necessary and/or convenient (i.e. registering to vote, obtaining a driver's license). Such acts and/or declarations alone are not sufficient evidence of intent to remain in Oklahoma beyond the college experience.
3. A non-resident student attending an Oklahoma college or university on more than a half-time basis is presumed to be in the state primarily for educational purposes.
4. An individual is not deemed to have acquired status as a resident of Oklahoma until he or she has been in the state for at least a year primarily as a permanent resident and not merely as a student. Likewise, an individual classified as a resident of Oklahoma shall not be reclassified as a nonresident until 12 months after having left Oklahoma to live in another state.
5. Unless he or she has established residency in another state, a student who resided in Oklahoma at the time of graduation from an Oklahoma high school and has resided in the state with a parent or legal guardian for the two years prior to graduation from high school will be eligible for resident tuition and scholarships or financial aid provided by the state, regardless of immigration status.
6. All married persons shall be treated as equal under this policy. Each spouse in a family shall establish his or her own residence status on a separate basis. Exceptions include: 1) when a nonresident marries an already established resident of Oklahoma, the nonresident may be considered a resident after documentation of the marriage and proof of domicile are satisfied, and 2) as provided in Sections VII and VIII.
7. The burden of proof of establishing Oklahoma residence or domicile, including providing any supporting documentation, shall be upon the applicant. Since residence or domicile is a matter of intent, each case will be judged on its own merit by the appropriate institutional official(s) consistent with this policy. No definitive set of criteria can be established as sufficient to guarantee classification as a resident of Oklahoma.
8. Initial classification as a nonresident student shall not prejudice the right of a person to be reclassified thereafter for following semesters or terms of enrollment as an Oklahoma resident provided that he or she can establish proof of residence in accordance with criteria and procedures as set forth in this policy.

SECTION III. DEFINITIONS
1. Resident of Oklahoma—A resident of Oklahoma is one who has lived continuously in Oklahoma for at least 12 months duration and whose domicile is in Oklahoma. A person's domicile is his or her true, fixed, permanent home or habitation. It is the place where he or she intends to remain and to which he or she expects to return. A person can have more than one residence, but only one domicile. Domicile has two components—residence and the intention to remain. When these two occur, there is domicile.
2. Independent Person—An independent person is one enjoying majority privileges (or is legally emancipated from the parental domicile) and who is responsible for his or her own care, custody, and support.
3. Dependent Person—A dependent person is one who is under the care, custody, and support of a parent or legal guardian.
4. Full-time Student—a full-time undergraduate student is one enrolled in a minimum of 12 credit hours per semester in an academic year or a minimum of six credit hours in a summer session. A full-time graduate student is one enrolled in a minimum of nine credit hours per semester in an academic year or a minimum of four credit hours in a summer session.

SECTION IV. INDEPENDENT PERSONS

If a person enjoying majority privileges and who is independent of parental domicile can provide adequate and satisfactory proof of his or her having come to Oklahoma with the intention of establishing domicile, he or she may be granted resident student classification at the next enrollment occurring after expiration of 12 months following the establishment of domicile in Oklahoma. The spouse of such person must establish proof of his or her own domiciliary status on a separate basis, except as provided in other sections of this policy.

SECTION V. DEPENDENT PERSONS

The legal residence of a dependent person is that of his or her parents, or the legal residence of the parent who has legal custody or the parent with whom the student habitually resides. If the student is under the care of those other than his or her parents, the legal residence is that of his or her legal guardian.

The dependent person may become emancipated (freed from his or her parental domicile) through marriage, formal court action, abandonment by parents, or positive action on his or her own part evidential or his or her alienation of parental domicile. To qualify under the latter category, a dependent person must have completely separated him or herself from the parental domicile and have proved that such separation is complete and permanent. Mere absence from the parental domicile is not proof of its complete abandonment. If an applicant can provide adequate and satisfactory proof of complete emancipation and his or her having come to Oklahoma with the intention of establishing domicile, he or she may be granted resident student classification at the next enrollment occurring after expiration of 12 months following establishment of domicile in Oklahoma.

SECTION VI. FOREIGN NATIONALS

An individual who is not a United States national may become eligible for classification as an Oklahoma resident provided that he or she holds lawful permanent residence status as defined by U.S. Citizenship and Immigration Services (USCIS), evidenced by whatever documents may be required under applicable federal law, who has resided in Oklahoma for at least 12 consecutive months, and who meets other applicable criteria for establishment of domicile as set forth in this policy or who has come to Oklahoma for the purpose described in Section VIII of this policy.

In accordance with House Bill 1804, an undocumented immigrant student enrolling for the first time in 2007-08 and thereafter, separates eligibility for resident tuition and for state financial aid. To be eligible for resident tuition, an undocumented immigrant student must:

1. Have graduated from a public or private high school in Oklahoma (Note: GED or home school education will not establish eligibility for any student);
2. Have resided in Oklahoma for at least two years prior to graduation;
3. Satisfy admission standards (Admission Requirements);
4. Have secured admission and enrolled in an institution within the Oklahoma State System of Higher Education; and
5. Do one of the following:

   a. Provide to the institution a copy of true and correct application or petition filed with the United States Citizenship and Immigration Services to legalize the student's immigration status; or

   b. File an affidavit with the institution stating that the student will file an application to legalize their immigration status at the earliest opportunity the student is able to do so, but in no case later than either: (a) one year after the date on which the student enrolls for study at the institution; or (b) if there is no formal process to permit children of parents without lawful immigration status to apply for lawful status without risk of deportation, one year after the United States Citizenship and Immigration Services (USCIS) provides such a formal process.

Students who file an affidavit must present to the institution a copy of a true and correct application filed with the USCIS no later than either: (a) one year after the date on which the student enrolls for study at the institution; or (b) if there is no formal process to permit children of parents without lawful immigration status to apply for lawful status without risk of deportation, one year after the United State Citizenship and Immigration Services (USCIS) provides such a formal process.

When a student provides or presents to the institution a copy of an application or petition filed with USCIS, the copy shall be maintained in the student's permanent record.

SECTION VII. MILITARY PERSONNEL

A student attending an institution while on full-time active duty in the armed forces is considered as having a temporary residence in the state in which he or she is attending school; therefore, a student neither gains nor loses residence status solely by such military service. Members of the armed services stationed in Oklahoma, their spouses and dependent children shall be admitted without the payment of nonresident tuition and without the 12 month domiciliary requirement, so long as they continue to be stationed in the state in full-time military service and under military orders.

While the policy clearly states that nonresident tuition will be waived for military personnel, such a waiver does not constitute Oklahoma residence status. Military personnel and their dependents that provide proof of a legal change in their state of residence to Oklahoma (such as claiming Oklahoma for income tax purposes) may have the full benefits of residence status.

Dependent children of military personnel that establish residency as described in Section II of this policy shall maintain residence status if their parents are subsequently stationed out-of-state. Dependents of military personnel who have not established residency according to policy may maintain nonresident waiver status if their parents are subsequently stationed out-of-state.

Section VIII. Full-time Professional Practitioner or Worker

An individual who provides evidence of having come to Oklahoma to practice a profession on a full-time basis, conduct a business full time, or work on a full-time basis shall be immediately declared an Oklahoma resident along with his or her spouse and dependent children without the 12 month domiciliary requirement so long as they continue in such full-time employment capacity or until such time that they establish residency as described in Section II of this policy.

Dependent children of the above professionals that establish residency as described in Section II of this policy may maintain residence status if their parents subsequently leave the state.

Likewise, a full-time professional practitioner or worker who is temporarily assigned to another location but maintains his or her residency in Oklahoma (such as claiming Oklahoma for income tax purposes) shall be considered a resident for tuition and state scholarship and financial aid purposes, along with his or her spouse and dependent children.

SECTION IX. RECLASSIFICATION

In addition to the aforementioned criteria, an independent person seeking to be reclassified as a resident of Oklahoma must meet certain criteria for the current and immediately preceding year. Contact the Office of the Registrar for more information.

SECTION X. ADMINISTRATION OF POLICY STATEMENT

Each institution should designate the admissions officer or some other individual to be responsible for administration of the policy, and should make appropriate provision for a student's appeal of an adverse decision.

SECTION XI. TUITION WAIVERS

Nothing in this policy precludes the waiving of fees or tuition for nonresidents by any institution upon authorization by the State Regents based on criteria other than residence status provided that the residence status classification will not be affected by any such waiver alone.

International Undergraduate Admissions

Office of International Students and Scholars • 076 Student Union • (405) 744-5459
Web site: http://union.okstate.edu/iss/index.htm • e-mail: admissions-iss@okstate.edu

International students are required to meet academic performance standards which are equivalent to those established for all domestic applicants; however, freshman students are not required to participate in the ACT or SAT. Participation in such tests is only necessary for students wishing to qualify for scholarship opportunities. (See Undergraduate Admissions, pg. 13 for the academic performance standards).

Application Procedure

For purposes of admission, an international student is defined as "a student who is, or will be, in the United States on a non-immigrant student visa." This specifically refers to the Student (F) and Exchange Visitor (J) visas. To apply for admission all international students must submit:

1. An application for Admission and a fee of U.S. $75.00 made payable to OSU.
2. An official or certified true copy of each academic record with a certified English translation. Students enrolled at U.S. institutions may have certified true copies of their foreign records sent by their current institution.
   a. Secondary school records (yearly mark sheets or transcripts).
   b. Records from each college of university attended (yearly mark sheets or transcripts).
   c. National examination results.
3. Applications for international students are processed on a "rolling basis" just as domestic applicants; however, students should aim for the following dates to ensure adequate time for their VISA interview process:
   a. March 1 for Summer term
   b. May 15 for Fall term
   c. October 1 for Spring term
4. All new applicants for undergraduate study for whom English is a second language are required to present either a minimum paper -based score of 500, a minimum computer-based score of 173 or a minimum Internet-based score of 61 on the Test of English as a Foreign Language (TOEFL), or a minimum score of 6.0 on the International English Language Testing System (IELTS), taken within the last two years.

In extraordinary and deserving cases, the President or the President's designee may admit a student who fails to meet the above requirements. In these situations, the applicant must have demonstrated proficiency in the English language prior to admission. For further details, contact the Office of International Students & Scholars.

Transfer Admission

For the purpose of determining admission, a transfer student is one who has earned seven or more semester hours of college-level credit.

In evaluating college-level credit for course work completed outside of the U.S., OSU requires that the institution where the credit was earned and the program of study be recognized as tertiary level through the standards set by the country where the institution is located. OSU evaluates semester credit hours and grades earned based on U.S. equivalency standards.

—Immigration Issues. The U.S. Citizenship and Immigration Services (USCIS) require that international students file a statement with the University showing adequate financial support for their education. OSU has its own financial guarantee form that international students need to complete as a requirement to receive the I-20 or DS-2019. Oklahoma State University has limited financial assistance for international students.

Students should not plan to finance their education with employment at Oklahoma State University. Students who are accepted to OSU and maintain their immigration status while making appropriate progress toward their degrees may be eligible to apply for on-campus University employment for 20 hours per week. However, students should take into consideration that campus employment opportunities are limited. Students holding F-1 or J-1 visas are rarely permitted by USCIS to work outside the University, and can be deported from the United States if they are found to be in violation of this regulation.

Electronic registration of immigration records into the USCIS Student Exchange and Visitor Information System (SEVIS) is mandatory for all international students pursuing education within the United States. International students must update their records in SEVIS prior to any change in their immigration information. This includes dropping below full-time status, changing local address, transferring to another institution, changing majors, withdrawing from classes, etc.

The OSU Office of International Students and Scholars (ISS) is responsible for entering those records into SEVIS. However, it is the student's responsibility to obtain and maintain the correct immigration status while in the U.S. Conditions that apply to F-1 and J-1 status are summarized on the I-20 or DS-2019 forms and explained in detail at the mandatory ISS International Student Orientation program. This orientation program occurs the week before classes begin each fall and spring semester. Students should make their travel plans accordingly. The Office of International Students and Scholars, located in 076 Student Union, should be contacted with questions related to SEVIS or individual immigration status issues at su-iss@okstate.edu.

Degree Programs

The type of degree offered in each major is listed on the following pages along with the options and the college(s) in which each may be earned. For details, see appropriate department narrative. Major and option codes are included to assist in completing University forms where major and option information is required.

College Abbreviations:

AG	College of Agricultural Sciences and Natural Resources
AS	College of Arts and Sciences
BU	Spears School of Business
ED	College of Education
EN	College of Engineering, Architecture and Technology
HES	College of Human Environmental Sciences
GR	Graduate College
VM	Center for Veterinary Health Sciences

Degree Abbreviations:

BA	Bachelor of Arts
BAR	Bachelor of Architecture
BEN	Bachelor of Engineering
BFA	Bachelor of Fine Arts
BLA	Bachelor of Landscape Architecture
BM	Bachelor of Music
BS	Bachelor of Science
BSAE	Bachelor of Science in Aerospace Engineering
BSAG	Bachelor of Science in Agricultural Sciences and Natural Resources
BSBA	Bachelor of Science in Business Administration
BSBE	Bachelor of Science in Biosystems Engineering
BSCH	Bachelor of Science in Chemical Engineering
BSCV	Bachelor of Science in Civil Engineering
BSCP	Bachelor of Science in Computer Engineering
BSEE	Bachelor of Science in Electrical Engineering
BSET	Bachelor of Science in Engineering Technology
BSHS	Bachelor of Science in Human Environmental Sciences
BSIE	Bachelor of Science in Industrial Engineering and Management
BSME	Bachelor of Science in Mechanical Engineering
BUS	Bachelor of University Studies
DVM	Doctor of Veterinary Medicine
MA	Master of Arts
MAG	Master of Agriculture
MBA	Master of Business Administration
MM	Master of Music
MS	Master of Science
MSBA	Master of Science in Business Administration
EdS	Specialist in Education
EdD	Doctor of Education
PhD	Doctor of Philosophy

Major / Option	*College*	*Degree*	*Major Code*	*Option Code*
COLLEGE OF AGRICULTURAL SCIENCES & NATURAL RESOURCES UNDERGRADUATE DEGREE PROGRAMS				
Agribusiness	AG	BSAG	AGBU	
Crop and Soil Science	AG	BSAG	AGBU	CASS
Farm and Ranch Management	AG	BSAG	AGBU	FARM
Finance	AG	BSAG	AGBU	FIN
Management	AG	BSAG	AGBU	MGMT
Marketing	AG	BSAG	AGBU	MKTG
Pre-Law	AG	BSAG	AGBU	PLAW
Pre-Veterinary Business Management	AG	BSAG	AGBU	PVBM
Agricultural Communications	AG	BSAG	AGCM	
Animal Science Double Major	AG	BSAG	AGCM	ANSI
Agricultural Economics	AG	BSAG	AGEC	
Accounting Double Major	AG	BSAG	AGEC	ACCT
International Agricultural Marketing	AG	BSAG	AGEC	IAGM
Agricultural Education				
Horticulture Double Major	AG	BSAG	AGED	HORT
Teaching	AG	BSAG	AGED	TCHG
Agricultural Leadership	AG	BSAG	AGLE	

Major / Option	*College*	*Degree*	*Major Code*	*Option Code*
Animal Science				
Agricultural Communications Double Major	AG	BSAG	ANSI	AGCM
Agricultural Education Double Major	AG	BSAG	ANSI	AGED
Animal Biotechnology	AG	BSAG	ANSI	ABIO
Business	AG	BSAG	ANSI	BUS
International	AG	BSAG	ANSI	INTL
Livestock Merchandising	AG	BSAG	ANSI	LSMR
Pre-Veterinary Animal Science	AG	BSAG	ANSI	PVAS
Production	AG	BSAG	ANSI	PROD
Ranch Operations	AG	BSAG	ANSI	RNCH
Biochemistry and Molecular Biology	AG	BSAG	BIMB	
Pre-Medical or Pre-Veterinary Science	AG	BSAG	BIMB	PMPV
Entomology				
Insect Biology and Ecology	AG	BSAG	ENTO	IBAE
Bioforensics, Pre-Veterinary and Pre-Medical Sciences	AG	BSAG	ENTO	BPPS
Environmental Science				
Environmental Policy	AG	BSAG	ENVR	ENVP
Natural Resources	AG	BSAG	ENVR	NATR
Water Resources	AG	BSAG	ENVR	WATR
Food Science	AG	BSAG	FDSC	
Food Industry	AG	BSAG	FDSC	FDIN
Horticulture				
Horticultural Business	AG	BSAG	HORT	HRTB
Horticultural Science	AG	BSAG	HORT	HRTS
Public Horticulture	AG	BSAG	HORT	PHRT
Turf Management	AG	BSAG	HORT	TURF
Landscape Contracting	AG	BSAG	LCON	
Landscape Architecture	AG	BLA	LA	
Natural Resource Ecology and Management				
Fire Ecology and Management	AG	BSAG	NREM	FEAM
Fisheries and Aquatic Ecology	AG	BSAG	NREM	FAEC
Forest Management	AG	BSAG	NREM	FORM
Forest Resource Conservation	AG	BSAG	NREM	FRRC
Natural Resource Communications	AG	BSAG	NREM	NRCM
Rangeland Ecology and Management	AG	BSAG	NREM	REM
Urban and Community Forestry	AG	BSAG	NREM	URCF
Wildlife Ecology and Management	AG	BSAG	NREM	WLEM
Plant and Soil Sciences				
Agribusiness	AG	BSAG	PASS	AGBU
Bioenergy Production	AG	BSAG	PASS	BEPD
Forage and Livestock Production	AG	BSAG	PASS	FALP
Plant Biotechnology	AG	BSAG	PASS	PBTC
Plant Science	AG	BSAG	PASS	PLNT
Soil Geotechnology	AG	BSAG	PASS	SGTC
Soil and Water Resources	AG	BSAG	PASS	SAWR
University Studies	AG	BUS	UNST	
COLLEGE OF AGRICULTURAL SCIENCES & NATURAL RESOURCES GRADUATE DEGREE PROGRAMS				
Agricultural Communications	AG	MS	AGCM	
Agricultural Economics	AG	MS/PhD	AGEC	
Agricultural Education	AG	MS/PhD	AGED	
Animal Breeding and Reproduction	AG	PhD	ANBR	
Animal Nutrition	AG	PhD	ANNU	
Animal Science	AG	MS	ANSI	
Biochemistry and Molecular Biology	AG	MS/PhD	BIMB	
Crop Science	AG	PhD	CPSI	

Major / Option	*College*	*Degree*	*Major Code*	*Option Code*
Entomology	AG	PhD	ENTO	
Entomology and Plant Pathology				
Entomology	AG	MS	ENPP	ENTO
Plant Pathology	AG	MS	ENPP	PLP
Environmental Science	AG	MS	ENVR	
Food Science	AG	MS/PhD	FDSC	
General Agriculture				
Agribusiness	AG	MAG	AG	AGBU
Agricultural Economics	AG	MAG	AG	AGEC
Agricultural Education	AG	MAG	AG	AGED
Agricultural Leadership	AG	MAG	AG	AGLE
Animal Science	AG	MAG	AG	ANSI
Entomology	AG	MAG	AG	ENTO
Horticulture	AG	MAG	AG	HORT
International Agriculture	AG	MAG	AG	INAG
Natural Resource Ecology and Management	AG	MAG	AG	NREM
Plant Pathology	AG	MAG	AG	PLP
Plant Science	AG	MAG	AG	PLNT
Soil Science	AG	MAG	AG	SOIL
Horticulture	AG	MS	HORT	
Natural Resource Ecology and Management				
Fisheries and Aquatic Ecology	AG	MS/PhD	NREM	FAEC
Forest Resources	AG	MS/PhD	NREM	FTRS
Rangeland Ecology and Management	AG	MS/PhD	NREM	REM
Wildlife Ecology and Management	AG	MS/PhD	NREM	WLEM
Plant and Soil Sciences	AG	MS	PASS	
Plant Pathology	AG	PhD	PLP	
Soil Science	AG	PhD	SLSI	
COLLEGE OF ARTS AND SCIENCES UNDERGRADUATE DEGREE PROGRAMS				
American Studies	AS	BA	AMSD	
Art	AS	BA	ART	
Art History	AS	BA	ART	ARTH
Studio Art	AS	BA	ART	STDA
Graphic Design	AS	BFA	ART	GRPH
Studio	AS	BFA	ART	STD
Biochemistry	AS	BS	BIOC	
Biological Science	AS	BS	BIOL	
Botany	AS	BS	BOT	
Biotechnology	AS	BS	BOT	BIOT
Ecology	AS	BS	BOT	ECOL
Chemistry				
ACS Approved	AS	BS	CHEM	ACS
Departmental Degree	AS	BS	CHEM	DEPT
Communication Sciences and Disorders	AS	BS	CDIS	
Computer Science	AS	BS	CS	
Economics	AS	BS	ECON	
General	AS	BA	ECON	GEN
International Economic Relations	AS	BA	ECON	IECR
English	AS	BA	ENGL	
Creative Writing	AS	BA	ENGL	CRWR
Screen Studies	AS	BA	ENGL	SCST
Professional Writing	AS	BA	ENGL	PRWR
American Sign Language Studies	AS	BA	ENGL	ASLS

Major / Option	*College*	*Degree*	*Major Code*	*Option Code*
French	AS	BA	FREN	
Geography	AS	BA/BS	GEOG	
Geology	AS	BS	GEOL	
German	AS	BA	GRMN	
History	AS	BA	HIST	
Journalism and Broadcasting				
Advertising	AS	BA/BS	JB	ADV
Broadcast Journalism	AS	BA/BS	JB	BJ
News-Editorial Journalism	AS	BA/BS	JB	NEWS
Public Relations	AS	BA/BS	JB	PR
Sports Media	AS	BA/BS	JB	SPTM
Liberal Studies	AS	BA/BS	LBST	
Mathematics	AS	BA/BS	MATH	
Microbiology/Cell and Molecular Biology				
Biomedical Science	AS	BS	MCMB	BMED
Clinical Laboratory Science	AS	BS	MCMB	CLSC
Microbial Ecology/Environmental	AS	BS	MCMB	MCEE
Microbial Pathogenesis	AS	BS	MCMB	MCPG
Molecular Genetics	AS	BS	MCMB	MLGN
Music	AS	BA	MUSC	
Elective Studies in Business	AS	BM	MUSC	ESBU
Performance	AS	BM	MUSC	PERF
Music Education				
Instrumental/Vocal Certification	AS	BM	MSED	IVCT
Philosophy	AS	BA	PHIL	
Physics	AS	BS	PHYS	
Applied Physics	AS	BS	PHYS	APPH
Physiology	AS	BS	PHSL	
Political Science	AS	BA/BS	POLS	
Psychology	AS	BA/BS	PSYC	
Russian Language and Literature	AS	BA	RUSS	
Sociology	AS	BA/BS	SOC	
Anthropology	AS	BA/BS	SOC	ANTH
Applied Sociology	AS	BA/BS	SOC	APSO
Spanish	AS	BA	SPAN	
Statistics	AS	BS	STAT	
Theatre	AS	BA	TH	
Acting	AS	BFA	TH	ACT
Design and Technology	AS	BFA	TH	DT
Zoology	AS	BS	ZOOL	
University Studies	AS	BUS	UNST	
COLLEGE OF ARTS & SCIENCES GRADUATE DEGREE PROGRAMS				
Botany	AS	MS	BOT	
Chemistry	AS	MS/PhD	CHEM	
Communication Sciences and Disorders	AS	MS	CDIS	
Computer Science	AS	MS/PhD	CS	
Creative Writing	AS	MFA	CRWR	

Major / *Option*	*College*	*Degree*	*Major Code*	*Option Code*
English	AS	PhD	ENGL	
Teaching English as a Second Language (TESL)	AS	MA	ENGL	TESL
Professional Writing	AS	MA	ENGL	PRWR
Fire and Emergency Management Administration	AS	MS/PhD	FEMA	
Geography	AS	MS/PhD	GEOG	
Geology	AS	MS/PhD	GEOL	
History	AS	PhD	HIST	
History	AS	MA	HIST	HIST
Applied History	AS	MA	HIST	AHIS
Mass Communication	AS	MS	MSCM	
Mathematics	AS	MS/PhD	MATH	
Applied Mathematics	AS	MS	MATH	AMTH
Microbiology/Cell and Molecular Biology	AS	MS/PhD	MCMB	
Pedagogy and Performance				
Applied Music	AS	MM	PEDP	APMU
Conducting	AS	MM	PEDP	COND
Philosophy	AS	MA	PHIL	
Physics	AS	MS/PhD	PHYS	
Optics and Photonics	AS	MS	PHYS	OPHO
Political Science				
American Politics	AS	MA	POLS	AMPL
Intl Relations/Comparative	AS	MA	POLS	INRC
Public Administration and Public Policy	AS	MA	POLS	PAPP
Public Policy and Administration	AS	MA	POLS	PPAD
Psychology	AS	MS	PSYC	
Clinical	AS	PhD	PSYC	CLIN
Lifespan Developmental Psychology	AS	PhD	PSYC	LSDP
Sociology	AS	MS/PhD	SOC	
Statistics	AS	MS/PhD	STAT	
Theatre	AS	MA	TH	
Zoology	AS	MS/PhD	ZOOL	
COLLEGE OF EDUCATION UNDERGRADUATE DEGREE PROGRAMS				
Aerospace Administration and Operations				
Aerospace Logistics	ED	BS	AADO	ARLG
Aerospace Security	ED	BS	AADO	ARSC
Aviation Management	ED	BS	AADO	AVMG
Professional Pilot	ED	BS	AADO	PRPL
Technical Services Management	ED	BS	AADO	TSM
Athletic Training				
Clinical	ED	BS	ATRN	CLIN
Preprofessional	ED	BS	ATRN	PPRO
Teacher Preparation (Physical Education)	ED	BS	ATRN	TPPE
Career and Technical Education				
Business and Information Technology Education	ED	BS	CTED	BIFT
Health Occupations Education	ED	BS	CTED	HOCE
Marketing Education	ED	BS	CTED	MKED
Certification	ED	BS	CTED	CERT
Non-Certification	ED	BS	CTED	NON
Technology Education	ED	BS	CTED	TEED
Education				
Non-Certification	ED	BS	EDUC	NCRT

Major / Option	*College*	*Degree*	*Major Code*	*Option Code*
Elementary Education	ED	BS	ELEM	
Health Education and Promotion				
Community Health Education	ED	BS	HEPR	CMHE
Exercise and Health	ED	BS	HEPR	EAHL
Leisure Studies				
Leisure Service Management	ED	BS	LEIS	LSM
Therapeutic Recreation	ED	BS	LEIS	TR
Physical Education				
Teacher Education	ED	BS	PHED	TCHE
Secondary Education				
English	ED	BS	SCED	ENGL
Foreign Language	ED	BS	SCED	LANG
Mathematics	ED	BS	SCED	MATH
Science	ED	BS	SCED	SCI
Social Studies	ED	BS	SCED	SSTD
University Studies	ED	BUS	UNST	
COLLEGE OF EDUCATION GRADUATE DEGREE PROGRAMS				
Applied Educational Studies				
Aviation and Space Education	ED	EdD	AEST	AVED
College Interdisciplinary	ED	EdD	AEST	CINT
Counseling				
Community Counseling	ED	MS	COUN	CMCS
School Counseling	ED	MS	COUN	SCHC
Education				
School Psychology	ED	EdS	EDUC	SCHP
Curriculum Studies	ED	PhD	EDUC	CRST
Occupational Education Studies	ED	PhD	EDUC	OCED
Professional Education Studies	ED	PhD	EDUC	PRED
Social Foundations of Education	ED	PhD	EDUC	SFED
Educational Leadership and Policy Studies				
Educational Administration	ED	PhD	ELPS	EADM
Higher Education	ED	PhD	ELPS	HIED
Educational Leadership Studies				
College Student Development	ED	MS	ELS	CSDV
Higher Education	ED	MS	ELS	HIED
School Administration	ED	MS	ELS	SCAD
Educational Psychology				
Educational Psychology	ED	MS	EPSY	EPSY
Educational Research and Evaluation	ED	MS	EPSY	EDRE
School Psychometrics	ED	MS	EPSY	SCPM
Counseling Psychology	ED	PhD	EPSY	CPSY
Educational Psychology	ED	PhD	EPSY	EPSY
Research and Evaluation	ED	PhD	EPSY	REVL
School Psychology	ED	PhD	EPSY	SCHP
Educational Technology				
Educational Technology	ED	MS	EDTC	EDTC
School Library Media	ED	MS	EDTC	SCLM
Health and Human Performance				
Applied Exercise Science	ED	MS	HHP	AEXS
Health Promotions	ED	MS	HHP	HPRO
Physical Education	ED	MS	HHP	PE
Health, Leisure and Human Performance				
Health and Human Performance	ED	PhD	HLHP	HHP
Leisure Studies	ED	PhD	HLHP	LEIS
Higher Education	ED	EdD	HIED	

Major / Option	*College*	*Degree*	*Major Code*	*Option Code*
Leisure Studies	ED	MS	LEIS	
School Administration	ED	EdD	SA	
Teaching, Learning and Leadership				
Curriculum and Leadership Studies	ED	MS	TLL	CLS
Elem/Middle/Secondary Ed/K-12 Ed	ED	MS	TLL	EMSK
Occupational Educational Studies	ED	MS	TLL	OCED
Reading and Literacy	ED	MS	TLL	REAL
Secondary Education for Teachers				
Non-Traditionally Certified	ED	MS	TLL	SCNT
Special Education	ED	MS	TLL	SPED
COLLEGE OF ENGINEERING, ARCHITECTURE & TECHNOLOGY UNDERGRADUATE DEGREE PROGRAMS				
Aerospace Engineering	EN	BSAE	AERS	
Architectural Engineering				
Structures	EN	BEN	ARCE	STR
Architecture	EN	BAR	ARCH	
Biosystems Engineering				
Biomechanical	EN	BSBE	BAE	BIOM
Bioprocessing and Biotechnology	EN	BSBE	BAE	BPBT
Environmental and Natural Resources	EN	BSBE	BAE	ENTR
Food Processing	EN	BSBE	BAE	FDPR
Chemical Engineering	EN	BSCH	CHEN	
Biomedical/Biochemical	EN	BSCH	CHEN	BMBC
Environmental	EN	BSCH	CHEN	ENVR
Pre-Medical	EN	BSCH	CHEN	PMED
Civil Engineering	EN	BSCV	CIVE	
Environmental	EN	BSCV	CIVE	ENVR
Computer Engineering	EN	BSCP	CPE	
Construction Management Technology				
Building	EN	BSET	CMT	BLDG
Heavy	EN	BSET	CMT	HVY
Electrical Engineering	EN	BSEE	ELEN	
Electrical Engineering Technology	EN	BSET	EETE	
Computer	EN	BSET	EETE	COMP
Telecommunications	EN	BSET	EETE	TCOM
Fire Protection and Safety Technology	EN	BSET	FPST	
Industrial Engineering and Management	EN	BSIE	IEM	
Mechanical Engineering	EN	BSME	MEEN	
Pre-Medical	EN	BSME	MEEN	PMED
Mechanical Engineering Technology	EN	BSET	MET	
University Studies	EN	BUS	UNST	
COLLEGE OF ENGINEERING ARCHITECTURE & TECHNOLOGY GRADUATE DEGREE PROGRAMS				
Biosystems Engineering	EN	MS/PhD	BAE	
Chemical Engineering	EN	MS/PhD	CHEN	
Civil Engineering	EN	MS/PhD	CIVE	
Electrical Engineering	EN	MS/PhD	ELEN	
Optics and Photonics	EN	MS	ELEN	OPHO
Control Systems	EN	MS	ELEN	CTLS
Engineering and Technology Management	EN	MS	ETM	

Major / Option	*College*	*Degree*	*Major Code*	*Option Code*
Environmental Engineering	EN	MS	EVEN	
Industrial Engineering and Management	EN	MS/PhD	IEM	
Mechanical and Aerospace Engineering	EN	MS/PhD	MAEN	
COLLEGE OF HUMAN ENVIRONMENTAL SCIENCES UNDERGRADUATE DEGREE PROGRAMS				
Design, Housing and Merchandising				
Apparel Design and Production	HES	BSHS	DHM	ADP
Interior Design	HES	BSHS	DHM	ID
Merchandising	HES	BSHS	DHM	MERC
Hotel & Restaurant Administration	HES	BSHS	HRAD	
Human Development and Family Science				
Child and Family Services	HES	BSHS	HDFS	CHFS
Early Childhood Education	HES	BSHS	HDFS	ECE
Gerontology	HES	BSHS	HDFS	GERO
Nutritional Sciences				
Allied Health	HES	BSHS	NSCI	ALHT
Community Nutrition	HES	BSHS	NSCI	CONU
Dietetics	HES	BSHS	NSCI	DIET
Dietetics and Exercise	HES	BSHS	NSCI	DIEX
Human Nutrition/Pre-Medical Sciences	HES	BSHS	NSCI	HNPS
Nutrition and Exercise	HES	BSHS	NSCI	NUEX
University Studies	HES	BUS	UNST	
COLLEGE OF HUMAN ENVIRONMENTAL SCIENCES GRADUATE DEGREE PROGRAMS				
Design, Housing and Merchandising				
Apparel Design and Production	HES	MS	DHM	ADP
Interior Design	HES	MS	DHM	ID
Merchandising	HES	MS	DHM	MERC
Hospitality Administration	HES	MS	HSPA	
Human Development and Family Science				
Child and Family Services	HES	MS	HDFS	CHFS
Early Childhood Education	HES	MS	HDFS	ECE
Developmental and Family Science	HES	MS	HDFS	DVFS
Gerontology (on-campus program)	HES	MS	HDFS	GERO
Gerontology (Internet-based program)	HES	MS	HDFS	GERI
Marriage and Family Therapy	HES	MS	HDFS	MFTH
Human Environmental Sciences				
Family Financial Planning	HES	MS	HES	FFP
Design, Housing and Merchandising	HES	PhD	HES	DHM
Hospitality Administration	HES	PhD	HES	HSPA
Science	HES	PhD	HES	SCI
Nutritional Sciences	HES	PhD	HES	NSCI
Nutritional Sciences				
Dietetics	HES	MS	NSCI	DIET
Nutrition	HES	MS	NSCI	NUTR
WILLIAM S. SPEARS SCHOOL OF BUSINESS UNDERGRADUATE DEGREE PROGRAMS				
Accounting	BU	BSBA	ACCT	
Economics	BU	BSBA	ECON	
Business Economics and Quantitative Studies	BU	BSBA	ECON	BEQS
Pre-Law	BU	BSBA	ECON	PLAW
Entrepreneurship	BU	BSBA	EEE	
Finance	BU	BSBA	FIN	
Commercial Bank Management	BU	BSBA	FIN	CBM

Major / Option	*College*	*Degree*	*Major Code*	*Option Code*
General Business	BU	BSBA	GNBU	
Pre-Law	BU	BSBA	GNBU	PLAW
International Business	BU	BSBA	INBU	
Management	BU	BSBA	MGMT	
Human Resource Management	BU	BSBA	MGMT	HRM
Sports Management	BU	BSBA	MGMT	SPMG
Management Information Systems				
Information Assurance	BU	BSBA	MIS	IA
Management Science and Computer Systems	BU	BSBA	MIS	MSCS
Marketing	BU	BSBA	MKTG	
University Studies	BU	BUS	UNST	
WILLIAM S. SPEARS SCHOOL OF BUSINESS GRADUATE DEGREE PROGRAMS				
Accounting	BU	MSBA	ACCT	
Business Administration				
Accounting	BU	MBA/PhD	BADM	ACCT
Business Intelligence	BU	MBA	BADM	BSIN
Economics	BU	MBA	BADM	ECON
Entrepreneurship	BU	MBA	BADM	EEE
Information Assurance	BU	MBA	BADM	IA
Management Information Systems	BU	MBA	BADM	MIS
Professional MBA	BU	MBA	BADM	PMBA
Risk Management	BU	MBA	BADM	RSKM
Telecommunications Mgmt	BU	MBA	BADM	TCMG
Entrepreneurship	BU	PhD	BADM	EEE
Finance	BU	PhD	BADM	FIN
Management	BU	PhD	BADM	MGMT
Management Science and Information Systems	BU	PhD	BADM	MSIS
Marketing	BU	PhD	BADM	MKTG
Business Geographics	BU	MS	BGGR	
Economics	BU	MS/PhD	ECON	
Management Information Systems				
Management Information Systems	BU	MS	MIS	MIS
Accounting Information Systems	BU	MS	MIS	AIS
Digital Business Systems	BU	MS	MIS	DBS
Knowledge Management Systems	BU	MS	MIS	KNMS
Information Assurance and Security	BU	MS	MIS	IAS
Quantitative Financial Economics	BU	MS	QFE	
GRADUATE COLLEGE GRADUATE DEGREE PROGRAMS				
Environmental Science	GR	MS/PhD	ENVR	
International Studies	GR	MS	IS	
Natural and Applied Sciences				
Aviation and Space Science	GR	MS	NAS	AVED
Health Care Administration	GR	MS	NAS	HCA
Interdisciplinary Science	GR	MS	NAS	NASI
Natural Sciences	GR	MS	NAS	NASN
Photonics	GR	PhD	PHOT	
Plant Science	GR	PhD	PLS	
Telecommunications Management	GR	MS	TCOM	
Veterinary Biomedical Science	GR	MS/PhD	VBSC	

Major / Option	*College*	*Degree*	*Major Code*	*Option Code*
CENTER FOR VETERINARY HEALTH SCIENCES DOCTOR OF VETERINARY MEDICINE DEGREE PROGRAM				
Doctor of Veterinary Medicine	VM	DVM	VM	
CERTIFICATE PROGRAMS				
Certificate:				
Geographic Information Systems	AS	CERT	GIS	
Undergraduate Certificate:				
Environmental Studies	AS	UCRT	EVST	
Graduate Certificates:				
Aerospace Security	GR	GCRT	ASPS	
Business Data Mining	GR	GCRT	BDM	
Engineering and Technology Management	GR	GCRT	ETM	
Family Financial Planning	GR	GCRT	FFP	
Information Assurance	GR	GCRT	IA	
International Studies	GR	GCRT	INS	
Negotiation and Alternative Dispute Resolution	GR	GCRT	NADR	
Teaching English to Speakers of Other Languages	GR	GCRT	TESL	
University Faculty Preparation	GR	GCRT	UFP	

MINORS

Minor	College	Minor Code
Agricultural Economics and Agribusiness	AG	AEAB
Agronomy	AG	AGRN
Animal Science	AG	ANSI
Biochemistry	AG	BIOC
Entomology	AG	ENTO
Food Science	AG	FDSC
Forestry	AG	FOR
Horticulture	AG	HORT
Leadership Education	AG	LDED
Natural Resource Ecology and Management	AG	NREM
Rangeland Ecology and Management	AG	REM
Soil Science	AG	SLSI
Wildlife Ecology	AG	WLEC
Aerospace	AS	AERO
Africana Studies	AS	AFAM
American Indian Studies	AS	AMIS
Ancient and Medieval Studies	AS	AAMS
Applied Politics	AS	PSAP
Art	AS	ART
Asian Studies	AS	ASTD
Biochemistry	AS	BIOC
Biology	AS	BIOL
Botany	AS	BOT
Central Asian Studies	AS	CAST
Chemistry	AS	CHEM
Classical Studies	AS	CLST
Cognitive Science	AS	CSCI
Computer Science	AS	CS
Economics	AS	ECON
Emergency Management	AS	EM
English	AS	ENGL
European Studies	AS	EUST
Foreign Language	AS	FREN/GRMN/JPN SPAN/RUSS/GREK LATN
Gender and Women's Studies	AS	GWST
Geography	AS	GEOG
Geology	AS	GEOL
Hispanic and Latin American Studies	AS	HLAS
History	AS	HIST
Legal Studies	AS	LEGL
Mathematics	AS	MATH

Minor	College	Minor Code
Microbiology	AS	MICR
Middle East Studies	AS	MES
Military Science	AS	MLSC
Music	AS	MUSC
Philosophy	AS	PHIL
Physics	AS	PHYS
Political Science	AS	POLS
Psychology	AS	PSYC
Religious Studies	AS	REL
Russian and East European Studies	AS	REES
Sociology	AS	SOC
Statistics	AS	STAT
Theatre	AS	TH
Zoology	AS	ZOOL
Accounting	BU	ACCT
Economics	BU	ECON
Entrepreneurship	BU	ENTP
Finance	BU	FIN
General Business Administration	BU	GNBU
Human Resource Management	BU	HRM
Information Assurance	BU	IA
International Business	BU	INBU
Management	BU	MGMT
Management Information Systems	BU	MIS
Management Science and Computer Systems	BU	MSCS
Marketing	BU	MKTG
Sports Management	BU	SPMG
Aerospace Administration & Operations		
Aviation Management	ED	AAAM
Professional Pilot	ED	AAPP
Educational Psychology	ED	EPSY
Health Education and Promotion	ED	HEPR
Leadership	ED	LDRS
Leisure Studies	ED	LEIS
Architectural Studies: History and Theory	EN	ASHT
Apparel Design and Production	HES	ADP
Child Development	HES	CHDV
Gerontology	HES	GERO
Individual, Family and Community Services	HES	IFCS
International Studies	HES	IS
Merchandising	HES	MERC
Nutritional Sciences	HES	NSCI

New Student Orientation

Missy Wikle, MA - *Director*

321 Student Union • (405) 744-3636
Web site: http://newstudents.okstate.edu • **e-mail:** newstudents@okstate.edu

Orientation Programs

New Student Orientation is a required program developed to assist in the transition to Oklahoma State University. The Orientation program introduces campus resources, offices and information while familiarizing new students with the campus and Stillwater communities.

During orientation, students:

- Learn about opportunities ahead and prepare for academic transition from high school or another institution to OSU.
- Develop expectations of OSU and learn what is expected of OSU students.
- Work with academic advisers to learn about degree program choices and discover initial tools for success at OSU.
- Enroll in classes.
- Work with an Orientation Leader and mentor who provides information from a student perspective.

—New Freshmen. New Student Orientation for first time freshmen occurs during the months of May, June and July for those attending in fall and in December and January for those beginning in the spring semester. The standard summer orientation is an overnight session where students meet with academic advisers in multiple settings and have time to consider course options prior to enrollment. An alternate one day option covers enrollment only, and is available during the summer or mid-year orientation programs.

—Transfer Students. Transfer Students have several options for New Student Orientation. For those admitted early, Transfer Orientation in April or November is the first opportunity to learn about OSU and enroll. For those admitted closer to the semester start, an alternative Transfer Orientation during the months leading up to the first day of class is available.

—Concurrent Students. Students who choose to concurrently enroll in high school and college courses will also participate in a New Student Orientation program. This program will work around your current class schedule.

Alpha

The Office of Student Affairs sponsors a new student welcome event in August called Alpha. This optional program for new students continues the transition to OSU while providing opportunities to meet other students, faculty and staff; experience OSU traditions; understand academic expectations; learn about resources available and find key buildings on campus. A few highlights of Alpha include moving into campus housing early to get settled before classes begin, taking part in the exciting opening ceremony and pep rally at Gallagher-Iba-Arena, and learning OSU traditions and what it means to be an official OSU Cowboy!

Camp Cowboy

Each summer, a group of OSU student leaders coordinate special weekend programs called Camp Cowboy. This optional program offers an opportunity to discover new friends, new experiences and new ideas. Camp Cowboy is a fun-filled three-day new student experience that includes small group activities, a ropes course, camp fires and much more. For students who can only travel to Stillwater once in the summer, some Camp Cowboy weekends fall immediately following New Student Orientation and Enrollment programs.

Student Information Systems (SIS)

The Student Information System (SIS) allows students to access and update their academic and personal information in a self-service system. The majority of SIS use comes during enrollment when students may use the system to view the OSU Catalog course descriptions, search open sections of specific courses, and drop and add classes from their schedule. In addition, the SIS system connects students to:

- Class schedule, grades and unofficial academic transcript
- Desire2Learn online classroom
- Personal information housed on the system
- Official academic transcript request
- Student Rights and Responsibilities document
- Official OKSTATE e-mail account
- Bursar account, financial aid connections and credit card payment options

Orange Key Account (O-Key)

Every OSU student creates a personal O-Key account they will use to choose an okstate.edu e-mail account and access campus network and computing resources. It is very important to access and set up the O-Key account after applying for admission. To activate visit https://okey.okstate.edu.

ID Services

The OSU ID card is the official identification card for Oklahoma State University. It is used for photo identification, access to campus buildings and facilities, charges to the OSU Bursar, tickets to a variety of campus events and services, and an ATM card with optional banking services. OSU IDs will be made during the New Student Orientation and Enrollment program.

Placement Exams

Assessment and Testing can save both money and time by allowing students to test out or receive credit for courses in which they already know the material or for placement in a course level. Residual ACT and SAT, CLEP and Placement credit exams are administered by University Testing and Evaluation Services, located on the corner of Walnut St. and Admiral Ave. Exams are given by appointment.

Visit http://UAT.okstate.edu or call (405) 744-5958 to set up an appointment.

Students with college credit through Advanced Placement and International Baccalaureate programs should have test scores sent directly to OSU Admissions from the testing agency in order to apply credits earned to their program of study.

Office of the Registrar

K. Celeste Campbell, PhD - *University Registrar*
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322 Student Union • (405) 744-6876 • fax: (405) 744-8426
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Student Enrollment

Students must be admitted to the university before they can enroll for classes. Enrollment initiates the creation of an academic record and incurs a financial obligation. See the "Bursar" section of this *Catalog*.

The registration process is introduced to new freshmen and transfer students during new student orientation.

After meeting with their academic adviser to select courses appropriate to their degree plan, students may enroll online via the Student Information System (SIS) at http://prodosu.okstate.edu or by visiting the Office of the Registrar in 322 Student Union. An overdue account with the University or other registration holds will prevent completion of the enrollment process until these holds have been cleared.

Continuing students register for summer and fall classes during the latter part of the preceding spring semester and for spring classes during the latter part of the preceding fall semester.

—Continuous Enrollment. An undergraduate student who is enrolled for every fall and spring semester is considered continuously enrolled. A fall or spring semester with no enrollment is considered a break in enrollment. A graduate student with no break in enrollment or with a break in enrollment of less than one year is considered continuously enrolled. Readmission to the university is required if a student does not maintain continuous enrollment.

—Priority Enrollment. In order to facilitate access to courses required for timely degree completion, a student's priority for enrollment generally follows academic class level with graduate students and seniors having the highest priority. Some exceptions to this basic priority may be necessary to accommodate bona fide student needs, such as students with physical disabilities, for those committed (by a scholarship or full-time employment at the University) to perform a service for the University on a schedule specified by the University, for graduate students and students in the Honors College. Academic Affairs determines enrollment priorities, and enrollment schedules are published in the Enrollment Guide which can be found on the Office of the Registrar's Web site http://registrar.okstate.edu each semester.

Full-time OSU staff may utilize priority enrollment to help ensure they are given an opportunity to identify classes at a time that is least disruptive to their work schedule. This benefit of priority enrollment is extended to full-time (100% FTE), regular staff members. Staff members who are employed less than full-time are not eligible for priority enrollment.

—Late Enrollment. Students are allowed and encouraged to enroll well before the beginning of a given term (fall, spring, summer). Students whose initial enrollment for the term occurs on or after the first day of the term will be charged a late enrollment fee. A student is permitted to add classes after initial enrollment without a late enrollment fee during the first two weeks of a 16-week semester or through the fifth day of an eight-week summer session or during proportionate periods for block or short courses (see additional restrictions for Adding Courses below). See the "Tuition, Fees and Cost Estimates" section of the *Catalog* for the current late enrollment fee amount.

—Adding or Dropping Courses. *Adding Courses.* Approval from the student's academic adviser is required for adding a course. The sixth day of a regular semester,or the third class day of an eight-week summer session, or proportionate periods for short courses is the last day a course may be added (nonrestrictive). With instructor approval, a course may be added during the second week of classes of a regular semester, or the fourth or fifth day of an eight-week summer session (restrictive).

During the restrictive period, students must obtain their instructor's and adviser's signatures on a drop/add card and submit it to the Office of the Registrar in 322 Student Union to add a new course to their schedule.

Dropping Courses. Dropping refers to the dropping of one or more courses while remaining enrolled in at least one other OSU course for a given semester. Courses may not be dropped without the approval of the student's academic adviser.

A student may drop a course with a full refund and no record of the course on their academic record anytime through the sixth day of a regular semester, or through the third day of the eight-week summer session, or through proportionate periods of block or short courses.

After the deadline for dropping with no record, but prior to the end of the twelfth week of a regular semester, or the sixth week of an eight-week summer session, or proportionate periods for block or short courses, a student may drop a course with a grade of "W" recorded on their academic record. They will also be responsible for the applicable tuition and fees for the course. (See *Policy and Procedures letter 2-0206*.)

A student may not drop any course in which a violation of academic integrity is pending against the student. If the student admits responsibility for a violation meriting a grade of "F" for an assignment or examination, the instructor or Academic Integrity Panel may permit the student to drop the course with a grade of "W" (regular deadlines for dropping and withdrawing from the University still apply). If the student is found not responsible for the violation, he or she may drop the course with either a "W" or "F" (according to the drop grade policy) appearing on the academic record. If the student is found responsible for the violation, the instructor may assign an appropriate sanction, including assigning the grade "F" for the assignment/examination or "F!" for the course. (See *Policy and Procedures Letter 2-0822*)

—International Students. Consult with the Office of International Students and Scholars (ISS) before dropping courses. Under new reporting regulations required by the Student and Exchange Visitor Information System (SEVIS), dropping below full-time can put a student's visa status in jeopardy.

—Withdrawing from the University. Withdrawing refers to withdrawing from all courses for which a student is enrolled for a given semester, and therefore the student is no longer enrolled. The withdrawal process is initiated in the student's dean's office. If the student is unable to appear in person, the request for withdrawal may be initiated through the mail or by fax to the student's dean's office. A student who withdraws prior to the end of the twelfth week of a regular semester

or the sixth week of a summer session, or proportionate periods for block or short courses, will receive a grade of "W" (withdrawn) on the student's academic record. A student who withdraws after the 12th week of a regular semester or the sixth week of a summer session but prior to "Pre-finals Week," will receive a grade of "W" (withdrawn) or "F" (failing) as assigned by the instructor of each course. The grade of "W" or "F" will be recorded on the student's academic record, and the grade of "F" will be calculated in the grade-point average. (See *Policy and Procedures Letter 02-0206*.)

After the beginning of "Pre-finals Week" a student may not withdraw from the University and will be assigned only the grade of "A," "B," "C," "D," or "F" or (when appropriate) "I," "NP," "P," "S," "U," "R," "SR," or "UR" by the instructor of each course at the end of the semester or summer session.

—International Students. Consult with the Office of International Students and Scholars (ISS) before withdrawing for the semester. Under new reporting regulations required by the Student and Exchange Visitor Information System (SEVIS), withdrawing for the semester can put a student's visa status in jeopardy.

Veteran Services

Oklahoma State University maintains a full-time office of veteran services for the convenience of veterans and their dependents. OSU is an approved institution for students to receive education benefits by the Department of Veteran Affairs (DVA). Information and assistance is available for completion of appropriate forms necessary to apply for education benefits. The DVA has specific requirements regarding course work and attendance; contact a veterans representative in the Office of the Registrar, 322 Student Union.

Faculty & Staff Enrollment in University Courses

—Faculty. Permanent (tenure track), full-time (100%) members of the faculty are eligible to enroll for credit in one course per semester or a maximum of five hours during normally scheduled working hours and receive discounted tuition and fees as indicated below. To be eligible for the faculty/staff fee waiver, an employee must submit a completed Request for Faculty - Staff Fee Waiver form to the Office of the Registrar prior to the beginning of classes. If enrollment does not exceed one course, only the department head's approval is needed to receive the fee waiver. If the employee is enrolled in more than one course, the employee's dean and vice-president must also give approval for the waiver.
For full-time 100% faculty enrolled in University courses, the following fees will be waived:

a. Student activity fees
b. Student activity fee - Athletic fee
c. Health Services fee
d. Transportation fee
e. Consumable Material fee
f. Student Development Initiative fee
g. *Daily O'Collegian* fee

Faculty members must pay 50% of the general tuition, 100% of any additional fees not listed above, as well as 100% of any special course charges. Some courses taught through extension, outreach and year-long independent study are excluded. For faculty members who enroll in NOC-Stillwater courses, the fees listed above may be waived, but no tuition is waived. For more information contact the department offering the course to determine whether the tuition waiver applies. For more information, refer to the *Policy and Procedures Letter 2-0108*.

—Administrative/Professional and Classified Staff. Permanent, full-time (100%) active status staff members who meet the academic requirements of the University are eligible to enroll for credit and receive discounted tuition and fees as indicated below. To be eligible for the faculty/staff fee waiver, an employee must submit a completed Request for Faculty-Staff Fee Waiver form to the Office of the Registrar prior to the beginning of classes. Enrollment in University courses which meet during the staff member's normal working hours will be limited to one course or a maximum of five hours. There is no limit on the number of courses a staff member may enroll in after normal working hours. If enrollment does not exceed one course, only the department head's approval is needed to receive a fee waiver. If the staff member is enrolled in more than one course, his or her dean and vice president must also give approval for a fee waiver.

For active status 100% FTE, continuous regular staff enrolled in University courses, the following fees will be waived:

a. Student Activity fees
b. Student Activity fee - Athletic fee
c. Health Services fee
d. Transportation fee
e. Consumable Material fee
f. Student Development Initiative fee
g. *Daily O'Collegian* fee

Staff members must pay 50% of the general tuition, 100% of any additional fees not listed above, as well as 100% of any special course charges. Some courses taught through extension, outreach and year-long independent study are excluded. For staff members who enroll in NOC-Stillwater courses, the fees listed above may be waived, but no tuition is waived. For more information contact the department offering the course to determine whether the tuition waiver applies. For more information, refer to the *Policy and Procedures Letter 3-0744*.

Official Records

—Six Week Progress Reports. Faculty report six week progress grades for all students (regardless of classification) enrolled in 1000- and 2000-level classes. This will normally occur during the seventh week of classes. Student athletes will have all six week grades reported, not just 1000- and 2000-level. Progress reports are made available to students and to the students' advisers through the Student Information System (SIS).

—Grade Reports. Reports of the final grades of all students are compiled and released shortly after the end of each semester by the Office of the Registrar. These reports are made available electronically to the students, the students' advisers and the students' deans through the Student Information System (SIS).

—Official Transcripts. All official transcripts of student academic records at OSU are prepared and released by the Office of the Registrar. The official transcript includes the complete academic record, both undergraduate and graduate, as well as the signature of the University Registrar and the official seal of the University.

Transcripts of academic records at OSU may be ordered in the following ways:

1. Online via the Student Information System (SIS).
2. Mail or fax a completed, signed Transcript Request form to the Office of the Registrar (forms can be downloaded from http://registrar.okstate.edu)
3. In person at the Office of the Registrar, 322 Student Union; with a photo ID.

Students with transcript holds (such as holds due to outstanding financial obligations to the University) will not be granted a transcript until the hold has been cleared with the appropriate University officials.

Copies of transcripts from other institutions cannot be furnished.

Students' Rights to Privacy

The Family Educational Rights and Privacy Act of 1974 (Buckley Amendment) was designed to protect the privacy of educational records, to establish the right of students to inspect and review their educational records in all offices, and to provide guidelines for the correction of inaccurate or misleading data through informal and formal hearings.

An OSU student has the right to:

1. Inspect and review information contained in his or her educational records.
2. Challenge the contents of the educational record.
3. Have a hearing if the outcome of a challenge is unsatisfactory.
4. Submit an explanatory statement for inclusion in the educational record, if the outcome of the hearing is unsatisfactory.
5. Secure a copy of the institutional policy, which includes the location of all educational records.
6. Prevent disclosure, with certain exceptions, of personally identifiable information from the educational record.

Withholding Disclosure of Information

Currently enrolled students may withhold disclosure of directory information. A student may file a written request with the Office of the Registrar to not release directory information. Such requests will be honored until revoked by the student. The University assumes that failure on the part of any student to specifically request the withholding of directory information indicates individual approval for disclosure.

Access to Records

Students may inspect and review their educational records. Some form of photo identification must be displayed before access to educational records will be allowed. No non-directory information regarding students' educational records may be disclosed to anyone without written consent of students, except for selected purposes as authorized by federal law, such as to "school officials" who have a "legitimate educational interest" in the student, to another institution to which a student is transferring, and in response to a lawfully issued court order or subpoena.

Parental Access to Records

At the postsecondary level, parents have no inherent rights to inspect their son's or daughter's educational records. Information regarding educational records is best obtained by direct communication between the parent and the student. Students may consent to release their educational records to parents, legal guardians, or other individuals by completing the appropriate form in the Office of the Registrar. Such consent should be given in an uncoercive environment. Parents of a dependent student may challenge denial of access to educational records by producing the most current copy of Internal Revenue Form 1040.

Definitions

"Educational Record" refers to those records which are directly related to a student and are maintained by an educational institution.

"Directory Information" includes: student's name; local and permanent address or hometown; telephone number; year of birth; major field of study; weight and height of student participating in officially recognized sports; dates of attendance at Oklahoma State University; degrees, honors, and awards granted or received and dates granted or received; academic classification such as freshman, sophomore, junior, senior, etc.; electronic mail address; most recent educational institution previously attended; dissertation or thesis title; advisor or thesis/dissertation advisor; participation in officially recognized organizations, activities, and sports; parents' names and addresses (city and state only).

"School official" is defined as an individual currently serving as a member of the Oklahoma State University Board of Regents or classified as faculty, administrative, or professional, and the staff such school officials supervise; the President and CEO of the Alumni Association and President and CEO of the Oklahoma State University Foundation and the staff they supervise; the National Student Clearinghouse; and contractors, volunteers, and other non-employees performing institutional functions as school officials with legitimate educational interests.

"Legitimate educational interest" is defined as an interest which results from the duties officially assigned to a school official and which are related to such a school official's responsibility for facilitating the student's development. School officials may have legitimate educational interests both in students who are currently enrolled and in those no longer enrolled.

Location of Records

The Office of the Registrar is the official office of the University for maintaining and releasing information pertaining to the students' academic records, and the Office of Student Affairs is the official office of the University for maintaining and releasing information pertaining to the students' discipline records. Career Services is the official office of the University for collecting and releasing information furnished or authorized by students for the purpose of seeking employment. Placement activities are conducted through several different offices on campus, and a variety of forms are available for the option of the student. The student's right of inspection will be determined by the option elected in providing information.

Scholarships and Financial Aid

Charles W. Bruce, PhD - *Senior Director*
Sara Bennett Flores - *Director, Talent Search*
Jennifer Chessmore - *Director, Upward Bound*
Julie Berg - *Associate Director, Programs*
Will Womack - Associate *Director, Information Systems & Operations*
Cathy Bird - *Assistant Director, Loan Processing & Records Management*
Chad Blew - *Assistant Director, Scholarships*
Linda Good - *Assistant Director, Client Services*
Margaret Betts - *Assistant Director, Special Programs*

119 Student Union • (405) 744-6604
Web site: www.okstate.edu/finaid • **e-mail:** finaid@okstate.edu

Students who need financial assistance to attend college are encouraged to consider the many types of financial aid available through the OSU Office of Scholarships and Financial Aid. These programs include scholarships, grants, loans, and part-time jobs.

Scholarship Programs

Oklahoma State University annually offers more than $29 million in tuition scholarships and more than $20 million in other scholarships to qualifying freshman, transfer, continuing and graduate students.

OSU's scholarships are awarded primarily on the basis of academic achievement, academic potential, leadership activities, or community service. Scholarships are awarded by various campus academic and administrative offices, the OSU Foundation, or in conjunction with private industry, private foundations, the Oklahoma State Regents for Higher Education, and the state of Oklahoma.

Tuition Scholarships

Tuition scholarships for Oklahoma residents range from approximately $800 to $2,500 in value, and vary in length from one year to four years. One-year and multiple-year tuition scholarships are awarded to incoming freshman students who have attained high scholastic standing in high school. Transfer tuition scholarships are offered to outstanding students transferring to OSU from two-year and four-year colleges.

Nonresident students entering OSU should inquire about eligibility for nonresident tuition scholarships. Students receiving these awards have some or all of their nonresident tuition charges waived and pay in-state tuition rates. These awards are made based on several criteria, including academic accomplishments, being a child or grandchild of an OSU alumnus, or being a member of a federally-recognized Oklahoma Native American tribe.

The priority deadline for students entering OSU in fall is February 1st; the priority deadline for students entering OSU in the spring is October 15th.

Each student with a multiple-year scholarship is required to meet specific renewal criteria to continue receiving his or her scholarship the following year (up to a specified maximum number of years of eligibility).

All current undergraduate students at OSU are encouraged to complete the Scholarship Application for Continuing and Readmitted Undergraduates each year, available at www.okstate.edu/finaid/. Scholarships for continuing students are awarded based on academic performance, financial need, or both.

Graduate students seeking cash or tuition scholarships should contact their academic departments and the Graduate College regarding application procedures and deadlines.

Cash Scholarships

—National Merit Finalists. OSU welcomes all Merit Finalists and Merit Scholars. OSU offers very attractive financial assistance opportunities for National Merit Scholars who select OSU as their first choice school with the National Merit Scholarship Corporation, and apply for admissions and scholarships at OSU. National Merit Finalists, National Hispanic Scholars, and National Achievement Finalists are encouraged to contact the Office of Scholarships and Financial Aid for more information on funding opportunities.

—President's Distinguished Scholarship (PDS). The OSU Foundation offers this prestigious $8,800 per-year cash award. It is available to students who have exhibited outstanding academic ability and involvement as a leader in school and community activities. PDS scholarships are very limited in number (about 75 each year) and the competition for them is highly competitive. Awards are usually made in March.

—President's Leadership Council (PLC). This one-year, $1,500 cash scholarship is awarded to a limited number of incoming freshmen based on leadership potential, school and community service, and academic achievement. The PLC is both an honorary and a working organization. The selection process is highly competitive. Awards are usually made in March.

—College and Departmental Cash Scholarships. Some colleges and departments award cash scholarships to freshman, continuing, and graduate students who have excelled academically. The number of awards, stipends and requirements vary, depending on the scholarship's requirements. For more information, contact the college or department.

—Oklahoma State Regents for Higher Education (OSRHE) Academic Scholars. Academic Scholars receive resident or nonresident tuition scholarships and up to $5,500 cash annually from the state of Oklahoma for four years. (A fifth year of funding may be requested.) Academic Scholars who are also National Merit Scholars may receive additional funds. Only national ACT or SAT test scores are used in the qualification process. Contact the Office of Scholarships and Financial Aid for eligibility details.

—Other Scholarships. The OSU Office of Scholarships and Financial Aid frequently has applications for scholarships sponsored by various local, state and national organizations available in its office in 119 Student Union. Students should visit the office periodically (or online at www.okstate.edu/finaid/) to see if there are scholarships with qualifications of interest.

—Residual ACT Test. Incoming students at OSU should consider taking the "Residual" ACT test at OSU. Incoming students who have raised their standardized test scores may submit those scores to the Office of Scholarships and Financial Aid to be considered for a higher value

scholarship, but must do so by August 1. For information about the Residual ACT, go to http://UAT.okstate.edu. (Some programs, such as the OSRHE Academic Scholars Program, accept only national ACT or SAT test scores.)

Special Notes

1. Final awards can be made only to applicants who are fully admissible, in good standing, to the University.
2. The student must accept the award within the time designated in the award letter or the offer may be rescinded.
3. The student must begin using the scholarship the first semester it is available and must use the scholarship continuously, with no breaks in attendance at OSU.
4. Tuition scholarships will be made to qualified students only as long as funds remain available.
5. A student may have only one tuition scholarship in effect at a time. However, students may receive multiple cash awards such as PDS, PLC, or college and departmental awards.
6. Selected state programs, such as the OSRHE Academic Scholars Program, accept scores recorded on national test dates only.
7. The OSU scholarship program accepts both national tests scores and residual tests taken at OSU.
8. State and University agencies may establish a cap on total scholarship dollars a student may receive from state and University sources, precluding students from receiving funds that exceed legitimate educational costs.

Federal Aid Programs

Federal aid at OSU is awarded on the basis of demonstrated financial need. Each student who wishes to be considered for need-based assistance should complete the Free Application for Federal Student Aid (FAFSA) and submit it to the processing center as soon after January 1 as possible to receive aid for the succeeding academic year. Early application is encouraged due to the high demand for available money.

Students can apply for assistance by submitting the paper FAFSA or they can file electronically by accessing the U.S. Department of Education's "FAFSA on the Web" application site www.fafsa.ed.gov.

An analysis of the FAFSA is used to determine demonstrated need for federal, state, and institutional programs such as Federal Pell Grants, Federal Supplemental Educational Opportunity Grants (FSEOG), Federal Academic Competitiveness Grants (ACG), National Science and Mathematics to Retain Talent (SMART) Grants, Oklahoma Tuition Aid Grants (OTAG), Federal Perkins Loans, William D. Ford Federal Direct Loans, Federal Work-Study (FWS), and tuition scholarships.

There are also programs available for students who do not demonstrate financial need. The Federal Direct Parent Loan for Undergraduate Students (PLUS) Program and the William D. Ford Federal Direct Unsubsidized Loan allow graduate students and independent undergraduates, as well as parents of dependent undergraduates, to borrow funds to meet educational expenses.

To be considered for financial aid, a student must:

1. Demonstrate financial need, except for some loan and scholarship programs.
2. Be a U.S. citizen or eligible non-citizen.
3. Be enrolled as a degree or certificate-seeking candidate, including a program of study abroad.
4. Meet minimum satisfactory academic progress standards.
5. Have a high school diploma or GED.
6. Not be in default on any federal loan, not have borrowed in excess of the allowable limits and not owe a refund to any federal grant program (including the Oklahoma Tuition Aid Grant program).
7. Be prompt in responding to any requests for additional information made by the Office of Scholarships and Financial Aid.

Students and parents are invited to contact the Office of Scholarships and Financial Aid for information regarding financial assistance programs or to make an appointment with a financial aid counselor to discuss specific eligibility requirements. The office has information about programs and services online at www.okstate.edu/finaid/.

Grants

Undergraduate students who have not completed their first bachelor's degree are eligible to apply for the Federal Pell Grant, Federal Supplemental Education Opportunity Grant, Academic Competitiveness Grant, and the Science and Mathematics to Retain Talent Grant. Undergraduate students who are Oklahoma residents are eligible to apply for the state grant program, the Oklahoma Tuition Aid Grant.

Federal Pell Grant eligibility is determined by the U.S. Department of Education by using a congressionally-approved formula.

Federal Supplemental Education Opportunity Grants (SEOG) are awarded to students who demonstrate financial need as reflected in the FAFSA. Funding in this program is limited and is usually awarded to applicants who demonstrate the most financial need.

Academic Competitiveness Grants are awarded to students who completed a rigorous high school program after January 1, 2005, who are eligible for a Pell Grant. This award is for students who have completed less than 48 credit hours of course work.

The National Science and Mathematics Access to Retain Talent (SMART) Grant provides assistance for undergraduate students who have successfully completed 48 credit hours in an approved major, are receiving a Federal Pell Grant, and who meet the grade point average requirements.

Oklahoma Tuition Aid Grants (OTAG) are awarded to eligible undergraduate Oklahoma residents who may apply by correctly completing the FAFSA. Grant amounts are determined by the applicant's enrollment status, demonstrated need, and by the availability of funds. Students are notified of their eligibility and award amounts by the Oklahoma State Regents for Higher Education, not by OSU.

Federal Work-Study

This program is designed to help students meet their educational expenses through part-time employment. The Office of Scholarships and Financial Aid determine award amounts on the basis of financial need. While all Federal Work-Study student employees are paid at least the current federal minimum wage, the actual rate of pay depends on their qualifications and the types of jobs they hold.

Eligible students may be employed by any participating office or department at OSU or at an off-campus, non-profit agency. While working in positions directly related to their curricula, students form strong links with the community.

Loans

OSU has several loan funds for students who need financial assistance. These funds are available to students who meet the eligibility requirements of the various programs and are making satisfactory progress in their college work.

Institutional loans include short- and long-term loans. The short-term loan program provides up to a maximum of $300 per semester (less a $10 service charge) for the purpose of meeting educationally-related expenses that are not charged to a student's University account. Students are billed for the loan through the Office of the Bursar on the billing statement of the month in which they apply. Applications must be made in person at the Office of Scholarships and Financial Aid.

Long-term loan programs consist of the Federal Perkins Loan, William D. Ford Federal Direct Subsidized and Unsubsidized Loans and the Federal Direct Parent Loan for Undergraduate Students (PLUS).

The rate of interest on a Federal Perkins Loan during the period of repayment is five percent simple interest per annum on the unpaid balance. Funding in this program is limited and is awarded to applicants who demonstrate significant financial need.

Enrollment Requirements

To be considered for loan funds, undergraduates must be enrolled in at least six hours in the fall, spring or summer semester. Undergraduates who plan to enroll in fewer than six hours for the semester may still be eligible for limited grant funding. Undergraduate tuition scholarship recipients must be enrolled in at least 12 hours to receive the award for the fall or spring semester; tuition scholarships are not available for the summer.

Graduate students must be enrolled in at least four hours in the fall or spring semester and at least two hours in the summer to be considered for financial assistance for that semester. Graduate students receiving tuition scholarships from their academic departments or the Graduate College should contact the awarding office for enrollment requirements.

Federal and institutional aid recipients who are unsure of their eligibility for assistance based on their enrollment status are encouraged to contact the Office of Scholarships and Financial Aid for clarification. Recipients of non-OSU scholarships should check with the awarding agency to determine the minimum enrollment required for payment.

Eligibility for financial assistance is related only to the total number of credit hours in which the student enrolls. Certifiable enrollment status, based upon a combination of enrollment and employment (such as a graduate assistant enrolled in six hours with a 50% graduate assistant appointment), only assists with the deferral of loan repayment, never qualification for aid.

Academic Progress

The OSU Office of Scholarships and Financial Aid is required by federal regulation to monitor the academic progress of all students who apply for financial assistance. The official record of the OSU Office of the Registrar is reviewed to determine student compliance with the policy.

The policy for federal aid and state (OTAG) recipients includes three components. Students must: (1) not exceed a maximum number of hours allowed for completion of the degree program; (2) maintain a minimum cumulative Graduation/Retention Grade Point Average; and (3) successfully complete at least 75% of the total cumulative hours attempted. A copy of the policy detailing the requirements is included with every award notice and is also available in the Office of Scholarships and Financial Aid and online at www.okstate.edu/finaid/.

Each undergraduate with a multiple-year scholarship is required to meet specific renewal criteria to continue receiving his or her scholarship the following year; the policy for each scholarship is included with the award letter and is available from the OSU Office of Scholarships and Financial Aid.

Recipients of athletic grant-in-aid must meet the eligibility requirements of the program.

Professional Education Certification

To receive financial assistance, students who are classified by the Graduate College as special students and who are also pursuing Professional Education certification must be enrolled in a required program for elementary or secondary teacher certification or recertification in Oklahoma (must be required to teach); and be enrolled in at least six hours in the fall or spring semesters or three hours in the summer term.

Professional Education students are eligible to apply for consideration in Federal Work-Study, Oklahoma Tuition Aid Grant (OTAG), Federal Perkins Loan, and Direct Loans (Subsidized and Unsubsidized). Due to the unique nature of the Professional Education program, students are encouraged to schedule an appointment with a financial aid counselor to discuss the required documentation needed for financial aid eligibility.

Prerequisite Course Work for Admission to a Graduate Program

To be considered for federal assistance, students generally must be enrolled in a recognized academic program leading to a degree or certificate. However, if a student is enrolled at least half-time in course work that is ***required for admission*** to a graduate program at OSU, the student may be eligible for loan consideration for one calendar year (12 months) beginning on the first day of the loan period.

Students are only eligible for Ford Federal Direct Loan consideration. Preparatory students who wish to be considered for assistance should schedule an appointment with a financial aid counselor to discuss their particular circumstances.

TRIO Programs

The TRIO Programs at Oklahoma State University are funded through the U.S. Department of Education. The programs are designed to provide support and motivation to youth and adults who have the potential for academic success and who meet government income requirements and/or whose parents have not graduated from college.

While the Upward Bound and Educational Talent Search programs each serve different groups of students, both programs provide the following services: academic advisement; career counseling; college financial planning; college selection and admission; parent/guardian services; personal and life skills development; technology skills; test preparation and score analysis; and tutoring.

Tuition, Fees and Cost Estimates

Tuition and Fees

It is important that students carefully consider the total cost of financing their education, from the entering term to the completion of their degree. If financial help will be needed beyond those funds which the student or the family is able to provide, the student should make the necessary applications for financial assistance well in advance of enrollment. Students should pay particular attention to early deadlines for application for grants, scholarships, work-study positions, and Perkins Loans. While the needs and resources of each student differ, the University can provide a general list of fees and expenses normally encountered.

Students are given information at the time they complete their enrollment on the procedures and deadlines for payment of tuition and fees. (See "Financial Obligation" on page 46 of this *Catalog*.)

The required tuition and mandatory fees for resident and nonresident students at Oklahoma State University are listed below. Resident and nonresident tuition rates are based on the undergraduate and graduate level of the course. All course offerings are listed by four-digit numbers with the first digit indicating the course level. Undergraduate courses are all courses with a first digit of 0 through 4. Graduate-division courses are all courses with the first digit 5 or above.

New freshmen who are Oklahoma residents are given the opportunity at the time of enrollment to select a guaranteed tuition rate that is locked in for four years. To maintain this rate, students must remain continuously enrolled as full-time students. The lock tuition rate is listed in the tuition and fees grid to the right, and detailed information is provided on the New Student Orientation Web site at http://newstudents.okstate.edu.

For the most recent student costs refer to the Office of the Bursar Web site at http://bursar.okstate.edu/tuition.html**.** Included in this section is information regarding fee definitions, refund policies, and residential life rates.

Tuition and fees are subject to change without notice, as provided by the University Board of Regents and OSRHE policies.

Estimated Total Expenses for Students

An estimated budget (based on 2008-2009 figures) for an undergraduate student at OSU is as follows:

Resident

Tuition and Fees (based on 15 credit hours)	$3,443.25
University Housing and Board (based on average freshman residence hall charges)	$6,750.00
Textbooks and Supplies	$440.00
Average Miscellaneous. Personal Expenses	$1,905.00
Total per Semester	**$12,538.25**

Non-Resident

Tuition and Fees (based on 15 credit hours)	$8,620.50
University Housing and Board (based on average freshman residence hall charges)	$6,750.00
Textbooks and Supplies	$440.00
Average. Miscellaneous Personal Expenses	$1,905.00
Total per Semester	**$17,715.50**

Undergraduate Tuition and Fees - per credit hour		
Resident	Non-Resident	
$131.35	$154.85	Tuition
$151.00	NA	**Resident** Lock 2009-2010 Tuition
$10.50	$10.50	Academic Facility fee
$3.25	$3.25	Academic Records fee
$5.00	$5.00	Advising/Assessment fee
$1.50	$1.50	Consumable Materials fee
$0.30	$0.30	*Daily O'Collegian* fee
$3.00	$3.00	Energy fee
$7.70	$7.70	Facility fee
$4.35	$4.35	Health Services fee (Stillwater courses only)
$10.80	$10.80	Library Automation and Technology fee
$2.50	$2.50	Life Safety and Security fee
$2.30	$2.30	Parking fee (Tulsa courses only)
$2.50	$2.50	Student Activity fee
$3.00	$3.00	Student Activity fee - Athletic fee
$2.00	$2.00	Student Development fee
$4.35	$4.35	Student Union Renovation fee (freshmen & transfer students only)
$2.30	$2.30	Transportation Services fee
$9.40	$9.40	University Technology and Infrastructure Maintenance fee

Graduate Tuition and Fees - per credit hour		
Resident	Non-Resident	
$476.50	$602.00	Tuition
$10.50	$10.50	Academic Facility fee
$3.25	$3.25	Academic Records fee
$5.00	$5.00	Advising/Assessment fee
$1.50	$1.50	Consumable Materials fee
$0.30	$0.30	*Daily O'Collegian* fee
$3.00	$3.00	Energy fee
$7.70	$7.70	Facility fee
$4.35	$4.35	Health Services fee (Stillwater courses only)
$10.80	$10.80	Library Automation and Technology fee
$2.30	$2.30	Parking fee (Tulsa courses only)
$2.00	$2.00	Student Development fee
$2.30	$2.30	Transportation Services fee
$9.40	$9.40	University Technology and Infrastructure Maintenance fee

Center for Health Sciences Professional Programs (2008-09 academic year)

Oklahoma Residents

$18,545.00	Resident tuition per year
$176.40	Activity fee per year
$120.00	Library fee per year
$108.00	Health Service fee per year
$161.25	Technology fee per year
$300.00	Malpractice Insurance

Non-Residents of Oklahoma

$36,466.85	Non-Resident tuition per year
$176.40	Activity fee per year
$120.00	Library fee per year
$108.00	Health Service fee per year
$161.25	Technology fee per year
$300.00	Malpractice Insurance

Center for Veterinary Health Sciences (2008-09 academic year)

Oklahoma Residents (per credit hour)

$6,195.53	Resident tuition per semester
$3.25	Academic Records fee
$0.30	*Daily O'Collegian* fee
$7.70	Facility fee
$4.35	Health Service fee
$7.80	Library Automation and Technology fee
$2.50	Student Activity fee
$3.00	Student Activity fee - Athletic fee
$1.90	Student Development fee
$2.30	Transportation Services fee
$5.00	University Technology & Infrastructure Maintenance fee
$271.96	Resident tuition (less than 12 hours)

Non-Residents of Oklahoma (per credit hour)

$14,833.18	Non-Resident tuition per semester
$3.25	Academic Records fee
$0.30	*Daily O'Collegian* fee
$7.70	Facility fee
$4.35	Health Service fee
$7.80	Library Automation and Technology fee
$2.50	Student Activity fee
$3.00	Student Activity fee - Athletic fee
$1.90	Student Development fee
$2.30	Transportation Services fee
$5.00	University Technology & Infrastructure Maintenance fee
$726.57	Non-Resident tuition fee (less than 12 hours)

Center for Veterinary Health Sciences students who repeat course work will be charged an amount per credit hour for Oklahoma residents and non-residents. Non-residents will also be charged non-resident tuition per credit hour.

Fees for Special Services

All students pay special fees each semester to contribute to the betterment and general welfare of the campus community.

Students regularly enrolled in the University are assessed *facility, health, and activity fees* that entitle them to use the Student Union, the Colvin Physical Education Center, and the Health Clinic, and that provide support for student governance, organizations, and programs.

The *activity fees* provide partial support to such programs, services, and organizations as the Student Government Association, collegial student councils and related student organizations, Allied Arts, fine arts, athletics, intramural activities and sports clubs, minority student organizations, and the Student Activities office.

The *academic facilities fee* funds renovation, maintenance, and construction of classroom and other academic facilities necessary to support contemporary instruction and the demands of growing enrollment.

The *academic excellence fee* provides for new faculty positions and/or helps increase existing faculty salaries up to peer averages.

The *academic records maintenance fee* provides for the basic graduation cost, the maintenance of the academic record system and issuance of official transcripts.

The *advising and assessment fee* provides for skills assessment and evaluation of students' capabilities at various stages of their academic careers, and to get feedback from students regarding their course work. This fee also supports the commitment to academic advising within each college to create a collaborative decision-making framework which students can identify and realize their educational goals. The goal is to preserve personalized advising services, reduce the advisor/student ratio in high demand areas and to develop advising technology such as degree audit systems to support an increased graduation rate. Support is also provided to students with career development, employment and internship services, including expanded interview opportunities, placement preparation, and other programs related to success after graduation.

The *consumable materials fee* provides for special services, supplies or equipment not covered by tuition or departmental operating budgets.

The *energy fee* supports the rising utility costs projected for the academic buildings across campus.

The *health services fee* is assessed for comprehensive health and pharmacy services.

The *library automation and technology fee* defrays the cost of equipment, software, and other aspects related to operating the online computerized library service. This fee also protects student access to heavily-used electronic journals and other information services.

The *life safety and security fee* provides for the assessment and continued implementation of campus safety measures that includes the "Code Red" emergency notification system to notify students and staff via voice mail, e-mail or text messages should there be an emergency situation.

The *O'Collegian fee* supports the production and distribution of the newspaper, the *Daily O'Collegian*, which is an award-winning campus newspaper.

The *transportation services (parking & transit services) fee* assists with maintenance and operations of the OSU Transportation Services.

The *student development fee* is used to support student participation in orientation efforts which are linked to recruitment and retention of freshmen as well as transfer students. Development and leadership opportunities for minority students will also be provided by these resources. It is also used to support campus life to cover costs for the guest speaker series, Student Union programs and the Student Union Activities Board.

The *Student Union renovation fee* is used for renovations and enhancements to the Union such as availability of computer kiosks and wireless connectivity, food service seating space, product mix and service style of merchant shops, and mixes of quiet study and social lounge space. These renovations include considerations to infrastructure as well as to accessibility and traffic flow within the building and improved merchant space.

The *University technology and infrastructure maintenance fee* provides for the maintenance of existing facilities, and the expansion and development of central and collegiate facilities, software, and multimedia capabilities. This fee also covers increasing costs in multiple areas, including network and system infrastructure, hardware and software costs and communications.

Certain groups of students in special courses may be on campus for very short time intervals or may be required by the University to reside away from the campus area for the entire semester. Such students will be prevented from participating in campus activities and will not be charged student activity, health, student development, and transportation fees when enrolled (1) only in a specialized course(s) offered for a special interest group and not in any other course(s) in the University or (2) in a course(s) which requires that the student reside out of area for the entire semester or summer session (clinical laboratory science, geology and forestry summer camps, etc.). Other extenuating circumstances may be cause to consider denying use of and charge for these facilities or participation in activities sponsored by these fees.

Special Fees

Academic excellence fee (per credit hour)	
Freshmen 08-09 & transfer students:	$25.75
Freshmen, sophomore & transfer students:	$19.75
All other students (excluding Vet Med):	$9.75
Application fee:	
International students	$75.00
Undergraduate and graduate students	$40.00
Audit without credit: tuition and fees are the same as credit enrollments	
Automobile parking permit (per year):	
Campus residents	$44.00
Off-campus residents	$54.00
Graduation fees:	
Fourth-year osteopathic medicine	$40.00
Master's thesis binding fee* (each)	$40.00
Doctoral dissertation binding fee* (each)	$60.00
Dissertation microfilming fee (each)	$50.00
Graduate level: Business Professional fee	$250.00
Health risk assessment fee for first-time students - Stillwater campus only:	$20.00
International student status maintenance fee: per semester	$50.00
Late enrollment fee: 1st day of term	$50.00
Math Licensing fee	$80.00
Remedial courses: Supplementary fee (per credit hour, in addition to the general fee)	$24.00
New Student Orientation & Enrollment fee (freshmen & transfer students - one time only)	$75.00

*If not submitting electronic version

College-Based Fees (per credit hour):

Agriculture Technology fee	$7.50
Arts & Sciences Technology fee	$7.50
Business Technology fee	$7.50
Education Technology fee	$9.50
HES Technology fee	$9.50
Engineering Technology fee	$21.50
VM Technology fee	$12.00
SSB Instruction Infrastructure	$4.50
Engineering Facilities/Equipment	$10.00
Arts & Sciences Collegiate Excellence fee	$11.50
Business Collegiate Excellence fee	$9.00
Education Collegiate Excellence fee	$9.00
HES Collegiate Excellence fee	$14.00
HORT & LA Facilities/Equipment/Lab	$12.00
ASNR Facilities/Equipment	$11.00

Other Expenses

Books and supplies used by the student are available in the Student Union Bookstore at reasonable prices and may be charged to the student's Bursar account. Additional incidental and personal expenses such as clothing and entertainment will depend upon the individual student.

—Sponsored International Students. Oklahoma State University charges a special administrative/management fee for sponsored international students and scholars who require third party billings and need extra assistance or whose sponsors have indicated a requirement for supplementary assistance beyond that of regular university programming. The customary sponsored student fee is $275 per semester. Sponsored programs may also include items such as special training, research costs, equipment, enrichment, required travel or any other needs deemed necessary by the sponsor. It is the charge of the Office of International Students and Scholars (ISS) to provide the most complete and appropriate educational program for sponsored international students and scholars. The ISS sponsored program is designed to coordinate, expedite and administer all aspects of procedures pertaining to related training. Sponsoring agencies should direct all matters to the Office of International Students and Scholars, 076 Student Union. E-mail may be sent to karen.sebring@okstate.edu. The fax number is (405) 744-8120.

Tuition and Fee Waivers for Faculty & Staff

Permanent, full-time, active members of the faculty and staff who meet the requirements under University Policy and Procedures 2-0108 or 3-0744 are eligible to enroll for credit or audit one course per semester or a maximum of five hours during normally scheduled working hours and receive discounted tuition and fees as indicated below. To be eligible under this fee policy, an employee must submit a completed Request for Faculty-Staff Fee Waiver form to the Office of the Registrar prior to the beginning of classes. If the form is not on file prior to the beginning of classes, the student will not be granted the waiver in fees. There is no limit on the number of courses a staff member may enroll in after normal working hours. If enrollment does not exceed one course, only the department head's approval is needed to receive a fee waiver. If the staff member is enrolled in more than one course, his or her dean and vice president must also give approval for a fee waiver.

For eligible full time 100% faculty or staff enrolled in University courses, the following fees will be waived:

a. Student Activity fees
b. Student Activity fee - Athletic fee
c. Health Service fee
d. Transportation fee
e. Consumable Material fee
f. Student Development Initiative fee
g. *Daily O'Collegian* fee

Faculty and staff must pay 50% of the general tuition, 100% of any additional fees not listed above, as well as 100% of any special course charges. Some courses taught through year-long independent study, extension and outreach are excluded. For faculty and staff members who enroll in NOC-Stillwater courses, the fees listed above may be waived, but no tuition is waived. For more information, contact the department offering the course to determine whether the tuition waiver applies.

Any individual 65 years or older may audit a class at no charge. The audit fee is also waived for faculty and staff who have retired from the University under the Oklahoma Teacher Retirement System's "Rule of 80" or "Rule of 90" regardless of age at time of retirement.

Refunds

Refunds and deposits that may be due a student will be first applied to encumbrances owed to the University.

Drop/Withdrawal Refund Policy

A student dropping a course:

prior to the end of the sixth day of a regular semester, or the third day of the eight week summer session, or during the proportionate period for block or short courses, **will receive a 100 percent refund of tuition and fees.**

A student dropping a course:

after the sixth day of a regular semester but prior to the end of the second week, or after the third day of the eight week summer session through the fifth day, or during the proportionate period for block or short courses, **will receive a 50 percent refund of tuition and fees.**

A student dropping a course:

after the second week of the regular semester, or after the first week of the eight week summer session, or during the proportionate period for block or short courses, **will not receive a refund.** (See *Policy and Procedures Letter 02-0206*.)

Title IV recipients follow federal refund guidelines.

Repayment Policy

Financial aid is considered to be used first for direct educational costs (tuition and fees) and, if the student is in University housing, for room and board. Therefore, if a student financial aid recipient withdraws and is eligible for a refund of tuition and fees and/or room and board, all or part of this refund will be used to reimburse the Title IV financial aid program(s) up to the amount of assistance that the student received from the program(s).

If a student receives cash from financial aid in excess of non-institutional costs, part of this aid may be required to be repaid; the amount of the repayment depends upon how many weeks the student was enrolled and the amount of aid received.

When there are multiple disbursements of aid, the assumption is made that the first disbursement(s) is used to pay institutional charges. Therefore, if cash is disbursed, the cash is derived from the last disbursement(s) prior to the disbursement of cash. A detailed policy can be obtained from the Office of Scholarships and Financial Aid or on the Web at www.okstate.edu/finaid/applying/enupt.html.

Refund Policy for Students Entering Military Services

If a student is called to active military service during the term in which he or she is enrolled and has not completed sufficient work for receiving grades, but is in good standing academically, the University will waive tuition and fees for that term. The student should submit a withdrawal form and withdrawal supplement, if necessary, to the Office of the Registrar. Once the student has withdrawn and submitted a copy of the military orders, the student will receive a 100% waiver of the tuition and fees or a 100% refund of tuition and fees paid. The military orders, if not available at the time of withdrawal, may be submitted at a later date at which time the waiver will be applied.

If a student enters military service during the term and is not in good academic standing at the time, the regular fee refund policy of the University applies.

Residential Life Rates

All rates are approved by the OSU Board of Regents and are subject to change. The rates listed below were effective for the academic year 2008-2009. All rates include room rent and all utilities, including electricity, water, cable television, and Internet connection. All halls are open continuously throughout the academic year. Year-round housing (12-month contract) is available in each type of housing offered. Some halls house only non-freshman students; but freshman may be placed there by exception only. See the Housing and Residential Life Web site for the latest information, including rates www.reslife.okstate.edu.

Residence Halls

—Traditional. Parker and Wentz Halls offer rooms for men and women. Drummond Hall offers rooms for women and Kerr Hall offers rooms for men. Most students are housed in double occupancy rooms, but single rooms can be requested. Wentz hall offers year-round housing.

Per Person - Academic Year	Monthly Rate
Single Room	$552.00
Double Room	$362.00
12 Month	Monthly Rate
Single Room	$509.00
Double Room	$333.00

Stout Honors Hall offers three floors of double occupancy rooms. The fourth floor provides smaller designed - single rooms for non-freshman, non-honors students.

Per Person - Academic Year	Monthly Rate
Single Room	$578.00
Double Room	$378.00
12 Month	Monthly Rate
Single Room	$532.00
Double Room	$347.00

—Furnished Deluxe Suites - Living Room in the Unit: Allen, Bennett, Booker, Jones, Patchin, Stinchcomb, and Zink Halls all offer deluxe suites for men and women with a living room in the unit, and all halls except Bennett offer a small kitchenette in the unit. These halls offer 9 month housing only. Patchin Hall is open to non-freshmen students, and the other halls are open to all classifications of students.

Per Person - Academic Year	Monthly Rate
4 Bdrm/2 Bath-private bedroom (Patchin-Jones, Zink-Allen)	$560.00
2 Bdrm/1 Bath-private bedroom (Booker, Stinchcomb)	$653.00
2 Bdrm/2 Bath-shared bedroom (Patchin-Jones, Zink-Allen)	$423.00
1 Bdrm/1 Bath-shared bedroom (Booker, Stinchcomb)	$472.00
- private bedroom (Booker, Stinchcomb)	$703.00
2 or 3 Bed/2 Bath-shared bedroom (Bennett)	$401.00
2 Bd/1 Bath or 3/4 Bd/2 Bath-private bdrm (lg) (Bennett)	$596.00
2 Bd/1 Bath or 3/4 Bd/2 Bath-private bdrm (med) (Bennett)	$552.00
2 Bd/1 Bath or 3/4 Bd/2 Bath-private bdrm (sml) (Bennett)	$523.00
1 Bdrm/1 Bath-private bedroom (large) (Bennett)	$675.00

—Furnished Suites - No Living Room in the Unit: Village CASNR, Village HES, Village Hall C, Village Hall D, Village Hall E, Village Hall F, Bennett, Booker, and Stinchcomb Halls all offer suite style rooms with no living rooms. Booker and Stinchcomb Hall rooms feature a small kitchenette. All halls offer nine month housing, while Village Hall D offers year round housing. Village Hall D is open to non-freshmen students, while the other halls are open to all classifications of students.

Per Person - Academic Year	Monthly Rate
2 Bdrm-private bedrooms (CASNR, HES, Village C-F)	$614.00
1 Bdrm-private bedroom (CASNR, HES, Village C-F)	$647.00
1 Bdrm/1 Bath-private bedroom (Booker, Stinchcomb)	$628.00
2 Bdrm/1 Bath-private bedroom (medium) (Bennett)	$552.00
Per Person - Academic Year	**Monthly Rate**
1 Bdrm/1 Bath-private bedroom (large) (Bennett)	$628.00
1 Bdrm/1 Bath-private bedroom (medium) (Bennett)	$583.00
1 Bdrm/1 Bath-shared bedroom (Bennett)	$401.00
12 Month	**Monthly Rate**
2 Bdrm-private bedrooms (Village D)	$570.00
1 Bdrm-private bedrooms (Village D)	$595.00

—Apartments. Bost, Davis, Kamm, Morsani-Smith, Peterson-Friend, Sitlington and Young Halls are available for men and women. Both furnished and unfurnished options are available. All apartments come with a fully furnished kitchen including a full-size washer and dryer. Some apartments are open to all classifications of students, while others are reserved for non-freshmen. Freshmen may be placed in a non-freshman hall by exception only. Davis, Morsani-Smith, Sitlington, and Young offer year-round housing.

Per Person - Academic Year	Monthly Rate
1 Per Bedroom/4 Bedrooms, 2 Bath	$608.00
1 Per Bedroom/4 Bedrooms, 2 Bath (unfurn)	$562.00
1 Per Bedroom/2 Bedrooms, 2 Bath	$727.00
1 Per Bedroom/2 Bedrooms, 2 Bath (unfurn)	$695.00
12 Month	**Monthly Rate**
1 Per Bedroom/4 Bedrooms, 2 Bath	$580.00
1 Per Bedroom/4 Bedrooms, 2 Bath (unfurn)	$516.00
1 Per Bedroom/2 Bedrooms, 2 Bath	$668.00
1 Per Bedroom/2 Bedrooms, 2 Bath (unfurn)	$640.00

Family and Graduate Student Housing

The University operates apartments to house married and single parents, and a limited number of single graduate and upper class students. Priority is given to families and graduate students. Individuals should apply eight to ten months in advance to assure choice of apartments.

Furnished apartments include coffee table, end or corner table, one table lamp, a love seat, two occasional chairs, a nightstand, double or single beds as needed, and a study desk.

The following 2009-2010 rates include all utilities (gas, water, electricity, local phone service, cable TV, and Internet connection). Please visit the Housing and Residential Life Web site at www.reslife.okstate.edu for the most up-to-date rates and information.

Unfurnished	Monthly Rate
*Williams 12-15, *Prosser Neighborhoods	$573.00
*West, *Stevens Neighborhoods	$583.00
*Demaree Neighborhood	$583.00
Williams 101-105	$694.00
Brumley Neighborhood	$694.00
Morrison (2 bedroom)	$958.00
Morrison (3 bedroom)	$1200.00
Furnished	**Monthly Rate**
*Williams 12-15, *Prosser Neighborhoods	$608.00
*West, *Stevens Neighborhoods	$618.00
*Demaree Neighborhood	$618.00
Williams 101-105	$729.00
Brumley Neighborhood	$729.00
Morrison (2 bedroom)	$993.00
Morrison (3 bedroom)	$1235.00

*Air Conditioning optional for $101/month.

University Dining Services

University Dining Services (UDS) offers more than 30 dining options to choose from on the Oklahoma State University campus. UDS makes every effort to provide options to satisfy the hungriest student, the most selective eater, those who prefer vegan options or have limited diets. The choices are endless, with something available from early morning to late night. From cafeteria dining, to national franchises/brands and specialty restaurants OSU provides you with the very best offerings. As a UDS meal plan holder, you can use your meal plan in any of these 30 locations. Of course, other methods of payment can be used as well including bursar charge, cash, credit card, etc.

Freshmen who are living on-campus are required to have a minimum meal plan (contact Residential Life for more information).

Meal Plan Charges:

- Meal plans are based on a declining dollars system. Residents purchase a particular plan and each time they eat in a dining option, a dollar amount is deducted from their balances. Please see the table below.
- A maximum amount may be carried over from semester to semester. To receive the carry-over, resident must have a Plan A-F for the following semester.
- Meal plan holders can eat in any of the dining facilities regardless of where they live. Meals can be eaten at the convenience of the students: when they want, where they want, as often as they want.

Plan	Cost of plan per semester	Carryover with Ensuing A-F Contract	Amount charged in All You Care to Eat
A*	$1,550	$300	$6.50
B*	$1,450	$280	$6.75
C*	$1,300	$250	$7.00
D*	$1,150	$220	$7.25
E*	$1,000	$190	$7.50
F	$850	$160	$7.75

*Freshmen must choose from the A, B, C, D, or E plans

G**	$100	ALL	$8.00
Cash Price			$8.25

**Meal plan G is for students who want occasional meals. Start with a minimum of $100 and balance will carry over from semester to semester.

Anyone can purchase a UD$ plan, including on-campus residents, off-campus students, and faculty and staff members. For more information, contact the Housing and Residential Life Office at (405) 744-5592 or see the Web site at www.reslife.okstate.edu.

Bursar

Laurie Beets, MS - *Bursar*
Kim Miller - *Assistant Director*
Gaylene Hargrove - *Assistant Bursar*
Joy Meyer, PhD - *Manager of Student Loans/Debt Management*
Tonya Jones - *Financial Counselor*
Steven Prudhomme - *Senior Accountant*

113 Student Union • (405) 744-5993 • fax: (405) 744-4984
Web site: www.bursar.okstate.edu • e-mail: bursar@okstate.edu

Financial Obligation

Enrollment at Oklahoma State University incurs a financial obligation and responsibility of the student to pay all amounts owed in a timely manner. In order to remain in favorable financial standing with the University, and thereby continue to participate in its educational programs, services, and benefits, a student must meet all financial obligations incurred at the University on or before the due dates. Federal law limits the information the University may provide to parents of OSU students. Information regarding bursar accounts may only be issued directly to the student.

Oklahoma State University combines your enrollment costs and charges from different areas on campus into one consolidated student account. A monthly statement is produced the 1st day of each month that reflects any previous balance owed and itemizes the semester charges with payment becoming past due after the 15th of the month. Paper bills are no longer mailed but available to view electronically online. Notifications to view billing statements via the web are e-mailed to students at the beginning of each month to the Okstate e-mail address. Using their O-Key login and password, students may view their bursar account online at http://bursar.okstate.edu/ or http://prodosu.okstate.edu/. Students must have an active University e-mail address to receive their e-bill notification and it is the students' responsibility to maintain accurate addresses. Failure to receive a bill does not relieve the student of their financial obligation, any late charges, and other penalties that may occur if the account is not paid by the due date. A student's account must be paid in full before they are eligible to enroll for future semesters or receive any records from the University. A late payment penalty of 1.5% will be assessed monthly for any past due charges. All tuition and fees (required and optional) associated with the student's enrollment are due no later than the 15th of the billing month.

In efforts to assist our students in meeting financial obligations, Oklahoma State University offers an in-house administered payment option plan (POP) as an alternative to the traditional lump-sum payment method. This plan provides an opportunity for families and students to pay University billed expenses in regular monthly installments either by the semester or annually. Visit our Web site at: http://bursar.okstate.edu/forms/osupop.pdf for the POP application.

When you send a check as payment, you authorize Oklahoma State University to clear your check electronically. Your checking account may be debited as soon as the same day we receive your payment. This electronic transaction will appear on your bank statement although your check will not be presented to the financial institution or returned to you. Any resubmission due to insufficient funds may also occur electronically. Please be aware that all checking transactions will remain secure and payment by check constitutes acceptance of these terms.

Students experiencing financial difficulties should immediately contact the Office of the Bursar for assistance and guidance. All delinquent accounts will accrue a penalty at the rate of 1.5% monthly (19.56% APR). Any charges incurred by the University in an effort to collect on delinquent accounts will be assessed to and will be the responsibility of the account holder. Delinquent account information is disclosed to credit reporting agencies, which could endanger the student's credit rating on a local or national level. Past due accounts may receive payment from the warrant intercept program (WIP) that captures state income tax refunds to pay outstanding OSU debt. Accounts must be cleared before the student can obtain the release of any academic records such as a transcript, receive a diploma or enroll for subsequent semesters. Oklahoma State University extends bursar optional charging privileges to students in order to facilitate use of campus based services. To maintain charging privileges with the University, bursar accounts must remain current or your charging privileges will be revoked.

It is the policy of the University to apply all financial aid to the student's bursar account, withhold all semester charges incurred (tuition, fees, housing, etc.), and refund the excess, if any. Bursar account credits resulting from a credit card payment are refunded back to the credit card, not to the student. To restrict federal Title IV financial disbursements to pay only current semester qualified educational expenses, complete the TIV form available in our office or visit our Web site: http://bursar.okstate.edu/forms.html.

The Electronic Direct Deposit Refund Program was developed to provide quicker access to refunds when bursar accounts have credit balances. If you participate in direct deposit, the refund will electronically transfer to your bank account within 48 business hours after the credit balance becomes effective on your bursar account. Financial institutions have individualized policies when posting electronic transfers to accounts; we encourage confirming deposits of funds with your bank before using the funds. To sign up for Direct Deposit, please contact our office for the appropriate forms or visit our Web site http://bursar.okstate.edu/forms.html. For students not wishing to participate in the Direct Deposit program, refunds will be issued by check. Checks are mailed approximately ten business days after the credit balance becomes effective. The local address listed on the student's bursar account is used as the mailing address. OSU complies with the U.S. Department of Education rules and regulations in accordance with The Federal Student Financial Aid Handbook instructions.

As previously mentioned, direct deposit refunds are usually processed daily and may occur earlier in the semester before bookstore and other miscellaneous charges are processed to your bursar account. You are responsible for paying these subsequent charges as they appear on your regular monthly bursar billing statement.

Many students are sponsored through various scholarships from organizations or foundations other than OSU. Typically, the sponsoring organization sends the check directly to the University. These funds are deposited to the student's account and used to pay any costs associated with attending OSU. The funds are divided into semesters (example $1000 will be split $500 for fall semester and $500 for spring semester) unless otherwise stated on the documentation. If a student receives scholarship funds directly, it is recommended that the student deposit the funds at our office to process toward their bursar account. Some organizations require a billing invoice from OSU before a scholarship is issued on behalf of the student. If this is the case, please ensure our office receives notification before the due date of the first semester's billing statement.

Academic Enrichment Programs

The Honors College

Robert L. Spurrier Jr., PhD - *Director*
Jessica Roark - *Assistant Director*
Jari Barnett - *Honors Academic Counselor*
Crystal Davis - *Honors Academic Counselor*
Brent Ladd - *Honors Academic Counselor*

Oklahoma State University is an active member of the National Collegiate Honors Council and the Great Plains Honors Council. The Honors College is composed of a university-wide General Honors component and specialized upper-division components at the departmental or college levels. The Honors College provides academically talented students with the opportunity to study, conduct research, and exchange ideas in an exciting and supportive academic environment. Honors sections are offered in many general education courses, and special honors seminars and interdisciplinary honors courses also are available. Honors classes are taught by outstanding faculty members and the classes are small in size to facilitate active student involvement.

Completion of the requirements for the General Honors Award leads to special designation on the student's OSU transcript, as does completion of the requirements for the Departmental or College Honors Award in the student's academic major. Students who earn a minimum of 39 honors credit hours and complete the Departmental or College Honors Award, as well as the General Honors Award, with 3.50 OSU and cumulative grade-point averages at graduation, receive the Honors College Degree, including a special entry on their transcripts and special honors diplomas.

Additional advantages for active participants in The Honors College (minimum of six honors credit hours per semester and 12 honors credit hours for each two consecutive semesters for freshmen and sophomores and three honors credit hours per semester for juniors and seniors) include use of The Honors College Study Lounge in the Edmon Low Library (with a computer lab), extended check-out privileges for library materials, priority enrollment for the following semester, and an honors housing option in Stout Hall (on a rooms-available basis).

Admission of new freshmen to The Honors College is based on an ACT composite score of 27 or higher (or comparable SAT score) with a high school grade-point average of 3.75 or higher. Weighted grade point averages certified by the high school may be used. Application forms are included in the OSU Application for Admission. Entering freshmen who fall just short of these criteria may inquire of The Honors College about the admission by petition option. Students other than new freshmen may be admitted to The Honors College on the basis of their OSU and cumulative grade-point averages (7-59 hours earned: 3.30; 60-93 hours earned: 3.40; 94 or more hours earned: 3.50). Transfer freshmen must have completed at least seven college credit hours (not including concurrent enrollment while in high school) to be eligible on the basis of college performance if they do not have the required high school grade-point average and ACT score. There is a February 1 deadline for automatic acceptance based on the criteria outlined above. Applications submitted after February 1 will be considered on a space-available basis.

For additional information about The Honors College, interested students should consult the director of The Honors College, 509 Edmon Low Library or visit www.okstate.edu/honors.

Scholar Development and Recognition

Bob Graalman, PhD - *Director*

Some outstanding OSU students compete for a wide range of prestigious national and international scholarships at the end of their undergraduate careers, such as the Rhodes, Marshall, Truman, Goldwater, Udall, and others. In addition, there is a host of lesser-known but still valuable opportunities that require students to prepare competitive applications.

This office monitors student progress, provides important information, supplies support, and plans courses and activities that can lead to success in these areas. Interested students can contact the office to inquire about opportunities and strategies. Often faculty will nominate candidates who have been performing at a high level academically and displaying other qualities through leadership and community service. Early identification of freshmen and sophomores is especially important in order for the student to gain the most from these programs.

Additionally, as an incentive for the kinds of students who are considered OSU's best and brightest, the Lew Wentz Foundation has provided substantial private funding to OSU for several scholarship programs that are managed in this office. The programs are:

1. Wentz Projects - an opportunity for outstanding undergraduates to plan and perform high-level research under the direction of a faculty mentor ($4,500 each);
2. Wentz Scholarships - traditional awards based on academic excellence and well-rounded campus activities ($2,750 each);
3. Wentz Non-Traditional and Transitional Student Text Book Award - full-time or part-time (up to $1,000).

This office also manages OSU's Freshman Research Program, whereby top entering students can begin their careers with a small scholarship for orientation to research.

Finally, in order to take full advantage of every opportunity, Scholar Development supports and recommends all OSU overseas study programs, and has its own program for study in the U.K. every July, whereby top students travel with OSU's best faculty for interesting courses on a variety of topics.

For further information contact the office at (405) 744-7313 or visit http://scholardevelopment.okstate.edu.

Oklahoma Scholar Leadership Enrichment Program

The Oklahoma Scholar-Leadership Enrichment Program (OSLEP) is a statewide academic program designed to develop scholarship and leadership abilities of outstanding students. Students study in intensive, five-day seminars with a distinguished scholar and are selected from Oklahoma's 21 four-year colleges and universities. OSU's sophomore, junior and senior students with a 3.00 GPA are eligible to apply. OSLEP seminars are taken for three hours of credit. The only cost to students is the tuition - the program provides books and room and board during the seminar. The seminars are graded on a satisfactory/unsatisfactory basis and are transferred to OSU as Pass/Fail. Application should be made as early in the academic year as possible. Further information and application materials may be obtained from OSU's OSLEP coordinator, The Honors College, 510 Library.

Special Academic Services, Programs and Facilities

University Academic Services

Martha McMillian, EdD - *Director*

The Office of University Academic Services (UAS) provides academic advising and a variety of enrollment services to several groups of students, including those admitted to OSU through the Alternative Admission Program, students regularly admitted by the Academic Review Committee, probationary students enrolled through the University Academic Assessment Program, undecided transfer students, students who wish to explore pursuing a Bachelor of University Studies degree, and concurrent high school students. UAS also provides free tutoring to all students across campus. The overall goal of UAS is to provide personal attention and assistance to students as they adjust to OSU and explore the various academic options. Students may contact the UAS office at (405) 744-5333 in 214 Student Union, or visit the Web site at http://uas.okstate.edu for more information.

The following programs are offered at UAS:

—Alternative Admission. The Alternative Admission Program allows approximately eight percent of OSU's entering freshman class to be admitted without meeting all of the initial academic requirements. UAS provides alternative admission students with a freshman orientation class (UNIV 1111) to help them adjust to the demands of college life, to learn how to become academically successful, to explore the various major options, and to make them aware of university rules and regulations. UAS strives to promote academic success by offering individualized academic advising tailored to students' needs, as well as by encouraging all OSU students to take advantage of the free tutoring available through the office. Academic advisers in UAS also enforce the required remediation of curricular and basic academic skills deficiencies. After remediating deficiencies and completing one semester with a 3.0 GPA or higher or two semesters with a minimum 2.00 GPA, students may generally transfer to their academic college of choice, depending on their college's and department's individual GPA requirements.

—Academic Review Committee (ARC) Admission. A new category of regularly admitted students includes those admitted by ARC, a committee appointed by the Vice-President of Academic Affairs. ARC looks holistically at student applicants and bases full admission on their response to a series of questions designed to assess their accomplishments, experiences, and special talents; their leadership and participation in activities; as well as their GPA's, test scores, and curricular summaries. These ARC admits will be advised in UAS until remediating any deficiencies they might have and meeting a minimum GPA requirement to transfer to their various college choices.

—University Academic Assessment. The University Academic Assessment Program (UAAP) is designed for students who have experienced academic difficulty at the college level. These include:

- students who are placed on academic probation while in UAS;
- students on probation who are referred by the colleges;
- students who are in good academic standing, according to State Regents' policy, but are ineligible for admission to their desired college or major;
- students who left OSU while on probation or were suspended by OSU and have stayed out of college for a minimum of one regular semester, but who are readmitted to OSU based on demonstrated potential for success; and
- students who transfer to OSU below the stated scale of 0 to 60 hours attempted with a 2.25 GPA or 61 or more hours attempted with a 2.0 GPA, and are thus on academic probation.

In addition to hands-on academic advising, UAS advisers assist students in developing a realistic plan of study through graduation. They inform students of important policies and requirements, such as the minimum grade-point averages required by the Oklahoma State Regents for Higher Education and by specific majors, as well as the repeat and reprieve options. Advisers also inform students of the UAS free tutoring program available to all OSU students. UAAP students are required to enroll in and complete UNIV 2001, the Academic Assessment and Evaluation course. This course is designed to help students identify their reasons for experiencing academic difficulty and determine ways to overcome their academic challenges. Once UAAP students complete at least one semester with a 2.00 GPA or above, they may generally transfer to their academic college of choice, depending on their colleges and departments individual GPA requirements.

—Transfer Student Resource Center. In addition to working with undecided and probationary transfer students, UAS sponsors two campus-wide organizations specifically for transfer students. The Transfer Student Organization (TSO) is open to all transfer students to provide a social network as well as information and resources about the University. The Tau Sigma National Honor Society, which recognizes academic excellence, is also available to those transfer students with 12 hours of 3.5 GPA or above in their first semester at OSU. A formal initiation is held each spring for students who qualify. E-mail transfer.uas@okstate.edu or visit http://uas.okstate.edu/tso.html for TSO information or http://uas.okstate.edu/tausigma.html for Tau Sigma information. Advisers also inform transfer students of the UAS free tutoring program available to all OSU students.

—Bachelor of University Studies. Occasionally a student experiences great difficulty in finding a degree plan appropriate for his/her interests and career goals. In this case, an individual degree plan can be developed which meets State Regents' and OSU requirements, along with general education requirements. In addition, some departmental requirements and concentrations or minors must be met. Academic advisers in UAS can be instrumental in helping draft the initial stages of such plans, which are then forwarded to the colleges for their approval.

—Concurrent High School Admission. OSU provides the opportunity for high school students with the stated requirements (24 ACT or 3.0 GPA and upper 33% of class for seniors; 25 ACT or 3.5 GPA for juniors) to enroll concurrently in college-level courses through UAS. High school students who participate in concurrent enrollment will have their tuition waived for up to six hours per semester during their senior year, including the summer prior to their senior year, as well as a one-time-only fee waiver for their first course. Concurrently enrolled high school students must also have a minimum ACT score of 19 in the areas in which they enroll. UAS academic advisers strive to actively communicate with these students to facilitate their transition to college while still in high school.

—Student Academic Mentor Program. The Student Academic Mentor (SAM) Program is a free service that connects new UAS freshmen with experienced OSU students in an effort to ease their transition to college. "SAMs" are carefully selected from continuing students at OSU to help freshmen feel welcome and to assimilate them into campus life, socially as well as academically. E-mail samprogram@okstate.edu for more information or visit http://uas.okstate.edu/sam.html.

—UAS Linked Courses. New freshmen advised through UAS will have the option of taking certain classes with the same group of students by sharing two common courses, including their freshman orientation class (UNIV 1111). Students enrolled in linked courses may also receive additional instruction, support, study group assistance, guidance, and academic accountability. UAS freshmen should speak to their adviser during enrollment to register for linked courses.

—UAS Tutoring Program. The UAS Tutoring Program is a free service offered for students campus-wide. Qualified tutors, who have been approved by both UAS and their academic department at OSU, are available to students for individualized, one-on-one tutoring. This program was funded initially as a gift from an OSU alum, Mr. Paul Milburn, who is dedicated to helping students succeed. It is now supported by University advising fees. Tutoring is available Monday through Friday, 8am to 5pm. Students may contact the UAS office at (405) 744-5333 in 214 Student Union to sign up and schedule appointments. Visit the free tutoring Web site at http://uas.okstate.edu/tutoring.html **for more information.**

Academic Advising

Academic advising is a major function within the University and serves the student first and foremost. Advising assists students in developing their intellectual potential through effective use of all resources available at the University—academic, cultural and social. The role of the student's academic adviser is to (1) assist in educational planning, including clarification of career and educational goals, curriculum planning, and short-term course selection, (2) become aware of and make appropriate referrals to campus support services, (3) provide information to prospective majors, and (4) prepare degree plans for graduating seniors and submit these to the respective college graduation certification office.

Advising is performed within each of the undergraduate colleges and in the Office of University Academic Services. Each college structures its advising system based upon the college's philosophy and perceived student needs. In most colleges, freshmen and undeclared students are advised through the college's office of student academic services, while declared majors are advised in their major department. In the Division of Agricultural Sciences and Natural Resources, all students are advised by faculty members.

Each college has an office of student academic services to represent the dean in matters concerning undergraduate students. Students should contact their office of student academic services when questions arise regarding advising, academic programs and requirements, and academic support services.

The locations of the offices of student academic services are:

- Agricultural Sciences and Natural Resources, 136 Agricultural Hall
- Arts and Sciences, 213 Life Sciences East
- Education, 106 Willard
- Engineering, Architecture and Technology, 101 Engineering North
- Human Environmental Sciences, 101 Human Environmental Sciences
- Spears School of Business, 201L Business Building
- University Academic Services, 214 Student Union
- OSU-Tulsa Advising Services, 130 NCB

Students should keep in mind that while the University provides advising as a service and resource, the ultimate responsibility for identifying and completing degree requirements rests with the student.

University Assessment and Testing

Chris Ray, PhD - *Interim Director*

The assessment program at OSU provides public assurance of program quality and accountability by documenting progress toward meeting the institution's educational goals. Assessment involves collecting, reviewing and using information about students' achievement of learning goals for the purpose of program improvement and, ultimately, improvement of student learning and development. The assessment process provides feedback to campus leaders about the effectiveness of academic and student programs, thereby allowing informed decisions about the need for changes. Assessment is an integral part of the institution's commitment to sustain and enhance academic quality and the student educational experience.

The OSU Assessment Council guides the institution's assessment plan. The Council membership consists of faculty from each college and representatives from the offices of student affairs, institutional research, the library, and student government. The Council supports academic units by providing funding and information to (1) measure the effectiveness of academic and student programs, (2) use the information provided by assessments to improve student learning and (3) determine the overall educational impact of the university experience on students.

Assessment activity at OSU, coordinated by the Office of University Assessment and Testing, includes four primary initiatives:

1. Entry-Level Assessment assists advisers and faculty in making placement decisions that will give first-time OSU students the best chance of academic success.
2. General Education Assessment evaluates student achievement of institutionally recognized general education competencies, including communication, problem solving, and critical thinking skills.
3. Program Outcome Assessment evaluates student achievement of learning goals in the major.
4. Student and Alumni Satisfaction Assessment evaluates student perceptions of academic and campus programs and services.

Results of these assessments provide information for improvement of programs and services, to increase students' level of achievement of learning goals, and to increase students' satisfaction with their educational experience.

Many assessments within academic programs are conducted by evaluating samples of student work selected from course assignments. These assessments are conducted for institutional or program level measurements and are not connected to grading in the course. Appropriate steps are taken to assure that confidentiality of students' work is protected, including the removal of identifying information from samples before they are evaluated by faculty members.

The Office of University Assessment and Testing submits annual reports to the Oklahoma State Regents for Higher Education that summarizes the assessments in the above areas. The learning goals, assessment methods used, student population involved, results, and uses of assessment data are reported for assessment in each initiative area, including separate outcome assessment reports prepared by each academic program.

The OSU Testing Center provides testing and evaluation support services for OSU students and faculty. The Testing Center administers exams for prospective students, including the ACT, the Residual ACT, SAT On-Campus, and the Test of English as a Foreign Language (TOEFL). College Level Examination Program (CLEP) exams are administered to current and prospective students who wish to earn college credit by 'testing out' of specific courses. The COMPASS test package is available to undergraduate students for course placement in reading, writing, and math courses. Exams offered at the Center include the Graduate Record Exam (GRE), Miller Analogies Test (MAT), Graduate Management

Admission Test (GMAT), Law School Admission Test (LSAT), and the Pharmacy College Admission Test (PCAT).

OSU faculty-made course exams are sometimes administered by Testing Center staff as 'make-up' exams or to provide accommodations for students with disabilities. As determined by the Office of Student Disability Services, testing accommodations may include distraction-free testing room, extended testing time, adaptive technology, and/or trained staff to assist students requiring a reader or an amanuensis.

For further information view the Web site at http://UAT.okstate.edu.

SPECIAL PROGRAMS

English Language Institute

Established in 1970, the English Language Institute (ELI) is an intensive program designed to help non-native speakers of English achieve the level of proficiency necessary to enter and succeed in an American institution of higher education. It is also suitable for those wishing to learn English for business or personal reasons. Regularly enrolled OSU international students who feel a need for additional language study may enroll part-time in ELI as well.

Institute students, who may represent as many as 25 or 30 different countries in any given semester, range from recent high school graduates to career professionals returning to school for master's or doctoral degrees. Assigned to one of six levels by means of a placement exam, all students spend 22 hours per week in class. Classes offered include listening/speaking, reading, composition, grammar, and an interactive module.

For more information, contact the English Language Institute, 307 Wes Watkins Center, (405) 744-7519, or visit http://eli.okstate.edu.

Independent Study

Independent Study (IS) provides individual study opportunities to learners whose work, family responsibilities, physical isolation, or medical condition may preclude participation in regularly scheduled class meetings. IS offers over 100 courses for college credit and continuing education units.

Students may enroll in independent study courses at any time without being admitted to OSU and take up to a year to complete course work. Some courses are web-assisted and some are video-assisted telecourses. IS also offers some semester-based courses in which students must be admitted to OSU, enroll through regular campus registration, and complete during one campus semester.

For more information or enrollment, contact OSU Independent Study, 309 Wes Watkins Center, (405) 744-6390, or e-mail to ICS-INF@okstate.edu or visit http://is.okstate.edu.

Pre-Law, Pre-Medicine and Other Pre-Professional Programs

Students planning to enter a professional school should visit with their advisors and consult professional school admission and course work requirements listed in the specific school catalog. Many professional schools select students with a variety of bachelor's degrees, although others may require a minimum core curriculum of varying length and grade-point average. Information about pre-professional programs is available in such areas as chiropractic medicine, clinical laboratory science, dental hygiene, dentistry, forensics, law, library science, medicine, nursing, occupational therapy, optometry, osteopathic medicine, pharmacy, physical therapy, physicians associate, medical imaging and radiation sciences, social work and veterinary medicine. For more information, students should consult their advisors or the Office of Life Sciences and Pre-Health Advising, 213 Life Sciences East, or the pre-law advisor, also in 213 Life Sciences East.

National Student Exchange

The National Student Exchange enables OSU students to spend a semester or year at one of over 190 colleges in the United States and its territories, as well as in Canada. Students pay tuition and fees to OSU or resident tuition and fees to the host institution, depending on the plan through which they participate.

Through the NSE, students have access to honors college programs, resident assistant exchanges, and designated study abroad programs offered by participating institutions. The NSE also enables students from member colleges and universities to attend OSU while paying their own university's tuition and fees or while paying OSU resident tuition rates. For additional information and application materials, visit the study abroad office Web site at http://studyabroad.okstate.edu, contact the Study Abroad/NSE Office, 060-G Student Union, or e-mail to: abroad@okstate.edu.

Study Abroad

OSU students can add an international dimension to their education through study abroad.

—Reciprocal exchanges. Students may earn OSU credit through reciprocal exchanges in many European, Asian, and Latin American countries. While participating in reciprocal exchange, students pay tuition and fees to OSU.

—College-based short term programs. Students may also earn OSU credit by enrolling in summer and short-term international courses offered by OSU college outreach units and departments in countries such as Australia, England, France, Italy, Japan, Mexico, Peru, China and Thailand.

—Affiliated/Approved programs. Students may earn transfer credit through participation in pre-approved study abroad programs offered by other U.S. universities or study abroad providers such as AIFS, CEA, and ISA. Students may also enroll directly in universities abroad. They may also participate in non-credit work, internship and volunteer opportunities.

Most exchanges and study abroad programs require successful completion of at least 48 credit hours and good academic standing. Application deadlines for priority consideration for both fall and spring semester reciprocal exchanges, many fall semester study abroad programs, and short-term international courses are at the end of January or the beginning of February. Deadlines for spring study abroad programs are usually in mid-October or early November.

Financial assistance is available through scholarships as well as federal grants and loans. Students may apply for the Provost's Study Abroad Office Scholarship through the Study Abroad Office to support their credit bearing activities abroad. There are two application cycles and PSAO scholarship amounts vary depending on the length of the program. Information is available on the Study Abroad office Web site at http://studyabroad.okstate.edu or through the Study Abroad/NSE office, 060 Student Union. Outstanding OSU undergraduates and graduates may apply for the Bailey Family Memorial Trust Scholarship for study abroad in the liberal arts. The scholarship is budget based. Information and applications are available at the College of Arts and Sciences student academic services office, 213 Life Sciences East. The Department of Foreign Languages and Literatures, 309 Gunderson Hall offers several scholarships for language study abroad. Individual colleges offer scholarships for their short-term programs. Information on national and regional scholarships for study abroad is available in the Study Abroad office. In many cases students may use federal financial aid to offset the cost of an academic program abroad.

Information on studying, working or volunteering abroad is available from the Study Abroad/NSE office, 060-G Student Union, by e-mail to: abroad@okstate.edu or on the Study Abroad/NSE Web site at http://studyabroad.okstate.edu.

Semester at Sea

Semester at Sea is an opportunity for OSU undergraduates in good academic standing to earn a semester of credit in a wide range of academic areas while traveling around the world on the S.S. Universe. Approximately 50 percent of the semester is spent at sea and 50 percent in various ports allowing students to travel and relate experiences directly to the academic program aboard ship. Specific information may be obtained by contacting the Campus Life director, 060 Student Union, or the Study Abroad/NSE office, 060-G Student Union. Semester at Sea is considered an affiliated/approved program.

The Biology Learning Resources Center

The LRC, which serves as a study area for life science students, especially those taking the introductory biology course. Here students may use computer tutorials, review sample tests and papers, examine experiments, or meet with a teaching assistant or study group. The LRC is located on the third floor of Life Sciences West and is maintained by the Department of Zoology.

The Center for Early Childhood Teaching and Learning

Linda Sheeran, EdD - *Clinical Assistant Professor and ECE Program Coordinator*

Dianna Ross, MS - *ECE Specialist and Child Development Laboratory Director*

The Department of Human Development and Family Science has a rich tradition of excellence in early childhood education. The Center for Early Childhood Teaching and Learning (CECTL) is located on the first floor of the College of Human Environmental Sciences West building.

The CECTL has three components that support the professional education of early childhood educators-- The Model Teaching Classroom, the Child Development Laboratory, and the Early Childhood Resource Room. The Ramona and Homer Paul Model Teaching Classroom is an innovative learning environment for adult students where education courses are taught within the physical setting of an early childhood classroom. This provides students with opportunities to make meaningful connections between course content and practical application. The Model Teaching Classroom is used for instruction of undergraduate early childhood education majors, continuing education of early childhood professionals, and research about the preparation of teachers.

The Cleo L. Craig Foundation Child Development Laboratory (CDL) serves as a field placement for early childhood education majors. Equipped with observation booths, the CDL is also used as a site for observation and interpretation of human growth and development by students in courses across campus. Research on developmentally appropriate practice, children's learning and development, and the preparation of teachers is conducted in the facility. The CDL program offers planned learning activities that are developmentally appropriate and designed to model best developmental practices.

The Early Childhood Resource Room is available to early childhood education students as well as other professionals as a place to prepare and checkout materials for classroom teaching. The Resource Room is designed to help foster developmentally appropriate practices and expose early childhood educators to a wealth of knowledge.

The Center for Family Services

Matt Brosi, PhD - *Assistant Professor and Marriage & Family Therapy*

Glade Topham, PhD - *Program Coordinator*

The Center for Family Services is sponsored by the Department of Human Development and Family Science in the College of Human Environmental Sciences West building.

The Center's dual mission is to provide high-quality, low cost marital and family therapy services to the public and to provide a training environment for master's degree students specializing in marriage and family therapy. Because the Center for Family Services is a training facility, advanced graduate students in marriage and family therapy conduct the majority of the therapy. While conducting therapy, therapists-in-training are under the direct supervision of clinical faculty members who are licensed marriage and family therapists. The Center's facility allows for observation of sessions by clinical supervisors and video recording of sessions.

The Center for Family Services is open to individuals, couples or families seeking help with personal or relationship issues. Issues may include marital concerns, family violence, adjustment to divorce or other life changing events, child behavior and school problems, parenting concerns, anxiety and depression, and family reunification. Fees are determined on a sliding fee scale based on income and family size, ranging from $5 to $50.

Appointments are available on request. While appointments are available during daytime and evening hours, most appointments are scheduled on Wednesday and Thursday evenings. When an individual contacts the Center to seek marital and family therapy services a staff member will ask a few questions about the family and the reasons for seeking the services in order to assign the most appropriate therapist. Usually within 24 hours, an initial appointment will be scheduled.

The marriage and family therapy program is accredited by the Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE) of the American Association for Marriage and Family Therapy.

The Center for Hospitality and Tourism Research

Hailin Qu, PhD - *Regents Professor, William E. Davis Distinguished Chair and Director, The Center for Hospitality and Tourism Research*

The OSU Center for Hospitality and Tourism Research (CHTR)in the School of Hotel and Restaurant Administration is dedicated to hospitality and tourism research and supports all areas of inquiry that directly and indirectly affect hospitality and tourism operations and management. The Center links cutting edge research with the critical needs and demands of the global hospitality and tourism industry. Through collaborative efforts between the University, the Oklahoma Department of Tourism and Industry, the CHTR supports research, instruction, and extension/outreach activities essential to faculty scholarly development, student learning, industry practice and local community development. The CHTR positions the School of Hotel and Restaurant Administration as the premier provider of hospitality and tourism research excellence. For more information visit http://ches.okstate.edu/chtr/.

Ethics Center

Scott Gelfand, PhD - *Associate Professor and Director*

The Ethics Center at Oklahoma State University, which is the only college or university ethics institute or center in the state, is committed to promoting moral reflection and deliberation in personal, professional, community, and civic life. The Ethics Center does not seek to dictate values; rather, we attempt to meet our organizational commitments by organizing and promoting workshops, symposia, conferences, and other forums where those interested, including professional ethicists, faculty, students, and the general public, can study and discuss relevant topics. In addition, we will attempt to support research relating to applied and professional ethics. Finally, the Ethics Center will provide Oklahoma State University with a centralized office that students, faculty and the public can contact to find out what ethics classes and resources are available.

The Ethics Center is sponsored and operated by the Philosophy Department at Oklahoma State University, under the direction of Dr. Scott Gelfand, and overseen by a standing committee of faculty members having research and teaching interests in applied and professional ethics.

Gerontology Institute

Whitney Brosi, PhD - *Assistant Professor and Director*

Alex Bishop, PhD - *Assistant Professor and Gerontology Program Coordinator*

The Gerontology Institute is housed in the Department of Human Development and Family Science. The Gerontology Institute sponsors a multidisciplinary gerontology program committed to promoting academic excellence in the study of aging throughout the life course through scientific research, education and service. The Institute provides a university-wide focus in coordinating a curriculum in gerontology.

The Gerontology Institute was created in response to a widespread interest in course offerings in gerontology. Students can receive an MS in Human Development and Family Science with an option in gerontology. Undergraduates may earn a BS in Human Development and Family Science with an option in gerontology. An undergraduate gerontology minor is also offered. Students wanting to attain an MS with an option in gerontology may complete the on-campus program in HDFS or the Great Plains Interactive Distant Education Alliance online gerontology program (Great Plains IDEA) at OSU. For more information on the online gerontology program see www.ches.okstate.edu/gpidea.

The Gerontology Institute serves as a link between the University and the community in the field of aging, and sponsors student internships in community agencies. For more information, visit http://ches.okstate.edu/hdfs or e-mail hes-hdfs@okstate.edu.

Mathematics Learning Resource Center

The Mathematics Learning Resource Center (MLRC) is a support facility for undergraduate mathematics instruction at OSU. Undergraduate math classes tutored range from intermediate algebra to differential equations. The MLRC is located on the 4th floor of the Classroom Building and is open to students on a walk-in basis.

Psychological Services Center

Larry L. Mullins, PhD - *Professor and Director, Psychological Services Center*

John M. Chaney, PhD - *Professor and Director, Marriage & Family Clinic*

The Psychological Services Center was established in 1971 as a training, service and research facility at Oklahoma State University. It is operated by the Department of Psychology through the College of Arts and Sciences. It is located in 118 North Murray on the OSU campus. The building is accessible to the handicapped.

Services are provided to children, adolescents and adults and are available to residents of Stillwater and the surrounding community as well as OSU students, faculty and staff. The Center offers a variety of psychological services such as but not limited to: individual, group, family, and marital therapy; parent counseling and training; treatment of phobias and anxiety disorders; relaxation training; assertiveness training; stress management; depression; intellectual and personality assessment; assessment of attention deficit and learning disorders; and school consultation.

The Center's staff includes doctoral students in the clinical psychology training program, and is accredited by the American Psychological Association. The staff also includes supervising clinical psychologists from the Department of Psychology. Although the exact composition of the staff may change from year to year, the staff is generally composed of individuals from diverse ethnic and cultural backgrounds.

There is a graduated fee structure based on one's financial situation.

The Center is open from 8:00a.m. until 9:00p.m. Monday through Thursday. On Friday it is open from 8:00a.m. until 5:00p.m. Appointments can be made by contacting the Center at (405) 744-5975. More information can be found at http://psychology.okstate.edu/.

Speech-Language-Hearing Clinic

Martin A. Fischer, PhD - *Professor and Director*

The OSU Speech-Language-Hearing clinic provides comprehensive clinical services to the OSU/Stillwater community. We are dedicated to providing the highest standard of care in speech-language pathology and audiology. Nationally certified and state licensed clinical faculty, supervise graduate student clinicians as they provide a wide-range of diagnostic, early intervention, and therapy services. Treatment is provided for a variety of communication disorders, delays and/or differences across the lifespan including:

- articulation disorders
- language disorders
- stuttering
- autism
- voice disorders
- swallowing disorders
- speech-language disorders resulting from stroke, head injury, and other neurological impairments
- dialect variations
- hearing impairment
- reading and writing disorders

The OSU Speech-Language-Hearing Clinic is located in the newly renovated Murray Hall on the OSU campus. Fees are charged for services with special rates provided for all OSU students, faculty, and staff. A sliding fee scale insures that all individuals are served, regardless of their ability to pay. To schedule an appointment please call (405) 744-6021.

Telecommunications Center

Blayne Mayfield, PhD - *Associate Professor and Director*

The Telecommunications Center is a visible commitment to the University's desire to keep pace with the communications revolution in the classroom and beyond. The facility is home to *The Institute for Teaching and Learning Excellence* (ITLE), which is responsible for both equipping our campus classrooms with educational technologies (as the budget allows) and providing assistance to our faculty in integrating those technologies into their teaching styles. The ITLE Faculty Development Center provides workshops and certification programs for both early-career and established faculty on innovative pedagogies and technology integration, and cooperates with various departments on research projects and learning communities. The ITLE Emerging Technology Group offers training in the use of various software products such as Turnitin, Respondus, and Camtasia. The IT Support Group provides web design training and support for faculty and departments, while ITLE Creative Services provides faculty with graphic designs, illustrations, 2-D & 3-D animations, and presentation material development as a free service to enhance any curriculum. A configurable classroom and a computer lab are available for both scheduled classes and faculty research/training. The ITLE Classroom Technology Support Center provides a wide array of equipment for portable and/or classroom use where that technology does not yet exist.

ITLE provides equipment and staffing in support of a wide range of OSU Distance Education offerings, including support for the Desire2Learn "Online Classroom" Courseware Management System. ITLE also produces video-based educational content from recording and editing classroom presentations for delivery via videotape, CD-ROM, DVD, and streaming media, to distributing live, interactive classes worldwide from high tech classrooms all over the campus. The Telecommunications Center also houses a broadcast-quality television production, editing, and transmission facility, which is used for everything from taping classroom presentations and producing high-quality animation/simulation segments to production of teleconferences, documentaries, video training tapes, and public service announcements for the University

and for both government and commercial agencies. OSU is connected to the world from the Telecommunications Center via a wide variety of media, including Internet and satellite capabilities. ITLE also operates the campus cable TV system, which includes the OSU Campus Calendar (channel 74) and the Residential Life Cowboy Cinema Movie Channel (channel 22).

The ITLE facility provides an outlet for student internships in art, production, and engineering fields, and ITLE has agreements with several departments across campus for credit-based experiences supervised by their full-time, professional staff. In addition, ITLE provides part-time employment for some students each year in many of their departments. For more information, call (405) 744-1000, or visit http://itle.okstate.edu.

Writing Center

Rebecca Damron, PhD - *Assistant Professor and Director*

Since 1976, thousands of members of the Oklahoma State University community - students, faculty and staff - have found support for their writing from the trained staff at the Oklahoma State University Writing Center. The one-to-one individualized conferences conducted at the writing center offer the opportunity for writers across campus to receive feedback on their writing based in best practices: supporting the writing process from beginning to end, focusing on the development of the individual writer at any level, assisting individuals to become their own best proofreaders and editors.

In keeping with the mission of the OSU Writing Center to foster writing culture across campus, opportunities are available for Writing Center staff to make in-class visits, conduct workshops related to writing issues at various locations across campus, or custom-design workshops for faculty interested in discipline-specific writing projects. Please contact the writing center for further information.

The OSU Writing Center is located in 104 Morrill Hall. Appointments can be made by calling the Writing Center at (405) 744-6671, online at www.rich15.com/osu/schedule, or e-mail: writingcenter@okstate.edu. Writing Center staff also conducts drop-in consultations at the Edmon Low Library. Please check with the Writing Center for appointment times.

SPECIAL FACILITIES

Bartlett Center for the Visual Arts and the Gardiner Art Gallery

The Bartlett Center, formerly known as Gardiner Hall, was built in 1910 as a women's residence hall and has since served as a classroom building for women's physical education, speech, agriculture extension and the College of Business Administration. The building was originally named to recognize Maude Gardiner, founder of the University's home economics program. Gardiner Hall was renamed the Bartlett Center in 1984 when Mr. and Mrs. F.M. "Pete" Bartlett made a generous gift to Oklahoma State University that was designated for renovation of the building then occupied by the Department of Art.

The Bartlett Center renovation has enhanced the capabilities for instruction in the visual arts at OSU. It has also provided an environment for activities that have brought regional and national recognition to the visual arts at OSU. The Department of Art has ten instruction studios in the Bartlett Center, including three computer laboratories, and a 100-seat auditorium for instruction in art history. This auditorium is equipped with state-of-the-art multimedia equipment. Additional studios for sculpture, ceramics, printmaking and 3D design are in the Visual Arts Annex located on the northwest corner of campus. These new facilities provide students with well-equipped studio environments designed with health and safety as paramount.

Maude Gardiner continues to be recognized through the Gardiner Art Gallery, a significant part of the Bartlett Center serving both instructional and outreach needs of the Department of Art. The Gallery provides exhibitions of regional and national importance to OSU and the community. Exhibitions have included the work of Manuel Neri, Deborah Butterfield, Lucas Samaras, and traveling exhibitions such as "American Works on Paper: 100 years of American Art" and "Watercolor USA." Faculty and student work is also exhibited on a regular basis.

Child Development Laboratory

The Oklahoma State University Child Development Laboratory (CDL) has a rich tradition of excellence in early childhood education. The CDL is sponsored by the Department of Human Development and Family Science. Originally established in 1924, the laboratory presently resides in a two million dollar facility opened in 1983 and renovated in 2006. A state-of-the-art outdoor learning laboratory was completed in 1999.

The Child Development Laboratory program offers a site for quality educational programming for young children; training of pre-service teachers in early childhood education; observation and interpretation of human growth and development; research designed and implemented by OSU faculty and students to further the knowledge base in such areas as early childhood curriculum, social interaction, language development and cognitive development; and community service in the form of child care, parenting programs and in-service professional education.

The CDL is licensed by the Department of Human Services and is accredited by the National Association for the Education of Young Children. The program offers planned learning activities that are developmentally appropriate; frequent and positive interactions between children and students; nutritious meals and snacks; regular communication with parents; positive guidance techniques; high adult-to-child ratio; (well trained and experienced) ECE degreed staff and ongoing, systematic program evaluation.

Subject to availability, families have an opportunity to enroll in a model early childhood program. Children enrolled in the program range in age from two through five years.

Collection of Vertebrates

The OSU Collection of Vertebrates (COV) is housed in Life Sciences West and maintained by the Department of Zoology. It includes specimens over 120 years old and consists of collections of fishes, amphibians, reptiles, birds, mammals, and frozen tissues. The collection of fishes maintains more than 30,000 lots of specimens, mostly from Oklahoma and other plains states, but also includes one of the world's largest collections of rare Nepalese fish. The collection of amphibians and reptiles includes approximately 12,000 specimens and houses among the largest collections of the rare Oklahoma salamander and the grotto salamander. The collection of birds houses 2,500 skins, is from Oklahoma and includes the oldest specimens that date from the 1880's. The first mammal catalogued into the Collection dates from 1924 and now includes more than 13,000 specimens from every county in Oklahoma, all 50 states, and 50 other countries; every continent except Antarctica. The Collection is one of the most taxonomically diverse collections at any university in the U.S. Among the most significant components of the collection of mammals are the more than 1,000 specimens from Ethiopia. All specimens are valuable for their use in teaching classrooms and for research.

Colvin Recreation Center

The newly expanded and renovated Colvin Recreation Center is open to the University community. This facility truly provides OSU students with an incredible experience socially, as well as physically. The new Colvin, with over 240,000 square feet of activity space, includes: 10 basketball/volleyball courts, a large multi-purpose court, over 30,000 square feet

of weight and fitness equipment, cardio-theater, indoor climbing wall, golf practice area, including two golf simulators, four-lane jogging track, indoor and outdoor swimming pools, 12 racquetball/handball courts, and five large multi-purpose activity rooms. The Center is generally open for student use from 6:00 am to midnight and is home to the Campus Recreation Department and all of its programs and activities.

Facilities are also available at Lake Carl Blackwell and Camp Redlands for a challenge course, sailing, water skiing, canoeing and crew. Reservations for socials, workshops and other retreats can be made for nominal rental rates in the lodge and cabins.

—Campus Recreation. Campus Recreation programs are designed to provide equipment, space and professional assistance in helping University students, faculty, staff members and their families pursue individual recreation interests. Located in the Colvin Recreation Center are facilities for activities including racquetball, basketball, volleyball, badminton, table tennis and strength and cardiovascular conditioning. In addition, areas for soccer, football, rugby, softball, archery, tennis, sailing, canoeing and hiking are made available for student and staff use.

—FIT First Program. The staff of the Colvin Recreation Center offers a variety of noncredit classes each semester to students, faculty and staff. Other instructional programs for adults include CPR, first aid, scuba, tennis, ballroom and swing, martial arts, tai chi, and yoga.

—Intramural Sports. The vision of the intramural sports program is to improve the quality of life at OSU and the mission is to develop students mentally and physically, provide quality programs and services, and to encourage all participants to value recreation. These programs are important for all students attending OSU because they provide an opportunity to meet new people, cultivate present relationships by participating with friends, and stimulate personal physical fitness through sports. Programs are available at differing skill levels, as well as opportunities to compete in specific divisions for men, women and co-recreational leagues. With over 50 activities to choose from, intramural sports offer something for every student.

—Sport Clubs. The Campus Recreation program advises and helps organize the active sport clubs on campus, which are governed by the Sport Club Council. The Council is chartered by the University and its officers are elected students. This Council develops sports club policies, sets priorities, and functions as the official representative for all sports clubs. The Campus Recreation program provides the adviser for this Council. Membership in all sports clubs is open to all students. If a group of students is interested in starting a sport club, the coordinator will assist them.

Active sports clubs are crew, cricket, cycling, karate, lacrosse, polo, rugby, sailing, scuba, soccer, snow skiing, volleyball, waterskiing, weightlifting, adaptive sports and wilderness pursuits.

—Outdoor Adventure. The goal of outdoor adventure is to provide opportunities for adventure, education and excitement. With a variety of local, national and international trips as well as adventure and leadership workshops at all skill levels, opportunities are provided for enrichment for the whole community.

In addition to trips and workshops, an extensive low- and high-elements challenge course is offered at Camp Redlands. A state-of-the-art indoor climbing facility is also available in the Colvin Recreation Center. To facilitate the trips program, as well as the University and local communities' pursuits, the outdoor adventure rental shop in the Colvin Recreation Center provides access to everything from snow shoes to sleeping bags.

Whether it is sea kayaking in the Baja Peninsula, a day at the challenge course, or the annual climbing competition, the common elements in all programs are quality leadership and lots of fun.

—The Adaptive Sports Program. The adaptive sports program is designed for students with disabilities to their upper or lower extremities or confined to a power or manual wheelchair. The program offers various wheelchair sporting events, such as wheelchair basketball, weightlifting, tennis, and track and field.

The campus recreation center offers diverse activities and programs for students and students with disabilities. The campus recreation center facility can mainstream students with disabilities into various activities, including intramural sports programs, outdoor adventure programs, sports clubs and anaerobic and aerobic workout programs. A student with any disability can have fun with other students while exercising body and mind.

Ecotoxicology and Water Quality Research Laboratory

The Ecotoxicology and Water Quality Research Laboratory (EWQRL) is located in Life Sciences West and is part of the Department of Zoology at OSU. Established in the 1960s as the Reservoir Research Center, in 2001 the lab changed names to reflect not only our expertise in standardized aquatic toxicity testing, but also additional research foci in aquatic ecosystem assessments. The EWQRL provides services to a number of companies and wastewater treatment facilities throughout Oklahoma in the form of EPA standardized bioassays. In addition, the staff and students (both graduate and undergraduate) funded by the EWQRL undertake aquatic monitoring projects in riverine, wetland and reservoir systems for both state and federal agencies. These projects include invertebrate and fish surveys and identification, zebra mussel monitoring, wetland delineation and toxicity assessments. The labs facilities include a fathead minnow rearing room, temperature and light controlled environmental chambers for in-house cultures of aquatic test organisms (cladocerans, amphipods and midges) and standardized toxicity testing of client produced water, a wet chemistry laboratory, computer laboratory, and numerous compound and dissecting microscopes all with digital imaging capabilities. Sampling equipment for field surveys includes a boat, electroshockers, nets, drift fences and several field meters.

OSU Libraries

The OSU library is a premier electronic library, with three branch libraries and a combined collection of over 2.5 million volumes, 96,500 serials, more than 4.5 million microforms and 420,000 maps and aerial photographs. Its primary mission is to serve as the "intellectual commons" of the University, providing high-quality resources, services, and gateways to information to meet the needs of OSU's diverse instructional, research and outreach programs. To fulfill this continuing role effectively, the library strives to be flexible and responsive to the needs of its constituents, to emphasize cooperative arrangements with other libraries, and to maximize the application of state-of-the-art technology to facilitate speedier and ever wider access to needed information.

The OSU library subscribes to more than 200 specialized databases to assist students, faculty and staff in their research. A growing number of these databases provide access to the full text of documents. Members of the OSU community can access dozens of these resources (including online, full-text journals with more than 30,000 titles), regardless of their location, from any computer with Internet access and a web browser. Library users can submit interlibrary loan requests and book renewal requests electronically using forms on the library's web pages. Many users are taking advantage of the library's electronic reserves to provide access to supplemental course materials. OSU students may check out laptop computers for two-hour periods. There are 100 laptops available. They are paid for by the library and have the same software used in campus computer labs. The library building is also equipped for wireless Internet connections. Library laptops or personal laptops can access the network. The library offers a variety of free training sessions throughout the year, including sessions on using the library's online catalog and other databases, searching the web, creating web pages, and using the student electronic mail system.

—Government Documents. Many people consider the OSU library's documents department to be the best regional depository for U.S. government publications in the southwest. Non-depository materials, as well as publications of the state of Oklahoma, foreign governments, and international organizations are obtained to support fields of interest to OSU. The documents department has a growing collection of indices and data files issued by the United States and commercial companies. These files include the 1990 Census, the 1992 Economic Census and indices to congressional publications and international trade information. Whenever possible, the department provides Internet access to U.S. government information via the OSU library's Internet site at www.library.okstate.edu.

M. B. Seretean Center for the Performing Arts

The M.B. Seretean Center for the Performing Arts provides a modern and well-equipped home for the departments of music and theatre. Constructed in 1970 at a cost of three million dollars and named in honor of its principal benefactor, M.B. "Bud" Seretean, a 1947 OSU graduate, the Center is the focal point of all major dramatic and musical events on the OSU campus. The center's 75,000 square feet include the 800-seat concert hall and the 600-seat Vivia Locke Theatre which attract a myriad of fine arts activities such as ballet, concerts, mime, opera, plays, faculty and student recitals, and a host of summer conventions.

In addition to the auditorium and theatre, the Seretean Center houses teaching studios for music, a variety of classrooms, a specially-designed choral room, a rehearsal hall for band and orchestra, the theatre scene shop, computer labs, and a well-equipped audio center, all designed to provide an excellent atmosphere in Oklahoma for the teaching of the fine arts.

—Theatre. Live theatre productions are an important part of the cultural life of the campus. OSU theatre produces six to eight plays each academic year from a wide variety of dramatic and musical theatre literature. Two separate production series are offered. Each year, four fully-mounted large-scale productions are presented in the 600 seat Vivia Locke Theatre. Two to four experimental productions, often student-directed and designed, are presented in the 100 seat Jerry L. Davis Studio Theatre. Each production's cast and crew is comprised of theatre majors and minors as well as non-majors from across the campus. Auditions are open to all students on campus regardless of major.

Seretean Wellness Center

The Seretean Wellness Center offers a variety of health and wellness programs for all OSU students. These programs include free wellness screenings (cholesterol, blood pressure, body composition, and web-based health risk appraisal), nutrition counseling, wellness education classes, Share the WEALTH peer education program, Wellness State (freshman orientation program), and campus-wide health promotion activities and events.

The Seretean Wellness Center offers a limited number of internships and graduate assistantships in the disciplines of exercise science, health education, marketing, nutrition, and wellness.

The SWC has partnered with University Dining Services to launch a campus-wide nutrition program, Choose Orange. On-campus dining facilities have designated healthy food items with a Choose Orange logo. Items with this logo follow U.S. dietary guidelines and contain no more than 30% of total calories from fat, although a few exceptions such as nuts and avocados will apply. Also available is a free "Ask the Dietitian" service. Log on to http://chooseorange.okstate.edu and click "Ask the Dietitian" - you will receive a FREE personalized and confidential response to your health, diet, or nutrition question.

The Seretean Wellness Center houses a registered dietitian, demonstration kitchen and dining room, fitness center, a full-service wellness laboratory, and a licensed massage therapist. Meeting rooms, including a 130 seat lecture hall are also available to recognized OSU student groups. Methods of accepted payment include cash, check, credit card, and bursar charge. For additional information, please call the Seretean Wellness Center at (405) 744-WELL (9355) or log on to http://wellness.okstate.edu.

Student Union

Dating back to 1815, college unions have always been thought of as "places where all may meet on common ground." The OSU Student Union certainly is no exception to this tradition as it has been serving the University community since 1950 and has become the place to be on the OSU campus. With a facility consisting of 611,652 square feet, it stands as the largest and most comprehensive union in the world. It provides the University with such services as the bookstore, retail shops, banking services, a travel agency, a campus post office, restaurants, lounges, meeting rooms and an 81-room hotel.

The primary purpose of the OSU Student Union is to serve the members of the University community through an organization that provides necessary and convenient goods and services; offers educational, social, cultural and leadership programs; and fosters an atmosphere of open interaction and exchange among all students, faculty, staff, alumni and guests.

In the Student Union is a full campus life facility housing a computer lab and the University's more than 400 campus organizations. Many activities such as movies, late night events and speakers are provided for students by the Union's student programming organization, the Student Union Activities Board, also located in the Union.

Through its meeting and conference center, the Student Union hosts many conferences throughout the year. The variety of meeting rooms located throughout the building are also available to OSU student organizations and faculty meetings, typically at no charge.

Although the OSU Student Union's annual budget exceeds $18 million, less than 10 percent of the total cost of operating the Union is funded from student fees. More than 85 percent of the Student Union budget is derived from self-generated sales of goods and services offered within the Union such as the bookstore and the student store.

During the next few years, the Union plans to continue to build on its tradition with an $86 million renovation project. The project's goal is to revitalize an iconic campus building so it can better meet contemporary student needs while maintaining the significance of its history, legacy and commitment to student success.

More information about the Student Union and its offerings can be found on the Internet at http://union.okstate.edu.

Student Services

Career Services

Pamela Ehlers, EdD - *Director*

Career Services offers extensive job search assistance to OSU students and alumni, including individual and collective services regarding career development, experiential education, student employment, volunteerism, service learning, and internship education as well as other topics.

Staff members assist students in learning how to obtain part-time jobs through résumé assistance, part-time online job listings, and specialized annual career fairs, including the Work & Service Fair and the Summer Camp Fair. Additionally, students are assisted with other options, including service learning, job shadowing, leadership, and volunteer experiences to build the skills necessary for future employment.

Internships, full-time employment, and graduate education experiences are also facilitated by Career Services through career consulting available in each academic college as well as in the Student Union. Career consultants assist students and alumni by offering individual consultations, job search exploration assistance, career development workshops, mock-interviews, and specialized programming.

Electronic job search assistance is also available through the departmental Web site HireOSUgrads.com**.** This site allows students and alumni to access the HIRE system, an online job search engine for full-time jobs, internships, federal work-study positions, part-time jobs and co-ops. On-campus interviews and employer information session details are also available on the HIRE system. Additionally, job search tools such as Interview Stream, Going Global, and job search podcasts are available on our Web site.

Details on every step of your decision-making process, from beginning the search through graduate school selection or salary negotiation is available on the Web site.

Additionally, campus wide career fairs are held at least once each semester for students and alumni. These events are excellent opportunities to network with potential employers and learn about specific career options regarding full-time positions, internships, co-ops, and graduate schools. To prepare for the career fairs, please stop by a Career Services office, visit with a career consultant and pick up your free résumé paper and thank you notes. Portfolios and business cards are also available for purchase for student use at the Career Services office located at 360 Student Union.

Information Technology

Darlene Hightower - *Chief Information Officer*

The Information Technology Department provides innovative, reliable, and integrated technology solutions for Oklahoma State University students and staff. IT provides administrative and academic computing services and support as well as telecommunications services for OSU. Services include network and communications infrastructure, software development, enterprise application systems management, security services, high performance computing, computer training, publications, desktop computing support, and a comprehensive HelpDesk.

—IT Helpdesk. The IT HelpDesk provides diagnostic support and assistance by phone, by e-mail, or in person. The HelpDesk office is located in 113 Math Sciences and can be reached at (405) 744-HELP or helpdesk@okstate.edu**.**

HelpDesk hours are:
Weekday hours (fall/spring semester): M-F 7:00 am-1:00 am
Weekday hours (summer semester): M-F 7:00 am-10:00 pm
Weekend hours (all semesters): Saturday 10:00am - 5:00pm;
Sunday 2:00pm-11:00pm

More HelpDesk information can be found by visiting http://help.okstate.edu/**.**

—Getting Access to IT Services. Students applying to Oklahoma State University are granted an Orange Key (O-Key) username and password that allows them access to an okstate.edu e-mail account and other IT services. For information on how to activate your O-Key account, visit http://it.okstate.edu/services/okey/. After enrolling, students are issued an OSU ID card that includes their photo and campus-wide ID (CWID) number. Students can obtain an ID card at the ID Services office in 432 Student Union Monday-Friday from 8:00 a.m.-5:00 p.m.

—Student Technology Resources. After enrolling at OSU, students receive access to network and computer labs, print services, 250Mb network data storage, software downloads, and electronic mail from any web browser by using Outlook Web Access (OWA) at http://mail.okstate.edu**.**

An extensive data communications network provides interfaces to OneNet, the Internet, Internet 2, and the National LambdaRail (NLR). OSU uses a campus wide Ethernet-based network to provide technology services to students. The campus has more than 35,000 10/100 megabits per second network drops and is continually expanding its WIFI coverage. Both the wired and wireless networks provide fast connectivity to university services and the Internet. For more information about WIFI coverage, visit www.it.okstate.edu/students/wireless**.**

—Campus Computer Labs. The OSU campus has five IT-managed computer labs located in Classroom Building 4th Floor, Bennett Hall B19, Kerr-Drummond Mezzanine, Student Union 065, and Math Sciences 108. Campus labs provide Microsoft Office Suite, SAS, SPSS, and Adobe Acrobat reader, as well as Internet access. Other college-specific software also can be found in these labs. For a complete listing of available software in the campus computer labs, please visit the "Campus Computer Labs" section of the IT Resource Center, http://it.okstate.edu/rc. While the majority of the computers in these labs are Intel, each lab includes Macintosh computers as well as numerous scanners available for student use. The Macintosh computers are fully functional, fully integrated into the OSU network, and are capable of accessing Online Classroom and other educational Web sites. In addition, there is at least one scanner available for students in each computer lab. All labs have wheelchair access and feature adaptive technology software.

Students also have access to three virtual computer labs created for students to access while off campus or in their dorm rooms. Students can login to these virtual labs from any computer with an Internet connection using their O-Key username and password. For instructions on how to login to the virtual labs using Windows, Mac, or Linux operating systems, please visit the "virtual computer labs" section of the IT Resource Center, http://it.okstate.edu/rc**.**

—High Performance Computing. The High Performance Computing Center (HPCC) provides super-computing services to faculty, staff, and students. The HPCC also provides consulting services to researchers with their experimental software and hardware needs and training in parallel computing concepts and operations. For access to this service, please e-mail helpdesk@okstate.edu and place your request. The Web site for this service is http://it.okstate.edu/depart/hpcc/.

—Student Technology Products. Students are eligible for discounts on Microsoft, Dell, Apple, and Cingular products and services through OSU. For information on how to obtain the OSU discount on Dell or Apple products, as well as information on Cingular cellular plans for students, please visit http://it.okstate.edu/students/. Virus protection software and Microsoft products, including Windows and Mac versions, are available to download through OSU's Microsoft Campus Agreement at the software distribution center Web site at https://app.it.okstate.edu/sdc/login.php. Directions for software pick-up or delivery also are available on the software distribution center Web site.

—Additional Information. For a complete listing of IT resources, please visit http://it.okstate.edu/rc. For additional information about the Information Technology department, please visit http://it.okstate.edu.

Parking and Transit Services

Steve Spradling - *Director of Parking and Transit Services*
Jan Hernandez - *Assistant Manager, Parking*
Steve Singleton - *Assistant Manager, Transit*
Jana Benningfield - *Shuttle Coordinator*

Vehicle Registration and Parking Regulations

Any motor vehicle parked on University property between the hours of 5:00 am and 5:00 pm, Monday through Friday, must display a valid OSU paid parking permit or pass. The color and type of permit indicates the area where the vehicle may be parked. Use of a motor vehicle on University property is a privilege, not a right, and is made available only under the policies established in the University Parking and Traffic Regulations manual currently in effect. Any vehicle driven or parked on the campus of the University by an OSU student or employee should be registered with the OSU Parking Services.

Free bicycle registration with the OSU Department of Parking and Transit Services is advantageous in the event the bicycle is stolen or lost. When bicycles are recovered by the department they are checked against bicycle serial numbers maintained in the registration files for return of the bicycle to the rightful owner.

The purpose of these regulations is to expedite the safe and orderly conduct of University business and to provide parking facilities in support of that function within the limits of available spaces. Purchase your permit online at www.parking.okstate.edu; new faculty or staff, vendor, handicapped, university vehicle, carpooling, emeriti, construction, registration or special permits must be purchased in person at the parking and transit services department office. A copy of the *OSU Parking Rules and Regulations* booklet is available from the Parking and Transit Services office, 1006 West Hall of Fame on the corner of Monroe and Hall of Fame; or view online at www.parking.okstate.edu/.

—Transit Services. The BUS is the campus and community transit service operated by the Department of Parking and Transit Services. The BUS offers fixed route transit and on-demand paratransit service year-round. Bus transportation is available from 6:30 am until 10:30 pm Monday through Friday during the school year and 6:30 am until 7:00 pm during the summer. Route and time information are available at the Parking and Transit Services office or online at www.transit.okstate.edu.

—Tulsa Shuttle. BOB, OSU's Big Orange Bus, is a shuttle service between the Stillwater and Tulsa campuses. There are nine trips daily from each campus Monday - Thursday; seven trips on Friday. It is open to current students, staff and faculty. The cost is $7 one way for students; and $13 one way for faculty/staff. Reservations can be made in Stillwater at the Shuttle office in 1006 West Hall of Fame, at the corner of Hall of Fame and Monroe, Monday - Friday 7:30 am to 5:00 pm, or in Tulsa at the North Hall Information Center, Monday - Thursday from 7:00 am to 6:00 pm and Friday from 7:00 am to 5:00 pm. In Stillwater, call (405) 744-7100 and in Tulsa call (918) 594-8332 or visit the Web site at www.osu-tulsa.okstate.edu/services/shuttle.asp.

Housing and Residential Life

Matthew S. Brown - *Director of Residential Life*
Terry Baker - *Dining Director, University Dining Services*
Shannon Baughman - *Assistant Director, Marketing & Conferences*
Scott Blackwell - *Assistant Director, Housing*
Jon Hunt - *Assistant Director, Administrative & Business Services*
Dave Stoddart - *Assistant Director, Family & Graduate Student Housing*

The Department of Housing and Residential Life offers 25 residence halls, seven family-first neighborhoods, 21 special interest housing options, over 30 dining options, and countless leadership activities for students. Students who live on campus graduate sooner and maintain higher grades than their off-campus counterparts. More than 500 students are involved in planning and leading educational, recreational, and social activities within the halls.

Freshmen are required to live on campus. Exceptions are: if they are married, are 21 years of age or older, are living with their parents in Stillwater or the surrounding area, are veterans, or are living in a fraternity or sorority house (sorority pledges generally live in residence halls due to limited sorority house space), or have completed 27 credit hours. Exceptions must be requested in writing, and approved by the Department of Housing and Residential Life.

All accommodations are rented on a contract date priority basis. While there is no deadline to apply for housing, prospective students are encouraged to return their applications and contracts at least nine months before the desired occupancy. This will improve the chances of receiving the preferred on-campus housing location.

Traditional Halls, Suites and Apartments

OSU offers three living styles to choose from when picking a place to live: traditional halls, suites, and apartments offer a variety of living accommodations. Traditional residence halls include Kerr-Drummond, Parker, Stout, and Wentz. Six suite buildings make up the area referred to as the Village. Suite units are also offered in Bennett Hall, Allen, Booker, Jones, Patchin, Stinchcomb, and Zink Halls. Apartments can be found in Bost, Davis, Kamm, Morsani-Smith, Peterson-Friend, Sitlington, and Young Halls.

All halls are open continuously throughout the academic year. Year round housing (12-month contract) is available in each type of housing offered. Some halls house only non-freshman students, but freshmen may be assigned by exception. Further information may be found on the Internet at www.reslife.okstate.edu.

Studies show that living on campus can be more affordable than living off campus. Some students save as much as $500 per academic year by living on campus. Just one bill pays for a student's rent, meal plan, and all utilities including cable TV and Internet connection. Rates rarely increase during the academic year, even when roommate(s) move out.

Students are offered several lifestyle options. Kerr Hall houses men only, while Drummond Hall houses women only. All other halls are co-ed. Residential Life offers numerous learning communities for students to consider when choosing their housing options. The first three floors of Stout Hall are open to students who are active participants in the

Honors Program. Zink Hall is home to the Ketchum house Native American house, as well as housing students interested in engineering. Engineering Houses can also be found in Kerr, Drummond and Bost Halls. Maude's Quad, Women in Engineering house, is located in Allen Hall, and the HOMES Multicultural Engineering house is also in Allen Hall. Men that are computer science majors may choose to live on the special interest house in Kerr Hall. Jones Hall is home to the Uhuru house, the African centered cultural house. Students interested in developing leadership skills may be interested in the Kamm Hall leadership house. Spanish majors or Spanish speaking students may be interested in living on the Spanish house located in Wentz Hall. The wellness house, located in Stinchcomb Hall, is open to residents who wish to adopt a total wellness lifestyle. The study abroad house is located on the fourth floor of Village Hall D. The third and fourth floors of Village CASNR houses participants in the FIT (freshmen in transition) program through the College of Agriculture. The first and second floors of Village CASNR are dedicated to the CASNR community. The College of Human Environmental Sciences is offering HES majors a living learning environment in Village Hall HES. Village Hall C is the location of three communities from the College of Arts and Sciences: the career exploration house on the second floor, the journalism and broadcasting house on the third floor, and the health sciences house on the fourth floor. The Spears School of Business community is located on the fourth floors of Village Halls E and F and the athletic training house is located on the third floor. The third floor of Village Hall F is home to the history floor. The recovery house provides support for students recovering from drug and/or alcohol dependence. Participating students will be housed in four bedroom apartments.

In every residence hall there is a well-trained, professional staff member to coordinate the day-to-day operations of the building, as well as student staff whose primary function is to see that students benefit educationally from their residential living experience. Each floor or wing has a live-in student staff member (resident assistants, community facilitators or community mentors) responsible for assisting and guiding the residents. Student staff members are undergraduate students specially trained in all aspects of residential area living with the experience and knowledge to answer questions and act as an advisor for student governments and programs.

University Dining Services

University Dining Services offers more than 30 dining options to choose from on the Oklahoma State University campus. UDS makes every effort to provide options to satisfy the hungriest student, the most selective eater, those who prefer vegan options or have limited diets. The choices are endless, with something available from early morning to late night. From cafeteria dining to national franchises/brands and specialty restaurants, OSU provides you with the very best offerings. As a UDS meal plan holder, you can use your meal plan in any of these 30 locations. Of course, other methods of payment can be used as well including bursar charge, cash, credit card, etc.

UDS also realizes how important it is to provide healthy options for its customers. We are proud to be a partner with the Seretean Wellness Center in the Choose Orange program. Be sure to look for the Choose Orange logo on the items that qualify for the U.S. Dietary Guidelines.

All freshmen living on campus are required to have a meal plan. To learn more about everything UDS has to offer, please visit http://dining.okstate.edu.

Mobility Impaired Student Housing

All residence halls and many Family and Graduate Student apartments offer some housing for students who have impaired mobility. Upon notification, the Department of Residential Life routinely modifies rooms and apartments to meet an individual's special needs. This modification may take several months, so advance notification is critical.

Family and Graduate Student Housing

More than 700 apartments are available to serve students in the following priority: families, single graduate students, and single, upper class, undergraduate students. Priority for single students is given to those who have lived in the residence halls.

Most apartments are two-bedroom units with optional furnishings. The Morrison Neighborhood features some three-bedroom units. The apartments have sidewalks, off-street parking, play areas, and two laundry facilities. Residents of the Morrison Neighborhood have full-size washers and dryers in their apartment units.

School bus transportation is provided to the Stillwater High, Junior High, and Middle schools, and to Westwood and Will Rogers elementary schools.

The Family Resource Center, located in the Family and Graduate Student Housing area, offers a variety of programs to meet the needs of the residents. These programs vary depending upon the needs of the clientele. Typical programs include: English as a Language class (ESL), after-school programs, children's programs, and pot luck dinners. The Laundry Mart convenience store is located inside of the University Laundry.

Family and Graduate Student Housing provides an on-site staff member, an apartment assistant, who is readily available to the residents. Each apartment assistant has responsibility for about 90 apartments. The assistant's duties include helping residents resolve inter-apartment conflicts, meet neighbors and find appropriate community services. They also provide information about the facilities and the University, and provide referrals to appropriate University offices for residents' needs. The apartment assistant can be a very helpful person for all residents.

For more information contact the Family and Graduate Student Housing Office, 120 Brumley, Stillwater, Oklahoma 74078, (405) 744-5353, or www.reslife.okstate.edu.

Residence Hall Student Organizations

Residence halls are popular places to live on the OSU campus. The housing and food service programs have a proud tradition of excellence recognized nationwide. Much of the success of the residence halls is the strong and vital student government system consisting of floor governments, councils for each hall or complex and the Residence Halls Association, which represents all halls on campus.

All residence halls on campus combine to form the Residence Halls Association (RHA). The Residence Halls Association acts as the voice of residential area students to the University administration concerning policies and regulations, and coordinates campus-wide activities for the enrichment of residential area living. Each hall has its own elected officers and constitution, and is a part of the RHA system of representative government. There are numerous opportunities for involvement in the halls, such as floor officer, social committees, food committees, and sports and athletic activities.

Students with Children

Information on child care in the Stillwater community is available at the following locations on campus:

Family Resource Center - 719 N. Walnut, (405) 744-6539

Nontraditional Student Services - 060 SU, (405) 744-5488, Marie Basler, coordinator

Non-Traditional Student Organization, 045 SU, (405) 744-7508

University Counseling Services

Suzanne M. Burks, PhD, LPC - *Director*
Dylan Burns - *Senior Clinical Counselor*
Carol Challenger - *Senior Clinical Counselor*
Joseph Dunigan - *Senior Clinical Counselor*
Baiba Ercum, MD - *Psychiatrist*
Joni Hays - *Coordinator, Career Resource Center*
Linda Myers - *Coordinator, Alcohol & Substance Abuse Center*
Kara Niccum - *Substance Abuse Counselor*
Tamara Young - *Senior Clinical Counselor*
Trevor Richardson - *Senior Clinical Counselor*
Alicia Severe - *Career and Outreach Specialist*
Cindy Washington - *Clinical Counselor*
Jason White - *Coordinator of Counseling*

The University Counseling Services provides confidential professional, personal and career counseling for OSU students. Both individual and group counseling is available. Assistance is offered for emotional problems as they affect personal and academic goals, intellectual functioning or relationships with others. Among the variety of concerns dealt with in counseling are stress, anxiety, depression, eating disorders, substance use/abuse, interpersonal relationships, and career indecision. Psychiatric consultation is available as needed.

University Counseling Services also assists students with problems, concerns, and experiences relating to educational difficulties; i.e., study habits, test-taking stress, lack of motivation, or attitudes related to school. All information regarding appointments and content of counseling is strictly confidential.

University Counseling Services operates the Career Resource Center. The Center provides walk-in assistance for OSU students. It contains books, handouts and computerized resources on careers, study strategies, scholarship and graduate school searches.

A broad range of developmental and proactive programming is offered through University Counseling Services in outreach and service to living groups, organizations and academic classes.

Minimal fees are assessed for individual and group counseling, for certain tests, for specific programs or workshops and for some career assessments. Depending upon the need, tests and other University services may be used in conjunction with counseling.

The University Counseling Services is an accredited member of the International Association of Counseling Services, Inc.

Americans with Disabilities Act (ADA) Compliance Program

Mike Shuttic - *Director*

Considerable progress has been made to enhance ADA access to OSU programs, services, facilities and grounds. Students with disabilities are encouraged to help with such efforts through the ADA Advisory Council for Individuals with Disabilities. In addition, students may exercise certain ADA appeal "rights" if dissatisfied with student services, accommodations or access. OSU is committed to improving the full and nondiscriminatory participation in all aspects of campus life for individuals with disabilities. For more information, contact the Office of ADA Compliance, 315 Student Union, (405) 744-7116, fax (405) 744-8380.

Student Disability Services

Mike Shuttic - *Coordinator*

Student Disability Services (SDS) at Oklahoma State University offers academic support to students with disabilities attending the Stillwater campus. Student Disability Services is committed to providing a community that ensures full participation for students. Additionally, Student Disability Services is a resource for faculty and staff members. Appropriate services are determined on an individualized basis and may include academic advisement, specialized testing, accessible textbooks, classroom access, assistive technology, and other services based on disability-related need. Students must initiate a request for services by contacting Student Disability Services at 315 Student Union, (405) 744-7116, fax (405) 744-8380.

University Health Services

Steve Rogers, CHE, MBA - *Director*
Kenneth B. Smith, DO - *Medical Director*

Oklahoma State University is as interested in the student's physical and emotional well-being as it is in his or her intellectual and cultural development. Good health will not guarantee academic success, but it will help; while poor health, either physical or emotional, can impair both the academic and the extracurricular career.

University Health Services maintains a staff of full-time physicians, nurses, laboratory technologists, pharmacists, x-ray technicians, and other necessary support personnel who make a specialty of providing the best possible care at the least possible expense for the student.

University Health Services is an ambulatory primary care facility, designed to provide cost-effective, physician-directed health care to students. Laboratory, x-ray, pharmacy and elective services are provided on a fee for service basis. In the event a medical condition exists that is beyond the scope of the services offered, referrals can be made to a family physician or a local physician in Stillwater. Emergency services are offered by Stillwater Medical Center 24 hours a day. University Health Services is fully accredited by the Accreditation Association for Ambulatory Health Care.

—Health Requirements.

1. All new students are required to complete the OSU Health History and Immunization form. Oklahoma law requires that students report their compliance with certain required immunizations; specifically measles, mumps, rubella, hepatitis B, and meningitis. Information about the requirements for compliance are explained in detail on the OSU Health History form that is mailed to all new students and is available for download from the Internet at www.okstate.edu/UHS/. Failure to comply with these guidelines will prevent future enrollment.

2. Students meeting the following criteria must provide a record of having a negative tuberculosis skin test (PPD) within six months of arrival at OSU, or, if the TB skin test is positive, must provide a negative chest x-ray; students who:

- are visa holders,
- are U.S. citizens, who previously resided outside the U.S.,
- have a medical condition that suppresses the immune system,
- are known to have been exposed to tuberculosis.

Refer to the Immunization and Health History form for specific guidelines and information. Failure to comply with these guidelines may affect future enrollment.

For more information contact the University Health Services, 1202 West Farm Road, Oklahoma State University, Stillwater, Oklahoma, 74078, or download the form from the Internet at www.okstate.edu/UHS/.

Campus Life

Kent Sampson - *Director, Campus Life*
Ruth Loffi - *Campus Life Administrative Associate*
Joe Ray - *Coordinator, Allied Arts & Special Events*
Stephen Haseley - *Manager, Leadership Development*
Marie Basler - *Coordinator, Nontraditional Student Services*
Kathleen Kennedy - *Coordinator, Student Union Activities Board*
Joyce Montgomery - *Coordinator, Service-Learning Volunteer Center*
Ival Gregory - *Manager, Fraternity & Sorority Affairs*
Elizabeth Osborne - *Coordinator, Fraternity & Sorority Affairs*
Tim Huff - *Manager, International Students & Scholars (ISS)*
Regina Henry - *Coordinator of Immigration, ISS*
Linda Dunbar - *Coordinator, International Tax, ISS*
Karen Sebring - *Coordinator, Sponsored Students, ISS*
Elizabeth Scott - *International Student Specialist, ISS*
Fran Gragg - *Coordinator, Cowboy Parents, OSU's Parents Association*

The Department of Campus Life is in the forefront of co-curricular activities on campus. Enhancing a sense of "campus community" is a key thrust of this department. It is responsible for the facilitation and implementation of programming for students and student organizations at the University. Campus Life's commitment is to provide an environment that encourages interaction among students, faculty, staff and the community at large through organizations to provide the best quality of services with integrity and respect for a diverse population.

Services provided by the Campus Life Center, 060 Student Union, include Student Union display case scheduling, insurance for OSU sponsored trips, a calendar of events, scheduling of Bennett Chapel, notary public, registering posters, fliers and signs, scheduling use of campus grounds, student organization records in liaison with the Student Government Association, Motor Pool requests, campus work orders for student groups, scholarship and membership applications, and a resource center that offers a wide variety of brochures on various subjects.

Campus Life at OSU encompasses the following administrative and programming areas:

Allied Arts

Allied Arts is the oldest university performing arts series in Oklahoma. The program has brought thousands of outstanding performances to Stillwater, as part of its mission to enrich university life and provide the university community with a broad range of professional-level musical, dance and theatrical events. Allied Arts performers are selected by a committee composed of students, faculty and staff, and each year six or seven performances are scheduled for the series. Students, faculty and staff can purchase a subscription for all events, or individual tickets to specific shows. For ticket information and schedule, visit the Allied Arts Web site at http://alliedarts.okstate.edu.

Fraternity and Sorority Affairs

Oklahoma State University benefits from the presence of 20 North American Interfraternity Conference fraternities, 11 National Pan-Hellenic Conference sororities, five National Pan-Hellenic Council fraternities and sororities and three Multicultural Greek Council organizations, two fraternities and one sorority. The Greek experience stresses academic excellence, leadership growth, community involvement, professional development and athletic competition. Greek life has been a part of OSU since 1908. The system provides student leaders with the opportunity to participate in a wide variety of activities, including numerous philanthropies that Greek members support. The Office of Fraternity and Sorority Affairs, located in 050 Student Union, provides guidance and resources to all Greek organizations. The full-time staff consists of Greek alumni who have extensive background and knowledge of the Greek system.

Honor and Service Organizations

OSU offers opportunities for personal and professional development through many nationally-affiliated honor and service organizations. These organizations provide opportunities for leadership and program development, new friendships and recognition of achievement. University-wide organizations include:

Blue Key (junior and senior honor society)
Golden Key (junior and senior honor society)
Mortar Board (junior and senior honor society)
National Society of Collegiate Scholars
Order of Omega (honor society for sorority and fraternity members)
Phi Eta Sigma (freshman and sophomore honor society)
Phi Kappa Phi (national honor society for seniors and graduate students)
(See college sections for organizations within each college.)

International Students and Scholars

The Office of International Students and Scholars (ISS) provides assistance to more than 1500 nonimmigrant students and scholars from 120 countries around the world. The goals of ISS are to assist international students and scholars with education on U.S. immigration regulations, orientation to the OSU environment and the American culture, exposure to the University resources available, and familiarization with the campus and community.

ISS is responsible for advisement and support to students, faculty and staff on matters specifically related to international students and scholars. Additional international related services include employment and tax assistance, immigration consultation, liaison with embassies, consulates and sponsoring agencies, legal referrals, academic referrals, orientation programs, community involvement and logistical support for special and nonacademic short term programs.

ISS provides numerous services to newly admitted international students prior to and after their arrival in the U.S. Some of the services include pre-arrival information, ground transportation from the Oklahoma City airport to OSU, temporary housing, banking, orientation, enrollment assistance, employment clearances, and support as needed. ISS informs continuing students on events and immigration issues through its weekly ISS listserv and web page. ISS also provides various public presentations on internationally-related issues as needed.

ISS supports numerous events and activities that encourage American and international students, faculty and staff participation. ISS is located at 076 Student Union within the Department of Campus Life.

Lectures

Oklahoma State University, through its academic organizations and student groups, has a significant number of speakers each year, enriching the intellectual life on campus. Individuals, from both off-campus and on-campus, share their expertise with faculty, students, staff, and town's people on a wide variety of topics.

Many of the academic units, as well as student groups, invite speakers to their meetings in order to enhance the educational component of the University. These lectures are generally of interest to specific academic areas, rather than to the general campus.

The Student Government Association, through its Speaker's Board, brings major figures in politics, entertainment, and business to the campus. The Student Union Activities Board also has a speaker's program related to topics of general student interest. Other student organizations conduct active lecture programs concerning their interest areas.

Allied Arts conducts lecture demonstrations in conjunction with its performing arts presentations. In this manner, students can gain additional knowledge of the performing arts and its artists.

Non-Traditional Student Services

The primary goal is to assist non-traditional students, anyone with at least a two-year break in education, by providing support, information and referrals. The coordinator serves as a resource person for the entire campus community and seeks to raise the awareness of faculty, administrators and students with regard to the needs of this special group. All nontraditional students are encouraged to stop by the Campus Life Center, 060 Student Union to discuss their concerns or questions. The coordinator also advises students who have rent-related difficulties, such as landlord disputes, or who are looking for housing off-campus.

Office of Leadership Development

—Leadership Minor. The leadership minor is an 18 hour academic and experiential opportunity for all students to develop and enhance their abilities to lead. Each student must also complete at least 40 hours of documented service learning experience or specific community service related to the student's stated goals for admission. Upon completion of the academic and experiential requirements, students will be required to meet with their student affairs mentor to prepare, publish and discuss a reflective analysis of their experience. Admission into the program will be based on an overall assessment of an applicant's educational, career and social goals. Applicants must complete a written application and be interviewed prior to acceptance into the program.

—President's Leadership Council. A scholarship and leadership program for outstanding incoming freshmen that teaches the importance of leadership and service throughout life. Freshmen chosen to be in PLC complete a year-long class that consists of leadership seminars, volunteer service, and a creative component.

—Leadership Issues Forum. Effective management of important issues is a key component of good leadership ability. Join the Leadership Issues Forum to learn how to deliberate as well as work effectively in groups to reach common ground on highly critical and relevant issues.

—LEAD Program. In recognition of the importance of acknowledging the achievements of student leaders and to encourage emerging leaders at OSU, this program is open to all OSU students and consists of the following components in two levels.

Level One: L.E.A.D. Participation Certificate

- To complete this level you must attend and participate in each of six leadership series seminars.

Level Two: L.E.A.D. Program

Participation Recognition Medal and Certificate

- Attend each of the seminars mentioned earlier
- Become active in at least two campus organizations
- Complete a Student Development Transcript
- Implement a leadership project
- Record program experiences in a leadership journal
- Maintain an acceptable GPA

—Society for Leadership and Success. The National Society of Leadership and Success, or Sigma Alpha Pi, was created by a nationwide effort of professional motivation speakers who wanted to truly impact student's lives on a long-term continuous basis, rather than a one-time motivational speech. The mission is to help individuals create the lives they desire by helping them discover what they truly want to do and giving them the support, motivation, and tools to achieve their goals.

—Leadership Study Abroad. The Leadership Study Abroad Program is an opportunity for students to learn and experience Leadership in different cultural settings receiving academic credit at the same time. The Office of Leadership Development, in partnership with The College of Education, has developed this program to provide academic international experiences that enhance the students personal and professional leadership development. Trips vary each year with places such as New York City, Paris, Geneva, The British Isles, Rome, and Greece which have been undertaken and planned for future offerings.

Cowboy Parents, OSU's Parents Association

Cowboy Parents consists of OSU parents and family members whose goal is to support their students and the University by sponsoring events, activities and scholarships both on campus and in their home communities. Cowboy Parents sponsors scholarships for students, safety programs for students and the Parents' Handbook that is distributed during new student orientation. The Association sponsors an annual family weekend and dad's day during the fall of each year and mom's day during the spring. Members receive free publications, a membership card that entitles them to discounts at select Stillwater area merchants, a vehicle decal to display and electronic newsletters that remind them of campus events, important dates, and deadlines on campus.

The purpose of the Cowboy Parents is to:

- enhance communication between the University and the parents of Oklahoma State students.
- provide parents with a supporting role in the education of their students, while providing a forum for networking with other parents.
- take an active role in promoting the excellence of the University.

The objective of the Cowboy Parents is:

- encourage parents to support the programs and activities of the University.
- help parents and students in the transitional time when the student begins college.
- support the academic community at Oklahoma State University.
- cultivate and recruit new students and families to the University.
- support student affairs and student services that enhances the students out-of-class experience.

Membership dues are $35.00 annually or a onetime payment of $105.00 for lifetime membership. To join, visit the group's Web site at http://parents.okstate.edu.

Religious Life

Campus religious centers, supported by state and national church bodies specifically to serve the University community, provide opportunity for worship in both traditional and contemporary services; religious education commensurate with higher learning for the development of the whole person; counseling that maintains a spiritual basis for the cohesion and meaning of life; and social activities which allow relationships and life views to deepen. The 18 religious centers have strategic locations close to campus and, in addition to their own ministry, coordinate many of their efforts with each other, other campus religious organizations and the University administration through the Interfaith Council.

Service-Learning Volunteer Center

The focus of the Service-Learning Volunteer Center is to provide OSU students with opportunities that reflect academic needs and personal interests. Working with local, state and national non-profit agencies, students at Oklahoma State University are provided with opportunities to grow and excel through meaningful hands-on involvement in service, research and academic activities. The Center assists students with the desire to become leaders in culturally diverse and challenging societal settings. Through recruitment, interviewing and training, the SLVC staff identifies and places students in engaging and meaningful civic service while promoting academic and learning outcomes. Students are exposed to various issue ideas and community needs on a first-come, first serve basis through interviews with the SLVC staff.

Civic engagement is broadly defined as activities which reinvigorate the public purposes and civic mission of higher education. Civic engagement activities within higher education include objectives such as developing civic skills, inspiring engaged citizenship, promoting civil society and building the commonwealth.

Since 1984 countless numbers of OSU students have served hundreds of non-profit agencies through dedicated and thorough service activities, building a reputation of civic responsibility within higher education and other communities in Oklahoma. Working together toward a common goal, these diverse students, by sharing their cultures, ideas and talents, have influenced communities worldwide.

Through information sessions and an annual service-learning fair, a traditional fall event, the Service Learning Volunteer Center keeps students informed about upcoming events and needs in the local community.

With multiple service sites, located on and off the OSU campus, students learn more about themselves, their new community and other communities as they become a valued force for change. OSU's SLVC partnerships include a variety of programs that teach students, faculty and staff the importance of civic engagement. Those programs include:

—Campus Compact. A national coalition of 850 college and university presidents committed to the civic purposes of higher education. To support this civic mission, Campus Compact promotes community service that develops students' citizenship skills and values, encourages partnerships between campuses and communities, and assists faculty who seek to integrate public and community engagement into their teaching and research.

—Oklahoma Money Matters. An AmeriCorps initiative to identify, recruit, train and provide mentors in financial literacy to Oklahoma children, youth and adults in existing school and community programs. The programs aim is to reduce the lack of knowledge of personal financial skills and increase chances of success.

—Service-Learning. OSU offers a number of courses that enrich students' lives through service-learning. Through service-learning, students learn and develop through active participation in thoughtfully organized service experiences that meet actual community needs. Often the service learning is integrated into the students' academic curriculum and enhances what is taught in school by extending student learning beyond the classroom and into the community.

Further information is available on the Internet at http://union.okstate.edu/Volunteer/index.htm.

Student Development Transcript

The Student Development Transcript (SDT) gives OSU students the opportunity to record their co-curricular activities in a format similar to an academic transcript. Involvement in all campus organizations and volunteer service may be included. The transcript can be used with applications for scholarships, honorary organizations and with resumes for job applications. Contact the Campus Life office at 060 Student Union for more information on this valuable tool.

Student Union Activities Board

Through the Student Union Activities Board (SUAB), OSU is enriched by cultural and recreational activities. Students coordinate events that are as diverse in nature as the students at OSU, such as FallFest, Bedlam Bonfire Bash, SpringFest, administrative discussion panels, live entertainment, Freshman Follies, Cowboy Showcase, internationally recognized speakers, weekend movies, independent movies, Bingo, TK's Casino, student art exhibits and slam poetry.

SUAB has six programming committees, a special promotions committee, and four executive chairs. It is one of the most active campus organizations at OSU. SUAB also hosts Union After Dark weekend line-up that is sure to entertain and provide great fun for all Cowboys.

University Police Services

Public Safety

Philosophy and Service

The Oklahoma State University Police Department is dedicated to enhancing the opportunity for students, faculty and staff to participate in the educational experience by providing a safe, protected and orderly environment. As a service organization, the department offers a full range of police resources, including area patrols, criminal investigations, crime prevention, facilities security analysis, event planning, and parking management and enforcement. In addition, members of the department serve on University and community committees, provide training and specialized presentations to campus organizations and living groups, participate in the design and installation of safety and traffic control devices, and act as special advisers to all campus departments and administration. The professional police men and women, full-time staff members, and part-time employees are all handpicked to meet the high standards and multidimensional mission of a public safety department.

The OSU Police Department was the first policing agency in the State of Oklahoma to receive accreditation from the Oklahoma Association of Chiefs of Police. The OSU Police Department gained accreditation in 1998 and continues its status after undergoing accreditation reviews in 2002 and 2005. The OSU Police Department is comprised of 31 sworn officers. The department employs a number of part-time employees (student employees) to perform low-threat duties such as entrance and motorist assists and selected assignments dealing with traffic and crowd control. Through efficient management of resources and success in gaining grant funding from State and Federal sources, the department continues to provide highly trained officers with appropriate communications and police equipment.

Policies and procedures have been adopted that stress conservation of equipment and supplies. Grants from the Department of Justice and other sources have allowed the complete computerization of the records keeping and data management functions, as well as the hiring of six additional police officers. A problem-solving grant has focused attention on larcenies and thefts on campus and has resulted in better methods of securing and protecting individual property. Overall, the department has gained more than four hundred thousand dollars in grant support to provide the OSU community with better protection and police services. All officers are trained in the principles of community oriented policing.

OSU police provide a positive image to visitors and members of the campus community, whether it is providing directions, motorist assistance, information, or just a friendly welcome. Officers represent the University as a group of caring and professional people, intent upon enhancing a friendly community atmosphere. Necessary enforcement includes using alternatives to arrest when reasonable, and cooperating fully with administrative services and functions that have an impact on student conduct. Enforcement efforts are geared toward providing a safe community.

OSU police participation in athletic and special event staging and planning ensures that all aspects of safety and security of participants are considered. OSU police provide professional crowd control and traffic regulation before, during, and after such events. As first responders to emergency situations, OSU police are often cited by citizens for decisiveness and professionalism. Students and staff find the OSU police willing to share statistics, insights, and experiences as a basis for class reports or vocational interest. OSU police managers seek proactive means to avoid problems and situations, whether it is suggesting added security measures, providing insight on planned activities, or using investigative analysis to assign a deterrent force.

For the OSU police, "service" is not just a word or a part of a catchy slogan, but a way of life. People programs, such as motorist assistance, money escorts, and emergency notifications are a part of the department's efforts to be involved in the community. OSU's emergency phone system was recently updated and expanded, and there are currently 77 emergency phones strategically located on campus and ten emergency phones located in the Greek Life area. These phones, with immediate response from the police, have been in operation since 1979 and are still being copied by other universities.

Operating under a 1989 grant from the Oklahoma Highway Safety Office, the OSU police launched the program Campus Community Alcohol Safety Effort (C-CASE), aimed at promoting seat belt use and educating citizens, primarily students, about the effects and penalties of alcohol use and abuse. A second positive effect of the C-CASE effort was the strict enforcement of alcohol-related laws that has shown dramatic results in getting the drunk driver off campus streets and consequentially preventing alcohol-related accidents. This program continues with a combination of education and enforcement efforts and has served as a model for other policing agencies throughout the state of Oklahoma.

Thousands of visitors, campers, fishermen, and sightseers visit Lake Carl Blackwell and surrounding recreational areas. OSU police officers provide friendly and efficient police protection, including lake patrol and rescue operations on the water.

Overall, the OSU Police Department believes in providing proactive law enforcement and service to the University community.

Crime Awareness

Security, Prevention, Statistics, Intervention

Crime

It is an unfortunate fact that criminal incidents of all types occur on college campuses. Many campuses around the country investigate and make public the nature of crimes, the number, and how they are investigated. Oklahoma State University subscribes to that approach and further believes that the public should know how active the OSU Police is in crime prevention and detection.

The OSU police sponsor a number of special programs for faculty, staff and students designed to provide information about campus security practices and procedures. During freshman parents' orientation each summer and monthly new employee seminars, procedures, suggested practices, availability of pertinent information, and individual responsibilities are discussed. The OSU police crime prevention staff

provides additional safety and security programs as requested. (See also "Avoiding Victimization.")

The crime statistics for the past three years for OSU may be found on the Internet http://osupd.okstate.edu.

Reporting Crimes

Crime victims, regardless how seemingly insignificant the crime, are encouraged to promptly report the incident to the OSU Police or the appropriate police agency. To report a crime, a victim or witness need only call the police phone number, 311 (non-emergency) and 911 for emergencies, and a police officer will meet the person to gather the information. An official report is made with copies available to the victim. Each day the incidents from the previous day, excluding names, are summarized and made available to the OSU president, key OSU staff, other law enforcement agencies, the media, and published on the Public Safety Internet page. Each month the number of incidents in each category of crime are counted and reported to the Oklahoma State Bureau of Investigation, who in turn provides the information to the Federal Bureau of Investigation. Each year, the FBI publishes a book of crime statistics called Crime in the United States that includes accurate accounting of the criminal incidents that occurred on the OSU campus. OSU has reported crime statistics in this manner since the FBI began publishing campus crime statistics in 1971.

Students and others are encouraged to report crimes or incidents to persons on campus with significant counseling responsibilities. The OSU Public Safety Department has further developed procedures for collecting information on crimes and violations pertaining to liquor laws, drug-related violations, and weapons violations from such counseling personnel and persons referred for campus disciplinary actions on these offenses. Such violations are published along with other criminal statistics.

Should a student need assistance in reporting crimes or incidents on or off campus, university counselors or police will provide guidance, direction or assistance.

Crimes in Progress

To report a crime in progress, a person, victim or witness, can dial 911 or use one of the outside emergency telephones, or call one of the police phone numbers. Either reporting method will stimulate the response of police, fire, ambulance, or other first responders. In addition, the victim of serious crimes can request support personnel, such as ministers, rape crisis or domestic violence counseling, during or after reporting.

Additionally, crime victims may be eligible for funds through victim compensation laws administered by the Office of the District Attorney.

Actual Crime at OSU

When comparing crime at OSU to other institutions of similar size, OSU's crime statistics are among the lowest. While a part of the former Big Eight athletic conference, OSU boasted having fewer crimes than any of the other Big Eight universities. As members of the Big Twelve conference, OSU has been among the lowest in crime according to the UCR Part I crime statistics.

The crime and arrest statistics reported are those which occurred within the jurisdictional boundaries of campus. They do not include "off campus" organizations or "off campus" private housing; these are within the city's police jurisdiction. It is the responsibility of the Stillwater Police Department to monitor and record criminal activities at "off campus" organizations or "off campus" private housing. Crime statistics concerning these locations or areas are available at the Stillwater Police Department.

Crime Statistics

The OSU Public Safety Department collects and publishes crime statistics for the three most recent calendar years concerning the occurrence on campus, in or on non-campus buildings, or property and on public property adjacent to OSU, of the following offenses reported to the local police agencies or to the OSU Police: Criminal Homicide, Murder and Non-negligent Manslaughter, Negligent Manslaughter, Non-Forcible and Forcible Sex Offenses, Robbery, Aggravated Assault, Burglary, Motor Vehicle Theft, Arson, and Arrests for liquor law violations, drug law violations, and illegal weapons possessions. Crime statistics are also reported by category of prejudice for any Hate Crimes reported.

All of these statistics are published on the OSU Public Safety Internet site http://osupd.okstate.edu and are also available in paper form. A paper copy can be obtained by calling the Public Safety Office or by writing to OSU Public Safety, 104 USDA Building, OSU, Stillwater, OK 74078 or by requesting a copy electronically at the above Internet site.

Future

Although it is believed that the low incidence of crime will continue, this report is not intended to give a false sense of security. Crime will occur, but prevention efforts can be effective in reducing the opportunities for criminal activity. Citizens play a key role in crime prevention efforts by being cautious, careful, and alert to personal safety and protective of personal and University possessions. The crime prevention tips noted below should be followed.

Security and Access Control

It is OSU's policy to lock the doors of buildings that are not in use. However, when working or studying in buildings after normal working hours, it is suggested that individual offices be locked, based upon an assumption that unrestricted access to the building is possible. Some buildings on campus are rarely locked, at the department's request, since students study and work on projects all hours of the day and night. Again, individual offices should be locked by the user on a presumption that the building is accessible. Residence halls have open access between the hours of 6 a.m. to midnight, Sunday through Thursday, and 6 a.m. to 2 a.m. on Friday and Saturday. During non-open access hours, all residence hall doors are locked except the front desk entrance. Instances of propped open doors have occurred, and residents are encouraged to take security precautions in the halls and rooms. Individual rooms should be locked at all times for safety.

Crime Prevention

OSU has experienced success at reducing and preventing crime. Some of the more notable efforts are:

- Emergency telephone system
- Emergency 911 dialing
- 24-hour preventive patrols
- Campus foot patrol by uniformed officers
- Police officer bicycle patrol
- Burglar alarms in key areas
- 24-hour staff in Residence Halls
- Custodial staff in academic buildings after hours
- Crime prevention seminar presentations to groups
- Crime prevention pamphlets for students and employees
- Monitoring of some parking lots by surveillance cameras

Crime stopper telephone line - 744-TIPS (744-8477)

In addition to preventing crime, considerable effort is devoted to crime intervention. All reported crimes are investigated immediately. Follow-up investigation occurs to identify the offenders. Where multiple incidents occur, surveillance techniques are implemented to help apprehend violators. When caught, offenders are processed through the county court system and OSU when appropriate.

Police Protection

The OSU campus is protected by a campus police agency consisting of 31 sworn officers, 7 support persons, and 9 part-time persons. The agency is operated and available 24 hours a day, 365 days a year. Authority of the sworn officers is derived from state statutes; these allow for full police powers on OSU property. In addition the OSU Police Department has a multi-jurisdictional agreement with the City of Stillwater and Payne County Sheriff's Office. These agreements provide additional resources for all agencies involved and therefore the OSU Police enjoy an excellent working relationship with other agencies within the community. All campus police officers undergo an extensive selection process and meet state-mandated training requirements.

Community Policing

The department subscribes to the concepts of community policing. The officers have been practicing problem-solving concepts for years. A police officer bicycle patrol was established to provide an opportunity for the officers to have closer contact with students.

Avoiding Victimization

Tips for personal safety and property security:

- Be cautious of strangers.
- Avoid getting into vulnerable no-exit places.
- Do not hesitate to call police when confronted by unknown persons.
- Keep house or residence hall room locked.
- At night, walk in groups of at least two.
- Walk with confidence, and avoid walking near bushes and parked cars.
- Become familiar with the location of emergency telephones.
- When parking, remove valuables from plain view and lock the vehicle.
- Engrave valuables with driver's license number and record serial numbers.
- Make copies of credit cards and lists of other valuables carried on person.
- Write name and ID number in several places in textbooks.
- Lock bicycle in a bicycle rack.
- Report all incidents and losses to police immediately.

When serious crimes occur on or off campus that are considered to be a threat to the campus community, that information will be provided to faculty, staff and students. The medium for this information dissemination will be the campus newspaper, faculty/staff newsletters, or in special instances, specific notices to on-campus residences. Such notices may be posted on residence hall entrance doors, in residents' mail boxes, or placed on electronic voice mail. In addition, the OSU Department of Public Safety maintains an Internet page http://osupd.okstate.edu. This page allows access to the daily crime log, crime prevention tips, and links to other sites providing similar information pertinent to the OSU campus.

Persons may dial the campus phone number (405) 744-6063 and have voice mail access to crime tip information, crime update, crime prevention tips, and parking information.

Alcoholic Beverages and Other Drugs

As set forth in local, state and federal laws, and the rules and regulations of the University, Oklahoma State University prohibits the unlawful possession, use, or distribution of illicit drugs and alcohol by students and employees in buildings, facilities, grounds, or other property owned and/or controlled by the University or as part of University activities.

Under OSU regulations, with limited exceptions, no low-point beer or other alcoholic beverage is allowed in OSU housing, including fraternities and sororities. Furthermore, under the same regulations, the possession/consumption of low-point beer or alcohol by those of legal age (over 21) is allowed only in certain designated, non-public places on the OSU campus, properties and facilities, including Lake Carl Blackwell. For further explanation, see the pamphlet "OSU Dangers of Drugs and Alcohol Abuse."

Drug and alcohol laws are vigorously enforced on the OSU campus. Violators are subject to criminal prosecution in the District Court of Payne County. The enforcement techniques range from plain view violation to long-term undercover investigations by local, state, or federal agents and agencies.

University Counseling Services and the Employee Assistance Program have counseling and rehabilitation programs for students and employees, respectively. Should these programs not meet an individual's needs, there are other programs in the community or nearby that may be better suited. A number of such programs are listed in the "OSU Dangers of Drugs and Alcohol Abuse" pamphlet.

Students should be aware that a student who has been convicted of any offense under any federal or state law involving the possession or sale of a controlled substance shall not be eligible to receive any grant, loan or work assistance under this title during the period beginning on the date of such conviction and ending after the interval specified in the table below (the Conference Report on the Higher Education Amendments of 1998 [H.R. 6], September 25, 1998, Suspension of Financial Aid for Drug Convictions, Sec. 483. Student Eligibility).

If convicted of an offense involving the possession of a controlled substance, ineligibility period is:

First offense	1 year
Second offense	2 years
Third offense	Indefinite

If convicted of an offense involving the sale of a controlled substance, ineligibility period is:

First offense	2 years
Second offense	Indefinite

Sexual Assault

What to do if Victimized

Oklahoma State University's prevention efforts in the area of sexual assault (including rape) involve the entire community. Many groups are involved in sexual assault prevention. These groups include the OSU Police Department, Residential Life, University Counseling, OSU faculty, Greek Life, University Conduct Office, OSU Student Health Center, OSU Mental Health, PaNOK (students who are peer educators), and OSU staff personnel. They provide training programs, presentations, and workshops to any interested individuals or groups.

Program topics generally include stranger rape, date and acquaintance rape, rapist characteristics, rape trauma syndrome, and victim recovery. An increasing number of presentations, explaining the male's role in sexual assaults, are directed to all male audiences, such as fraternities and athletic teams.

Procedures to Follow

A victim of sexual assault should follow certain procedures and consider several options. These procedures and options are clearly outlined in the rape avoidance seminars mentioned previously and "Rape Prevention" pamphlets made available to the OSU community. These educational programs and pamphlets also outline techniques and strategies that help people recognize and avoid sexual assault threats.

—Evidence. Preserving evidence is of paramount importance after a sexual assault. Victims should be careful not to bathe, douche, wash clothing, or tamper with other potential evidence after a sexual assault. The first inclination may be to do one or more of these; however, the temptation should be resisted. Evidence is critical in a criminal prosecution.

—Contacting the Police Department. When a sexual assault is reported to the OSU Police Department or to the Stillwater Police Department, an officer is dispatched. Determining the extent of physical and emotional trauma that the victim has suffered will be the officer's first concern. If the attack just occurred, the officer will want a brief review of the events, a description of the assailant, the direction of travel, and a description of the vehicle used by the assailant, if any. This information is necessary in order to apprehend the assailant as soon as possible. After the initial interview, the officer or whoever is designated by the victim, will assist in getting a complete change of clothes.

—Agreeing to have a Sexual Assault Examination. An officer or designee will take the victim to the Student Health Clinic or the Stillwater Medical Center to be examined by a physician. A complete physical examination will be given as well as treatment for any injuries. A friend or relative may be permitted to accompany the victim. In addition, the victim may be examined for the purpose of obtaining evidence that would be needed in court. Appropriate antibiotic therapy can be given to decrease the chances of developing venereal disease. After the examination at the hospital, the officer may bring the victim back to the police headquarters or another location to complete the interview. Again, a counselor is encouraged to be present.

The victim of a rape is not responsible for legal expenses related to the criminal prosecution. The case is prosecuted by the Office of the District Attorney. The victim only has to contribute time. The Stillwater Medical Center can provide initial medical services for rape victims. The Crime Victims Compensation Board can provide payment for medical services and counseling, even if charges are not filed. The victim need only file an application with the Office of the District Attorney.

—Police Investigation. Later, at police headquarters, the victim will be asked to be more specific about the events of the attack. A person of the victim's choosing may accompany the victim during this period. This questioning is done to help the investigation and to help arrange the events firmly in mind. The victim's comments will probably be tape recorded for future reference. This will make testifying in court much easier and less frightening. It will be handled considerately and courteously. Only the investigating officer will ask questions. Based on conversations with the officer, the victim can then decide whether or not to file charges. Threats or harassment of a rape victim after charges have been filed are rare. When finished at police headquarters, the victim can go to a place of their choice. OSU and Stillwater Police officers have been trained to deal with sexual assault victims. However, if the victim should feel uncomfortable speaking to a male officer, every effort will be made to notify a female officer, female counselor, or female volunteer.

A rape or sexual assault may be reported to the hall director, a university counselor, or health worker at the Student Health Center. Charges do not have to be filed against the attacker if a rape is reported. However, it is wise to give information to the police anyway. The information and suspect description may help locate a suspect in other offenses and possibly prevent another person from becoming the victim of a rape. The police will not know that there is a rapist on campus unless they are told. The police will not pressure the victim to file charges. Victims of sexual assault can elect to have personal information eliminated from police reports.

Support Services

—University Conduct Office. If the victim does not want the case to be addressed through the criminal justice system, another alternative is available. Cases involving students who are accused of non-academic misconduct might be assigned to the Office of Student Conduct. Persons found guilty of sexual assault, forcible or non-forcible, could be placed on probation or suspended from OSU. Both the accuser and the accused are entitled to the same opportunities to have others present during a campus disciplinary hearing, and both are entitled to be informed of the outcome of any disciplinary proceeding. Further information can be obtained by contacting the Office of Student Conduct at (405) 744-5470. Also, a copy of the "Student's Rights and Responsibilities" can be obtained at various locations on campus.

—Role of Housing. The hall directors and resident assistants who work in the residence halls continually attend sexual assault training programs, and they learn how to respond to a student who has been victimized by a sexual or physical attack. They have been informed about the resources available; in fact, some have been trained to conduct sexual assault presentations and workshops. A victim of a sexual assault may request assistance from the University administration in changing academic and/or living situations where a continued threat may be reasonably assumed.

—Role of Counseling Services. The OSU Student Health Center and University Counseling Services provide individual and group counseling services for those victimized by sexual or physical assault. Services are available to all Oklahoma State University students, regardless of gender, and their significant others.

The psychological and emotional trauma after a sexual assault can be painful. Possible symptoms include: eating disorders, sleep disturbances, lack of trust, guilt feelings, depression, mood swings, and relationship and communication problems. Sexual assault incidents can only be greatly reduced when men and women understand the dynamics involved in sexual assaults and are willing to participate in educational programming and ongoing communication.

Regents' Resolution on Disruption of the Educational Process

A resolution of the Board of Regents for Oklahoma State University to further clarify existing student regulations. Section 1, "Legal Obligation of the Student," as it pertains to the disruption of the educational process, was adopted in the regular monthly meeting at Stillwater, Oklahoma, on July 11, 1970:

Be it resolved by the Board of Regents of Oklahoma State University:

I. That this statement known as "Emergency Disciplinary Procedure in Cases of Disruption to the University's Educational Process" containing the following provisions be enacted:

A. Definition of Disruptive Conduct

Oklahoma State University has long honored the right of the individual to free discussion and expression, of peaceful demonstration, and of petition and peaceful assembly. That these rights are a part of the fabric of this institution and of the nation as stated in the Bill of Rights is not questioned. They must remain secure. It is equally clear, however, that in a community of learning, willful disruption of the educational process, destruction of property, and interference with the rights of other members of the community cannot be tolerated.

B. Responsibility of the Student

Any student, who willfully by use of violence, force, coercion, threat, intimidation or fear, obstructs, disrupts or attempts to obstruct or disrupt, the normal operations or functions of the University, or who orally or in writing advises, procures, or incites others to do so, shall be subject to dismissal from the University.

The following, while not intended to be exclusive, illustrates the offenses encompassed herein: occupation of any University building or part thereof with intent to deprive others of its use; blocking the entrance or exit of any University building or corridor or room therein; setting fire to or by any other means substantially damaging any University building or property, or the property of others on University premises; any possession or display of or attempt or threat to use or use of firearms, explosives, other weapons or destructive means or devices, except as necessary for law enforcement, in any University building or on the University campus; prevention of the convening, continuation or orderly conduct of any University class or activity or of any lawful meeting or assembly in any University building or on the University campus; inciting or organizing attempts to prevent student attendance at classes; and, interfering with or blocking normal pedestrian or vehicular traffic on the University campus.

C. Responsibility of the President

When it appears that there is a violation of Section I-A or I-B, it shall be the duty of the president (and he or she is fully authorized to act) to take all steps which the president deems advisable to protect the assumed and designated interests of Oklahoma State University and to see that its rules, regulations and policies are enforced. The president shall ensure that any person or persons found guilty after proper hearing shall be disciplined in accordance with the existing Oklahoma State University student disciplinary regulations.

In carrying out these duties, the president may call upon any member of the University administration, or any member of the faculty, and the president may call upon any agency of the University created to deal with cases arising under Section A. Action by any state or federal court shall not preclude the University from exercising its disciplinary authority.

D. Responsibility of the Board of Regents

The Board of Regents recognizes that by the Constitution and Statutes it has the power to make such rules and regulations for the management of the University as it may deem necessary and expedient, not inconsistent with the Constitution and laws of the state. While the Regents fully appreciate their obligations in this respect, they further recognize that in dealing with those offenses against the University defined in Section A hereof, they must impose the duty and authority of enforcing the policies set forth herein in the principal executive officer of the University—the president. It will be the responsibility of the Board of Regents to furnish all possible assistance to the president when requested by the president.

II. Subject to the provisions of Sections I-A through I-D, it shall be the duty of the president to exercise full authority in the regulation of student conduct and in matters of student discipline. In the discharge of this duty, delegation of such authority may be made by the president to administrative or other officers of the institution, in such manner and to such extent as may by the president be deemed necessary and expedient; provided, that in the discharge of this duty it shall be the duty of the president to secure to every student the right of due process.

III. The text of this resolution shall be printed in the "Student Regulations" section of the *Student Handbook* of the University and in the *University Catalog*.

Student Rights and Responsibilities

By enrolling at OSU, students become members of an academic community in which self-discipline and respect for the rights and privileges of others is essential to the educational process. Therefore, students take on the responsibility to observe and help maintain standards of personal behavior that are a positive contribution to the academic community. OSU expects students to accept responsibility for compliance with all University policies and contracts (including financial obligations to the University), to show respect for lawful authority, to represent themselves truthfully and accurately at all times, and take responsibility for their actions, and actions of their guests. Students may be held accountable for the violations of local, state and federal laws on campus and for law violations that occur off campus that affect the University community or the University's mission.

The purpose of the document Student Rights and Responsibilities Governing Student Behavior is to inform the student body of the standards of behavior expected of students in the OSU community, the processes in place for enforcing the rules, and the University's response to violations. The University makes this document available on the Internet www.okstate.edu/ucs/SCEA. Additionally, printed copies are available in the offices of the Provost and Senior Vice President for Academic Affairs, Vice President for Student Services, Student Council Office, student academic services offices of each college, Residential Life Office in each building, and Campus Life.

OSU Alumni Association

www.orangeconnection.org

The OSU Alumni Association (OSUAA) serves as the connection between alumni and the University. Its mission is to provide services to its members and alumni, and to support the needs of Oklahoma State University, its students, faculty, staff and friends.

Membership is open to all graduates, current students, former students and friends of Oklahoma State University. Members may join through an annual membership fee or a one-time life membership fee.

The OSUAA is the orange connection to OSU and to an array of benefits enjoyed by members of the association, including college publications, the STATE magazine, discounts from the online Orange Connection Alumni Store www.orangeconnection.com, alumni events, and hotel and car rentals.

—Communication. The OSU Alumni Association communicates with its members in a variety of ways, including its Web site, www.orangeconnection.org. Alumni Association members receive the award-winning STATE magazine three times yearly and receive Orange Bytes, a monthly e-mail newsletter.

—Chapters. OSUAA has about 60 alumni chapters across Oklahoma and additional chapters in such cities as Houston, Dallas, Atlanta, Austin, Washington, D.C., Chicago and Denver. Chapter activities include alumni networking, student scholarships, athletic event watch parties, and other programs that support OSU.

—Homecoming. OSU's award-winning Homecoming is one of the few homecoming celebrations in the country jointly coordinated by students and alumni. The OSUAA provides staff support to student committees selected each year. Homecoming includes a variety of events, including the Harvest Carnival for children; the popular WalkAround, where Homecoming decorations are viewed by thousands of spectators; a pep rally; a parade; and the crowning of Homecoming royalty at halftime of the football game.

—OSU Legacy Program. The OSUAA is securing the future of OSU by communicating with legacies from birth to ensure their future at Oklahoma State through the OSUAA Legacy Program. Gifts and communications begin at birth and continue through the legacy's enrollment at OSU. The highlight of the program is Grandparent University where legacies attend classes at OSU with their grandparents.

—Alumni Awards. The OSU Alumni Association administers and produces both alumni and student award programs each year. The awards are the Alumni Hall of Fame, Distinguished Alumni, Seniors of Significance, and Outstanding Seniors. The awards recognize personal and professional achievements and service to OSU and the Alumni Association.

—Cowboys for Higher Education. The OSU Alumni Association provides alumni the opportunity to be advocates for OSU at the legislative level by contacting legislators on behalf of issues supporting OSU.

OSU Foundation

www.osuf.org

The Oklahoma State University Foundation is a 501(c)(3) not-for-profit corporation. Gifts to the Foundation are deductible under Section 170 of the Internal Revenue Code. Established in 1961, the Foundation unites donor passions and university priorities to achieve excellence and manages donated resources efficiently and effectively.

The OSU Board of Regents, through a resolution passed in 1966, directed that gifts or donations made for the benefit of Oklahoma State University be made to the OSU Foundation.

Although it is a separate and distinct legal entity from the Oklahoma State University System, the OSU Foundation maintains a close and cooperative working relationship with the University to establish fundraising priorities and cultivate constituency relationships.

OSU-Oklahoma City

www.osuokc.edu

Jerry Carroll, EdD - *President of Oklahoma State University - Oklahoma City*
Larry Edwards, PhD - *Vice President for Academic Affairs*
Jerry Brooks, BS - *Vice President for Finance and Operations*
Jay Kinzer, PhD - *Vice President for Student Services*

Oklahoma State University-Oklahoma City (OSU-Oklahoma City) is a North Central Association accredited, state-assisted public technical college serving one of the fastest growing metropolitan cities in the country. Located in the heart of Oklahoma City, at the crossroads of Interstate 44 and Interstate 40, this campus enrolls approximately 9,700 full- and part-time students each semester. OSU-Oklahoma City has grown from a campus of one building with fewer than 100 students in 1961 to a campus that today consists of 110 acres, ten modern buildings, and 318 full-time faculty and staff.

Offering one bachelor in technology degree, 33 associate in applied science degree programs, seven associate of science programs, a variety of certificate programs, and developmental education courses, the Oklahoma City campus takes pride in its student-centered approach to collegiate education. Curriculum is designed in response to local employment needs and input from professionals who serve on OSU-Oklahoma City advisory committees. All energies are directed toward one goal—blending both academic and student support services to create a collegiate educational experience—that addresses the needs of the individual student. Degrees awarded at OSU-Oklahoma City are listed below.

—Bachelor of Technology. The bachelor of technology degree is a 124-credit hour technology-intensive application-focused baccalaureate degree. OSU-Oklahoma City offers one bachelor of technology degree.

—Human Services. Emergency Responder Administration

—Associate in Applied Science. The Associate in Applied Science degree signifies the completion of at least 60 semester credit hours of collegiate course work that will place the graduate on a career path. Oklahoma State University-Oklahoma City offers 31 Associate in Applied Science degree programs in six divisional areas.

Agriculture Technology
- Horticulture Technology
- Turfgrass Management
- Veterinary Technology

Arts and Sciences
- Applied Technology
- Technical Spanish/Translation and Interpretation

Business Technology
- Accounting
- Business Technology
- Computer Information Systems
- Information Technology
- Management
- Restaurant Management
- Technical Communications

Health Services
- Echocardiography Technology
- Nurse Science
- Radiologic Technology
- Vascular Technology

Human Services
- Crime Victim/Survivor Services
- Early Care Education
- Emergency Management
- Emergency Medical Services
- Municipal Fire Protection
- Police Science
- Sign Language Interpretation

Science and Engineering Technology
- Applied Technology
- Architectural Technology
- Civil/Surveying Technology
- Construction Technology
- Electronic Power Technology
- Electronics Engineering Technology
- General Engineering Technology
- Industrial Drafting and Design Technology
- Occupational and Environmental Safety
- Power Transmission and Distribution Technology
- Wind Turbine Technology

—Associate of Science. The Associate of Science degree is a program designed for transfer to an upper-division baccalaureate degree program. The Associate of Science degree is typically awarded to those who wish to major in subjects with heavy undergraduate requirements in mathematics and science, including, but not limited to, fields such as engineering and agriculture. It represents successful completion of a minimum of 60 credit hours, excluding any physical education courses. Oklahoma State University-Oklahoma City offers seven Associate of Science degree programs.

Agriculture Technology
- Horticulture Technology

Arts and Sciences
- Public Service

Business Technology
- Health Care Administration

Human Services
- Alcohol and Substance Abuse Counseling
- American Sign Language
- Police Science

Science and Engineering Technology
- Fire Protection and Safety Technology

—Higher Education Cooperative Agreements. The purpose of these agreements is to serve students who choose to pursue unique OSU-Oklahoma City degree programs in their geographical areas. The following are our current higher education partners and programs:

- Alcohol and Substance Abuse Counseling
  - Murray State College
  - Ardmore Higher Education Center
  - Cameron University
- Nurse Science
  - Panhandle State University
- Police Science - Crime Scene Investigation
  - Murray State College
  - Ardmore Higher Education Center

—Career Technology Center Cooperative Agreements. The purpose of these cooperative agreements is to allow students of approved career technology center programs to obtain OSU-Oklahoma City college credit so they may attain their education or career goals.

- Computer Information Systems - Accounting Emphasis
  - Francis Tuttle Technology Center
  - Metro Technology Centers
- Computer Information Systems - Computer Technical Support
  - Metro Technology Centers
- Electronics Engineering Technology
  - Metro Technology Centers
- Emergency Medical Services - Municipal Fire Protection
  - Canadian Valley Technology Center
  - Eastern Oklahoma County Technology Center
  - Kiamichi Technology Center
  - Metro Technology Centers
  - Moore Norman Technology Center
- Industrial Drafting and Design
  - Metro Technology Centers
- Information Technology - Network Emphasis
  - Metro Technology Centers
- Information Technology - Network Security
  - Metro Technology Centers
- Management - General Business
  - Metro Technology Centers
- Municipal Fire Protection
  - Eastern Oklahoma County Technology Center
- Radiologic Technology
  - Metro Technology Centers
- Technical Communications - Illustration/Multimedia
  - Francis Tuttle Technology Center
  - Metro Technology Centers
- Technical Communications - Internet Administration/ Web Page Design
  - Metro Technology Centers

—Philosophy. Oklahoma State University-Oklahoma City operates in the belief that each person should be treated with dignity and respect, afforded equal opportunity to acquire a complete educational experience, given an opportunity to discover and develop their special aptitudes and insights, and provided an opportunity to equip themselves for a fulfilling life and responsible citizenship in a world characterized by change.

—The Mission. Oklahoma State University-Oklahoma City develops and delivers collegiate-level career and transfer educational programs, professional development and support services which prepares individuals to live and work in an increasingly technological and global community.

—Institutional Effectiveness. The Institutional Effectiveness effort provides for a long-term commitment to institutional change through assuring effective, on-going institutional self-study processes. These efforts are an integral part of institutional decision-making systems and the student learning and growth process. The purpose of the Institutional Effectiveness effort on campus is to ensure that systems are in place that: determine institutional effectiveness, are improvement oriented, maximize limited resources, provide meaningful and quality information to faculty, service providers and students to assist in decision-making, provide an effective guide for planning.

Institutional effectiveness is driven by a process of critical self-examination and is directly related to improving services, the curriculum and the quality of teaching and learning within the institution. A process for determining institutional effectiveness must be linked to the major functions of the mission of the institution.

OSU-Oklahoma City has developed a plan that calls for a continuous quality improvement process that engages faculty, staff and students in thinking about the purpose and mission of education. Programs that assess and document student growth and learning are an integral part of this plan.

—Functions of OSU-Oklahoma City. OSU-Oklahoma City maintains an open-door policy that provides access to higher education for all eligible individuals, and treats all students fairly and equally and with no discrimination, regardless of social, economic or academic background. It provides learning opportunities for students to complete a Bachelor of Technology degree, an Associate in Applied Science degree, an Associate of Science degree or Certificate Program primarily in technical education. It prepares students for upper-division academic study at various other types of institutions.

When appropriate, OSU-Oklahoma City participates in reciprocal and cooperative relationships with educational and various other types of institutions.

OSU-Oklahoma City provides students the opportunity to acquire the knowledge and skills that enable them to accomplish specified career or personal educational goals. It provides a developmental studies program to enable students to be successful at the college level. It provides a complete student services program, including academic advisement, career planning and placement, enrollment management, counseling services, campus judicial programs, admissions and records, minority student programs and services, veterans services, student activities, financial aid, assessment, student support services and child development services.

OSU-Oklahoma City conducts workshops, seminars and conferences to accommodate the needs of local business, industry and community groups on a noncredit basis. It engages in a broad campus-wide program of assessment and improvement, including regular and systematic review of program and funding sources, in order to conduct long- and short-range planning, and to provide and encourage faculty and staff development activities to meet stated goals and to improve efficiency and effectiveness. For further information visit the Web site at www.osuokc.edu.

OSU Institute of Technology

www.osuit.edu

Robert Klabenes, EdD - *Provost and President of OSU Institute of Technology*
Linda Avant, EdD - *Executive Vice President, Academic Affairs*
Deborah McIntyre, MBA - *Vice President, Business Affairs*
Ina Agnew, MS - *Vice President, Enrollment Management*
Anita Gordy-Watkins, MS - *Vice President, University and External Relations*

Oklahoma State University Institute of Technology is a residential branch campus of OSU that focuses upon offering quality education in advancing technological and academic programs. Graduates earn the associate in applied science, associate in science or Bachelor of Technology degree.

OSUIT's core curriculum is as diverse and innovative as its student body. Individuals receive the comprehensive education required to prepare them as competitive members of a world-class workforce and to be contributing members of society. Unique in Oklahoma, the Okmulgee campus blends the best of emerging technologies, enhanced computer applications and general education to prepare students for rewarding careers in business and industry. Each program curricula is carefully reviewed twice each year by a team of industry and business advisers to make certain course content and instructional aids remain relevant. Students enjoy the low faculty-student ratio, the emphasis upon hands-on learning, and industry-experienced faculty.

OSU Institute of Technology has established an extensive array of business and industry partnerships that enhance participating programs. Many national and international corporations have chosen to partner with OSUIT. These partnerships support the college with scholarships, training aids and equipment. Students benefit by having greater access to sponsoring partners and employers at graduation. Students in most programs of study also participate in internships, a closely monitored, authentic work experience in a business or industry within their career choice. Most interns receive pay during their internship.

OSU Institute of Technology continues to take the leadership role in a number of Cooperative Alliance Agreements which allow high school and adult students to receive college credit for course work while they are enrolled at a participating Technology Center, and apply that credit toward an Associate in Applied Science degree.

Several industry certifications and program accreditations also attest to the quality of instruction. The Nursing program is accredited by the National League for Nursing Accrediting Commission (NLNAC) as well as the Oklahoma Board of Nursing. Orthotics and Prosthetics is accredited by the National Commission on Orthotic and Prosthetic Education (NCOPE). The Information Assurance and Forensics program (Bachelor of Technology) is ABET accredited by their Commission on Computing. Automotive Service Technology and Collision Repair Technology programs maintain Automotive Service Excellence (ASE) certification.

The combination of the college's high quality educational programs, business and industry partnerships, the internship program, and modern and well-equipped instructional facilities, ensures OSU Institute of Technology graduates are highly marketable in a competitive job-seeking environment. Job placement for OSU-Okmulgee graduates is among the highest in Oklahoma, with many often having several job offers prior to graduation.

The college's educational programs are divided into ten instructional divisions, each with several instructional programs.

They include:

- *Transportation* - automotive service, automotive collision repair, diesel and heavy equipment technologies, and Precision Agriculture Technology;
- *Information Technologies*
- *Construction Technologies* - air conditioning and refrigeration technology and construction technologies;
- *Engineering Technologies* - electrical-electronics technologies, instrumentation, civil, engineering graphics, manufacturing, nanotechnologies, and power plant technology;
- *Arts and Sciences* division includes transfer degrees in pre-education and business;
- *Culinary Arts*
- *Health and Environmental Technologies* division- orthotics and prosthetics, pedorthics;
- *Nursing*
- *Visual Communications* - graphic design, multimedia, and photography
- *Watchmaking*

Students may also pursue the Bachelor of Technology degrees in civil engineering technology, information assurance and forensics, and instrumentation engineering technology.

OSU Institute of Technology operates on a year-around, three-semester system. New semesters begin in late August, in early January and mid-April.

The college participates in both national and state financial aid programs. Deadline is March 1 for financial aid applications. Most scholarship deadlines also are March 1.

Oklahoma State University Institute of Technology is located at 1801 E. 4th Street, Okmulgee, Oklahoma 74447-3901. The toll free phone number at OSUIT is (800) 722-4471. Information can also be found on the web at www.osuit.edu. Visitors are always welcome.

OSU-Tulsa

www.osu-tulsa.okstate.edu

Gary L. Trennepohl, PhD - *President*
Raja Basu, PhD - *Vice President for Academic Affairs*

Oklahoma State University offers undergraduate and graduate courses at OSU-Tulsa. For undergraduate programs, lower-division courses (1000-and 2000-level) are available at Tulsa Community College. Upper-division (3000- and 4000-level) and graduate (5000- and 6000-level) are offered at OSU-Tulsa.

Each student wishing to attend OSU-Tulsa must be admitted to the academic degree program of choice. All students must comply with admission procedures of OSU. Once admitted, regulations published in the OSU *Catalog* govern the student's pursuit and completion of the degree program.

OSU provides admission, enrollment, financial aid and academic advising services at OSU-Tulsa. Scholarships are also available from OSU-Tulsa. Students may enroll in classes in Tulsa or Stillwater and pay tuition at either location. The students' official academic records and transcripts are maintained by OSU at the Stillwater campus. Faculty are hired by OSU and the college offering the degree program. Upon completion of an academic program, OSU grants the degree. Students are responsible for making certain each course taken will apply toward the chosen degree or certificate program. Courses taken from other participating universities are treated as transfer credit courses. Transfer credit hours are applied to a student's degree program in accordance with regulations of OSU.

OSU-Tulsa is administered by a Board of Trustees and under the governing authority of the OSU Board of Regents. Classes are held at 700 N. Greenwood Ave., Tulsa, OK 74106-0700. Semester class schedules are published by OSU-Tulsa and distributed on the Stillwater campus through the OSU Office of Admissions and the Graduate College. For more information, contact the OSU-Tulsa campus at (918) 594-8355 or visit the OSU-Tulsa Internet site www.osu-tulsa.okstate.edu.

University Academic Regulations

Contents—

In addition to these minimal regulations, additional college, department or program requirements may apply. Students are advised to review all steps of their academic progress with their academic adviser.

1. ADMISSION, ACADEMIC STANDING AND WITHDRAWAL

1.1 Admission of Freshmen. Policies and procedures governing the admission of new freshmen are detailed in another section of the *Catalog*. (See "Undergraduate Admissions.")

—Assessment/Course Placement. To help insure that students possess the skills necessary to be successful in college, the Oklahoma State Regents for Higher Education require students to obtain a 19 ACT subject area score(s) in science reasoning, mathematics, and English to enroll in course work in the respective subject area(s). Students must score 19 or higher in reading to enroll in courses that require extensive reading. Students scoring below 19 will be required to remediate in the discipline area (UNIV 0023, 0111, 0123, 0133, or 0143) or undergo additional testing to determine the level of readiness for college level work. Students must pass remedial courses within the first 24 hours attempted or have all subsequent enrollments restricted to remedial courses until the deficiencies are removed. If a student fails to remediate in a single subject within the 24 hour limit and is in good academic standing, the adviser and dean may recommend to the Provost that the student be allowed to continue to enroll in college level courses in addition to remedial courses.

1.2 Admission of Transfer Students. Policies and procedures governing the admission of transfer students are detailed in another section of the *Catalog*. (See "Undergraduate Admissions.")

1.3 Admission to Certain Professional Programs. Admission to certain programs as approved by the University may be restricted. (See "Undergraduate Admissions" and appropriate college sections in the *Catalog*.)

1.4 English Proficiency Requirement. As a condition of admission to undergraduate study at OSU, all persons for whom English is a second language shall be required to present evidence of English proficiency. (See "Undergraduate Admissions.")

1.5 Satisfactory Academic Progress. Students not under academic suspension from the University are judged to be making satisfactory progress toward their educational objectives. They are eligible to enroll in any of the undergraduate colleges except as may be restricted. (See Academic Regulation 1.3 *Admission to Certain Professional Programs*.)

1.6 Good Academic Standing and Scholastic Requirements for Continuing Enrollment of a Student under Academic Probation in an Undergraduate College. Undergraduate students must meet the GPA requirements below to be in good academic standing. Each college, department, or academic program within OSU may require higher standards for admission, retention, or good academic standing.

Total retention/ graduation hours attempted	Minimum retention/ graduation grade-point average required
0 through 30	1.70
31 or more	2.00

Any student not maintaining a retention/graduation GPA as indicated above will be placed on probation for one semester. At the end of that semester, he or she must have a semester GPA of 2.00, not to include activity or remedial courses, or meet the minimum standard required above, in order to continue as a student.

First year students (30 or fewer credit hours, as defined by OSRHE policy) with a retention/graduation GPA of 1.70 to less than 2.00 will be placed on academic notice. These students should remain in contact with their student academic service offices regarding special academic support services and procedures.

All courses in which a student has a recorded grade will be counted in the calculation of the grade-point average for retention purposes, excluding any courses repeated or reprieved, and excluding remedial courses and physical education activity courses. These calculations are made three times per year, to coincide with the conclusion of the fall and spring semesters, and the collective summer term. Grades submitted after these calculations are carried forward to the next calculation. (See also Academic Regulations 6.4 *Grade-point Average Calculating* and 6.13 *Academic Forgiveness*.)

A student enrolling on probation should seek help from an academic adviser and a counselor in the University Counseling Services when deciding on an academic load and extracurricular activities.

1.7 Academic Suspension. A student on probation will be suspended when he or she earns a semester GPA of less than a 2.00 in regularly-graded course work not including activity or remedial courses, and the retention grade-point average for all hours attempted falls below the following:

Total retention/ graduation hours attempted	Minimum retention/ graduation grade-point average required
0 through 30	1.70
31 or more	2.00

1.8 Reinstatement after Academic Suspension. A student who has been suspended from the University for academic reasons may not be readmitted until one regular semester (fall or spring) has elapsed (unless the faculty appeals committee grants immediate reinstatement). Students who wish to appeal suspension status should inquire about procedures and deadlines from the Office of Academic Affairs. Students who were concurrently enrolled in another college or university during the semester may appeal the suspension by submitting an official transcript from the institution. Procedures and deadlines for appealing may be obtained from the Office of Academic Affairs.

Readmission after one regular semester (fall or spring) has elapsed will be considered on the merits of the individual case. Suspended students can be readmitted only one time. If a student is suspended a second time, he or she must attend another institution and raise the retention/graduation GPA before readmission to OSU can be considered.

A student with 90 or more hours in a specified degree program who has been academically suspended may enroll, at the discretion of the institution, in up to 15 additional credit hours in a further attempt to achieve the requirements for retention. During these 15 hours of enrollment, the student must achieve a minimum 2.00 semester GPA at the end of each term or must raise the retention GPA to 2.00 or above to avoid suspension. This senior suspension exception must be approved by the Director of Student Academic Services or Associate Dean for Instruction in the student's college in the form of a letter to the Registrar. This option can be exercised only once per student.

A student suspended from OSU at the end of the spring semester may continue in the summer semester at OSU if this spring suspension was the student's first suspension. The student must complete a minimum of six hours and must achieve a 2.00 summer semester GPA, or raise the retention/graduation GPA to the OSRHE standard, in order to continue in the subsequent fall semester. The student should contact his or her dean's office for additional information and restrictions. (See also Academic Regulation 1.7 *Academic Suspension*.)

1.9 Readmission. A student who has attended OSU but was not enrolled during the immediate past semester (except the summer session) must submit an updated Application for Admission and current application fee. A student who has enrolled in another college or university since last attending OSU must submit a transcript from each school. Admission status will be determined after an evaluation of the previous work has been made.

1.10 Withdrawing from the University. Withdrawing refers to withdrawing from all courses for which a student is enrolled for a given semester, and therefore the student is no longer enrolled. The withdrawal process is initiated in the student's dean's office.

A student who withdraws prior to the end of the twelfth week of a regular semester or the sixth week of an eight-week summer session, or proportionate periods for block or short courses, will receive a grade of "W" (withdrawn) on the student's academic record. A student who withdraws after the twelfth week of a regular semester or the sixth

week of an eight-week summer session but prior to "Pre-finals Week," will receive a grade of "W" (withdrawn) or "F" (failing) as assigned by the instructor of each course. Grades of "W" or "F" will be recorded on the student's academic record, and grades of "F" will be calculated in the grade-point average.

After the beginning of "Pre-finals Week" a student may not withdraw from the University and will be assigned only the grade of "A," "B," "C," "D," or "F" or (when appropriate) "I," "NP," "P," "S," "U," "R," "SR," or "UR" by the instructor of each course at the end of the semester or summer session. International students need to consult with International Students and Scholars (ISS) before dropping courses or withdrawing for the semester. Under new reporting regulations required by the Student and Exchange Visitor Information System (SEVIS), dropping below full-time can put a student's visa status in jeopardy.

2. STUDENT STATUS

2.1 Classification of Students. Undergraduate classification is determined by the criteria below:

Freshman	fewer than 28 semester credit hours passed
Sophomore	28 to 59 semester credit hours passed
Junior	60 to 93 semester credit hours passed
Senior	94 or more semester credit hours passed

These hours are calculated based on graduation/retention hours earned.

2.2 Full-time Students. Undergraduate students who are enrolled in 12 or more semester credit hours (six or more for the summer session) are classified as "full-time" students. Graduate students enrolled in nine or more semester credit hours (four or more for the summer session) are classified as "full-time."

Credit hours offered through correspondence study are not counted toward full-time status, unless the course is independent study taken through regular enrollment.

Students engaged in an internship or cooperative education program assignment that requires full-time work on the assignment are regarded as full-time students when they are enrolled in the number of credit hours deemed appropriate for the academic credit they receive for the assignment.

A student holding a 0.50 FTE graduate assistant appointment who is enrolled in a minimum of six hours during the fall or spring semester and three hours during the summer semester will be certified as a full-time graduate student. Any FTE appointment less than 0.50 requires nine hours of enrollment for the fall or spring semester and four hours of enrollment for the summer semester in order for the student to be classified as a full-time student. There is no reduction in credit hour requirements in the final semester of enrollment for graduate assistants.

A student enrolled for the final semester of a bachelor's degree program may be classified as a full-time student if enrolled in fewer than 12 hours during that semester.

2.3 Part-time Students. Students who are enrolled but not meeting the definition of full-time students are classified as "part-time." Undergraduate students are classified as "half-time" if they are enrolled in six hours in a regular semester (or three hours in a summer session). Graduate students are classified as "half-time" if they are enrolled in four hours in a regular semester (or two hours in a summer session).

2.4 Special Students. A student who does not have immediate plans to enter a degree program but wants to take courses may be classified as a "special student." A student on an F-1 visa may not enroll as a special student since he or she must be admitted to a degree program.

3. UNDERGRADUATE DEGREE REQUIREMENTS

3.1 Date of Matriculation. A student's matriculation date is associated with his or her first term after high school graduation as an admitted student in an accredited institution of higher education. That date will be used in calculating the time limit for the use of a given plan of study.

3.2 Changes in Degree Requirements. A student generally follows the degree requirements associated with his or her matriculation year. Although the curriculum may be revised before a student graduates, students will be held responsible for the degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation. A student has the option of adopting the new degree requirements that have been established since matriculation. The time limit for following a given undergraduate degree program is six years. Time limits for graduate degrees are described under "Academic Regulations" in the "Graduate College" section of the *Catalog.*

3.3 The Honors College. (See the "Academic Enrichment Programs" section of the *Catalog*.)

3.4 General Education Requirements. Although the University has a general education program, each college determines and publishes the general education requirements for its degree programs. College requirements may exceed the minima for general education established by the University, which are 40 semester credit hours (exclusive of physical education activity courses by OSRHE policy):

a. six semester credit hours of English composition;

b. three semester credit hours of American history (HIST 1103 or equivalent), and three semester credit hours of American government (POLS 1113);

c. at least six semester credit hours in each of the approved general education designated areas of Analytical and Quantitative Thought, Humanities, Natural Sciences, and Social and Behavioral Sciences (at least one course in each of these four areas must come from the approved general education lower-division course list, and at least three hours of "A" must be earned in a general education Math course);

d. at least one course designated as International Dimension and one course in Scientific Investigation and, beginning in Fall 2008, one Diversity course.

Substitution of general education courses is allowed when background for the major demands greater depth in an area in which a general education requirement is stated. Only in the Analytical and Quantitative Thought "A" and Natural Sciences "N" areas is substitution of the more advanced lower-division course permitted. Such a substitution requires the recommendation of the student's academic adviser and dean and the approval of the Office of the Provost and Senior Vice President.

Courses used to fulfill general education requirements are identified by code letters that appear preceding the course titles listed in the back of the *Catalog* and in the class schedule. The code letters designate the general education category for which the course may be used:

A Analytical and Quantitative Thought
D Diversity
H Humanities
I International Dimension
L Scientific Investigation
N Natural Sciences
S Social and Behavioral Sciences

General education courses are also identified in the Student Information System (SIS) and on the Internet site maintained by the Office of Academic Affairs.

The Oklahoma State Regents for Higher Education require computer science proficiency prior to graduation. This requirement could be met by:

a. successfully completing a high school computer science course that meets State Regents' high school curricular requirements;

b. satisfying an institution's computer proficiency assessment; or

c. successfully completing college-level course work that the institution designates.

The method by which a student demonstrates computer science proficiency at OSU varies by major. This requirement does not increase the number of courses required to earn a degree. The use of computers is an integral part of every degree program; hence a student demonstrates proficiency by satisfactorily completing degree requirements.

3.5 English Composition Requirement. The University requires a minimum of six semester credit hours in English composition for a baccalaureate degree. The required sequence of courses is ENGL 1113 and ENGL 1213. For those who qualify, ENGL 1123 or 1313 may be substituted for ENGL 1113. Students who earn an "A" or "B" in ENGL 1113 (or ENGL 1123 or 1313) or who earn three semester credit hours in English composition through credit by exam, and who have the consent of their college, may substitute ENGL 3323 for ENGL 1213. Students who qualify may substitute ENGL 1223 or 1413 for ENGL 1213. A third course may be required by the student's college to satisfy either an additional composition or oral communication requirement.

3.6 Substitution of Required Courses. In meeting degree requirements a lower-division course may not be substituted for an upper-division course requirement. Substitution policy is governed by the individual colleges.

3.7 Waiving of Required Courses. A maximum of six semester credit hours may be waived. Required courses in English, American history and American government cannot be waived, and the total number of semester credit hours required for the degree cannot be reduced. Waive cards must be signed by the student's adviser, the head of the student's major department and the dean of the college.

3.8 Changing Majors. Students are advised to select a specific major no later than the end of the sophomore year. Students on probation, or not making satisfactory progress toward a degree, may change majors only with the approval of the dean of the college in which they wish to pursue a different degree. Students should contact the office of Student Academic Services of his or her college concerning procedures and forms to change majors and/or minors.

3.9 Deadline for Completion of Requirements. Degrees are conferred only on specific commencement dates. If a student completes requirements for a degree after a commencement date, the degree will be granted at the next scheduled commencement after the student files a diploma application. (See Academic Regulation 7.9 *Diploma Application*.) The student may request a certified statement of completion of graduation requirements from the Office of the Registrar.

3.10 Second Baccalaureate Degree. A student who receives a baccalaureate degree from OSU may use all applicable courses toward a second baccalaureate degree. A minimum of 30 semester credit hours of additional work, including all requirements of the second baccalaureate degree, is required. An additional baccalaureate degree may not be earned in the same major as the first degree, even if the option is different. For example, it is not possible to earn both a BS degree in Journalism and Broadcasting with an option in Advertising and a BS degree in Journalism and Broadcasting with an option in Public Relations. Completion of requirements for more than one option may be noted on the official transcript, but a second degree will not be awarded.

3.11 Double Majors and Minors. A double major can be earned by satisfying the field of concentration requirements for the second major and any additional departmental requirements. If the general education courses are met from one college, they do not need to be met for the second major if it is in another college. The second major does not necessarily require hours above the minimum required for the first major. Whether additional hours are required generally depends upon the number of electives allowed by the first major and the degree of overlap between courses in the two fields of concentration.

Minors are available for many departments. A student should check with the department to find out what the requirements are to obtain a minor in that area. A list of current minors can be found in the "Degree Programs" section of the *Catalog*.

If a student majoring in one field also completes the specified requirements for a major or minor in other fields, the second major and/or additional minors will be noted on the student's transcript while in-progress.

The student should contact the office of Student Academic Services of the college in which the student is enrolled concerning procedures to have the additional major or minor recorded or removed.

3.12 Pre-finals Week. Final examinations are scheduled at the end of each semester and are preceded by pre-finals week, which begins seven days prior to the first day of finals. During pre-finals week, all normal class activities will continue; however, no assignment, test or examination accounting for more than five percent of the course grade may be given; and no activity or field trip may be scheduled that conflicts with another class. This *excludes* makeup and laboratory examinations, out-of-class assignments or projects made prior to pre-finals week, and independent study courses. No student or campus organization may hold meetings, banquets, receptions, or may sponsor or participate in any activity, program, or related function that *requires* student participation. Additional information may be obtained from the student services office of each college or the Office of Academic Affairs.

3.13 Final Exam Overload. In the event that a student has three or more final exams scheduled for a single day, that student is entitled to arrange with the faculty member instructing the highest numbered course (based on the 4-digit course number) to reschedule that examination at a time of mutual convenience during final exam week. (Common final exams are not among those to be rescheduled unless two common exams are scheduled at the same time) The affected student should submit this request in writing two weeks prior to the beginning of final exam week. In seeking to provide the relief to the student, the faculty member may request that the student provide a copy of his or her schedule to confirm the difficulty. The faculty member has one week prior to the beginning of final exam week to arrange a mutually convenient time for administration of the final exam, after which the student may take the request to the Office of Academic Affairs.

4. CREDITS

4.1 Residence Credit. Residence credit is awarded for work taken on campus (not through correspondence or credit earned by examination) or at a location officially designated as a residence center by the governing board of the institution (e.g., in-state military bases and OSU courses at OSU-Tulsa.)

4.2 Courses Offered through Outreach and Correspondence. Academic credit is awarded for courses offered through the outreach offices of the six colleges, by the Independent Study Center of OSU, or by transfer of work certified as extension or correspondence credit by another fully accredited institution.

—Extension Credit. OSU will accept, toward a degree, a maximum of eight semester credit hours earned through extension at another institution if that institution is fully accredited.

—Correspondence Credit. OSU will accept, toward a degree, a maximum of eight semester credit hours earned through correspondence at another institution if that institution is fully accredited. Credits earned through correspondence cannot exceed one-fourth of the credits required for a baccalaureate degree. (See also Academic Regulation 2.2 *Full-time Students*.)

4.3 Transfer Credit from Other Accredited Four-year Institutions. Except as excluded in Academic Regulations 4.4 *Transfer of Credit from Community Colleges* and 7.2 *Residence Credit Requirements*, credits transferred from accredited senior colleges will apply toward baccalaureate degrees in the same way that they would apply had

they been earned in residence at OSU. Students may not use transfer credits to satisfy more than one-half the major course requirements for a department unless they have the approval of the head of that department and the academic dean.

4.4 Transfer Credit from Community Colleges. Credits will be accepted by transfer from a community college to meet lower-division (i.e., 1000- and 2000-level courses) requirements only. A minimum of 60 semester credit hours must be earned at a senior college. Within these guidelines, transfer credits are subject to the individual colleges' degree requirements.

4.5 Transfer Credit from International Colleges and Universities. Credit is accepted based on equivalent standards as outlined in Academic Regulations 4.3 and 4.4. Credit is accepted based on the U.S. letter grade equivalents for the post-secondary grading method used in each country of study.

4.6 Credit by Exam. The academic regulations listed below apply to the following examinations: Advanced Placement Program (AP), International Baccalaureate Program (IB), College Level Examination Program (CLEP), and OSU Advanced Standing Examinations.

a. credit earned by examination will not be placed on a student's transcript unless he or she is currently enrolled and has successfully completed 12 or more semester credit hours of academic work at OSU;

b. credit will be recorded with a neutral grade of "P" (Pass) if the student earns the equivalent of a "C" or better on the examination. No grade is recorded if the student fails the exam;

c. credit earned by examination does not count toward the minimum of 30 hours that must be earned in residence (See Academic Regulation 7.2 *Residence Credit Requirements*);

d. a native speaker of a foreign language (one whose high-school level instruction was conducted principally in that language) cannot earn credit toward graduation in lower-division (1000-2000 level) courses in that language (See Academic Regulation 4.9 *Foreign Language Credit for Native Speakers*);

OSU Advanced Standing Examinations may be offered by academic departments on campus in subject areas not offered through the examination programs listed above. Any currently enrolled student whose travel, employment, extensive readings or educational experience appear to have given the student proficiency in a subject that is offered at OSU, equivalent to the proficiency ordinarily expected of those students who take the subject in a regular class, may apply for an examination on the subject.

In addition to the regulations listed above, to qualify for an OSU Advanced Standing Examination the student must:

a. be enrolled at OSU;

b. not have taken an Advanced Standing exam over the course within the preceding six months;

c. receive the approval of the head of the department and the associate dean in which the course is offered;

d. present a valid student I.D. at the examination.

Information pertaining to OSU Advanced Standing Examinations may be obtained from the Office of Undergraduate Admissions.

—Military Credit. OSU awards credit as recommended by the American Council on Education (ACE), as published in "The Guide to the Evaluation of Military Experiences in the Armed Services," for selected educational experiences provided by the armed forces. OSU also accepts credit earned through the DANTES Subject Standardized tests for active military personnel.

Students who wish to establish credit for military training should submit a copy of their DD214, Armed Forces of the United States Report of Transfer or Discharge, or their DD295, Application for the Evaluation of Educational Experiences During Military Service, to the Office of Undergraduate Admissions. Course Completion Certificates may be used to supplement other records or when service schools are not reflected on the DD214 or 295.

An official AARTS Transcript (Army/ACE Registry Transcript Service) is available to Army enlisted, active duty personnel, and veterans who entered the service after October 1, 1981. An official SMART transcript (Sailor/Marine ACE Registry Transcript) is available to active duty and reserve Sailors and Marines, Navy veterans who separated or retired after January 1975, and Marines who separated or retired on or after June 1999.

—Training Programs. OSU awards credit as recommended by the American Council on Education (ACE) in the "National Guide to Educational Credit for Training Programs." Students may present certificates of completion or a transcript from the ACE Registry of Credit Recommendations to the Office of Undergraduate Admissions for evaluation. OSU also awards credit based on the recommendation of the Board of Regents of the University of the State of New York in the "Director of the National Program on Non-collegiate Sponsored Instruction."

4.7 Graduate Credit Hours for a Senior. An OSU undergraduate senior may take a limited number of courses for graduate credit toward an OSU degree program. The credits may not be utilized for both a baccalaureate degree and a graduate degree. The courses in question must be approved for graduate credit (denoted by an asterisk next to the course number as listed in the *Catalog*). The applicability of such graduate courses to a specific graduate program will be determined by the student's graduate advisory committee when the student enrolls in the Graduate College and submits a plan of study for an advanced degree.

To receive credit, a *Graduate Credit for Seniors* form must be completed by the student to receive graduate credit for courses taken. This form must be submitted to the Graduate College prior to the end of the second week of class instruction of a regular semester, or the first week of a regular summer session. The required form is available on the Graduate College's Internet site or in the Graduate College.

Such credit may be earned only if the following conditions are satisfied at the time of application:

1. Students must have a minimum cumulative graduation/retention undergraduate GPA of 3.00.
2. The total enrollment must not exceed 18 credit hours for a regular semester or nine credit hours for a summer session.
3. The student must be within 12 semester credit hours of completing requirements for the baccalaureate degree at the beginning of the semester or summer session in which courses are taken for graduate credit.
4. Admission to courses taken for graduate credit must have approval of the course instructor, the director of the undergraduate student services office associated with the student's major, and the dean of the Graduate College.

Not more than 15 semester credit hours taken while a senior may be approved for graduate credit. The student must earn a grade of "B" or higher in those courses for which he or she seeks graduate credit. Credit will be applied to the student's graduate transcript only after the student has been admitted as a graduate student at OSU. Students are cautioned that institutions other than OSU may or may not allow courses taken for graduate credit during the senior year to be transferred into one of their graduate programs.

4.8 Semester Credit Hour. A semester credit hour is equivalent to (a) sixteen 50-minute class sessions (including examinations) conducted under the guidance of a qualified instructor plus 32 hours of preparation time, or (b) sixteen 3-hour laboratory sessions, or (c) sixteen 2-hour laboratory sessions plus 16 hours of preparation time. These same equivalencies apply to outreach courses, short courses and other learning formats for which academic credit is awarded.

4.9 Foreign Language Credit for Native Speakers. A native speaker of a foreign language cannot enroll in or earn credit toward graduation in lower-division (1000- or 2000-level) courses in that language. A native speaker of a foreign language is defined as a person whose high-school level instruction was conducted principally in that language.

Native speakers may occasionally have valid reasons for establishing credit in a lower-division course. Requests for such consideration should be directed to the dean of the student's college for recommendation to the head of the Department of Foreign Languages and Literatures.

5. ENROLLMENT

5.1 Course Numbering System. All courses are identified by numbers composed of four digits. The first digit indicates the class year in which the subject is ordinarily taken, although enrollment is not exclusive as to student classification; the second and third digits identify the course within the field; and the last digit indicates the number of semester credit hours the course carries. For example, a course numbered 1123 should be interpreted as a freshman, or beginning, level course carrying three hours of credit. A course number beginning with zero indicates that the course does not carry University credit. A course number ending in zero indicates that the course carries variable credit.

5.2 Maximum Semester Credit Hour Load. Undergraduate students are allowed to enroll in the number of credit hours each semester that do not result in academic overload, which is defined as the number of semester-credit-hours 25 percent or more than the number of weeks in the applicable academic term. In general, graduate students may not earn credit to exceed one credit hour per week of resident study. See "Enrollment" in the "Graduate College" section of the *Catalog*.

Undergraduates desiring to carry an academic overload must have demonstrated readiness to perform on an overload basis, either through superior performance on a college aptitude test or on the basis of superior academic achievement in high school or college, and must complete a Petition for Excessive Hours (available in the Office of the Registrar). The maximum academic overload in any given term is limited to the number of semester-credit-hours which is 50 percent greater than the total number of weeks in the applicable academic term. Exceptions to deserving students may be granted by the Office of Academic Affairs.

In a regular 16-week Fall or Spring semester, the maximum enrollment for undergraduates without special approval is 19 credit hours. Enrollment in 20 to 24 credit hours results in academic overload, which requires a Petition for Excessive Hours. Enrollment in 25 or more credit hours requires both a Petition for Excessive Hours and approval by the Office of Academic Affairs.

Proportionate credit-hour limits apply to summer sessions and intersession periods separately, depending on the length of the session.

5.3 Adding Courses. The sixth class day of a regular semester or the third class day of an eight-week summer session, or the proportionate period for block or short courses is the last day a course may be added (nonrestrictive). With instructor and academic adviser approval, a course may be added during the second week of classes (seventh through tenth class days) of a regular semester or the fourth or fifth class day of an eight-week summer session, or the proportionate period for block or short courses (restrictive).

5.4 Dropping Courses. Dropping refers to the dropping of one or more courses while remaining enrolled in at least one other OSU course for a given semester. Courses may not be dropped without the approval of the student's academic adviser.

Anytime through the sixth day of a regular semester or through the third day of the eight-week summer session, or during the proportionate period for block or short courses, a student may drop a course, and no record of the course will appear on the student's academic record.

After the deadline for dropping with no record, but prior to the end of the twelfth week of a regular semester or the sixth week of an eight-week summer session, or proportionate periods for block or short courses, a student may drop a course and the grade of "W" (dropped) will be recorded on the student's academic record.

After the twelfth week of a regular semester, or the sixth week of an eight-week summer session, or proportionate periods for block or short courses, a student may not drop a course and will be assigned only the grade of "A," "B," "C," "D" or "F," or (when appropriate) "I," "NP," "P," "S," "U," "R," "SR," or "UR" by the instructor at the end of the semester. (Exceptions to this policy may be allowed by petition due to verifiable extraordinary circumstances and committee approval. A petition requires the signatures of the student's instructor, adviser and dean with the grade of "W" or "F" assigned by the instructor.)

A student may not drop any course in which a violation of academic integrity is pending against the student. If the student admits responsibility for a violation meriting a grade of "F" for an assignment or examination, the instructor or Academic Integrity Panel may permit the student to drop the course with a grade of "W." If the student is found not responsible for the violation, he or she may drop the course with either a "W" or "F," (according to the drop grade policy) appearing on the academic record. If the student is found responsible for the violation, the instructor may assign an appropriate sanction, including assigning the grade "F" for the assignment/examination or "F!" for the course. (See *Policy and Procedures Letter 02-0822*).

International students need to consult with International Students and Scholars (ISS) before dropping courses or withdrawing for the semester. Under new reporting regulations required by the Student and Exchange Visitor Information System (SEVIS), dropping below full-time can put a student's visa status in jeopardy.

5.5 Concurrent Enrollment. A student who desires to earn credits concurrently at another institution or through correspondence, or DANTES (Defense Activity for Non-traditional Education Support) examinations while enrolled for residence credit at OSU, must secure approval *in advance* from his or her dean if he or she expects this institution to accept those credits. Armed Forces personnel will be granted 60 days from the date of their first enrollment to establish, through DANTES examinations, advanced standing in subject matter that they mastered while in the Armed Forces.

5.6 Prerequisites to Upper-division and Graduate-division Courses. When no prerequisites are listed for courses numbered 3000 or 4000, it is understood that the prerequisite is approval of the student's adviser. The prerequisite for courses at the 5000 or 6000 level is graduate standing in addition to any other prerequisites listed. Instructors may waive prerequisites when the student's background justifies this action. Prior approval of the instructor may be required in problems courses, independent study, internships, thesis and dissertation courses, and courses taught in a professional school.

5.7 Class Enrollment Maxima. The maximum number of students permitted to be enrolled in each section of a course is determined by the department head and can be increased or decreased only by the department head or dean. Generally, the maximum number of students permitted in an honors section is 22 students. The director of The Honors College may slightly increase or decrease the size of some honors sections. The number of students enrolled in a class may not exceed the fire code capacity of the designated classroom.

5.8 Priority Enrollment. Currently enrolled/continuing students register for summer and fall classes during the latter part of the preceding spring semester, and for spring classes during the latter part of the fall semester. In order to facilitate access to courses required for timely degree completion, a student's priority for enrollment generally follows academic class level with seniors having the highest priority. Some exceptions to this basic priority may be necessary to accommodate bona fide student needs, such as a special priority for physically disabled students. The Office of Academic Affairs determines enrollment

priorities, and enrollment schedules and priorities are posted in the enrollment guide located on the Registrar's Web site at http://registrar.okstate.edu.

Full-time staff members may utilize priority enrollment to help ensure they are given an opportunity to identify a section(s) at a time that is least disruptive to work in the office. This benefit of priority enrollment is extended to full-time (100% FTE), regular staff members. Staff members employed at less than one hundred percent are not eligible for priority enrollment.

5.9 Late Enrollment. Students are allowed and encouraged to enroll well before the beginning of a given term (fall, spring, summer). Students whose initial enrollment for the term occurs on or after the first day of the term will be charged a late enrollment fee. A student is permitted to add classes after initial enrollment without a late enrollment fee during the first two weeks of a 16-week semester or through the fifth day of an eight-week summer session or during proportionate periods for block or short courses. See the "Tuition, Fees, and Cost Estimates" section of the *Catalog* for the current late enrollment fee amount.

5.10 Payment of Tuition and Fees. Oklahoma State University (OSU) combines your enrollment costs and charges from different areas on campus into one consolidated student account. A monthly bursar account statement is produced on the 1st day of the month that reflects your bursar balance due and is due prior to the 15th of the month. Paper bills are no longer mailed, but available to view electronically online. Notifications to view billing statements via the web are e-mailed to students at the beginning of each month to the Okstate e-mail address. Using their O-Key login and password, students may view their bursar account online at http://bursar.okstate.edu/ or http://prodosu.okstate.edu/. Failure to receive a bill does not relieve the student from their financial obligation or any late charges and other penalties that may occur if the account is not paid by the due date. All tuition and fees (required and optional) associated with the student's enrollment are considered past due if not paid by the 15th of the billing month. Direct deposit refunds are usually processed daily and may occur earlier in the semester before bookstore and other miscellaneous charges are processed to your bursar account. You are responsible for paying these subsequent charges as they appear on your regular monthly bursar billing statement. All past due accounts accrue a penalty at the rate of 1.5% monthly (19.56 APR).

In efforts to assist our students in meeting financial obligations, Oklahoma State University offers an in-house administered payment option plan (POP) as an alternative to the traditional lump-sum payment method. This plan provides an opportunity for families and students to pay University billed expenses in regular monthly installments either by the semester or annually. Visit our Web site link http://bursar.okstate.edu/forms/osupop.pdf for the POP application.

When you send a check as payment, you authorize Oklahoma State University to clear your check electronically. Your checking account may be debited as soon as the same day we receive your payment. This electronic transaction will appear on your bank statement although your check will not be presented to your financial institution or returned to you. Any resubmission due to insufficient funds may also occur electronically. Please be aware that all checking transactions will remain secure and payment by check constitutes acceptance of these terms.

Accounts must be cleared before the student can obtain the release of any academic records such as a transcript, receive a diploma or enroll at OSU for subsequent semesters. Oklahoma State University extends bursar optional charging privileges to students in order to facilitate use of campus based services. In order to maintain charging privileges with the University, bursar accounts must remain current or your charging privileges will be revoked.

Any charges incurred by the University in an effort to collect on delinquent accounts will be assessed to and will be the responsibility of the account holder. Delinquent account information is disclosed to credit reporting agencies, which could endanger the student's credit rating on a local or national level. Past due accounts may receive payment from the warrant intercept program (WIP) that captures state income tax refunds to pay outstanding OSU debt.

5.11 Auditing Courses. A student who does not wish to receive credit in a course may enroll as an auditor, provided space is available and the student obtains approval from the instructor of the course and his or her adviser. (Note: Adviser permission is only required for currently enrolled students.) A student who enrolls as an auditor must verify that he or she will not petition to receive credit for the audited course by any method other than that described below under "Audit to Credit." Instructor discretion will determine the auditor's level of class participation, such as taking exams or turning in assignments.

Audited courses do not count in the determination of full-time student status and do not apply toward Veterans Affairs benefits. Laboratory courses, private music lessons, studio art courses, outreach courses, and other courses that require special course fees are not open for audit enrollment.

The audit enrollment form is available on the Office of the Registrar website (http://www.okstate.edu/registrar). Initial enrollment in a course as an auditor may be completed only between the first and the tenth class day (inclusive) of a 16-week semester and proportionate periods for shorter sessions.

—Audit to Credit. The allowable time to change from audit to credit enrollment is between the first and tenth class day (inclusive) of a 16-week semester and proportionate periods for shorter sessions. Students changing enrollment status from audit to credit must have been admitted to OSU.

—Credit to Audit. A student who is already enrolled for credit in a course may change the enrollment to audit only if the student officially drops the course (or, if appropriate, withdraws) at the time the student changes to audit. This action is not allowed after the drop/withdraw deadline for the course. The audit action will not remove the original course withdrawal notation from the student's transcript.

Audited courses appear on a student's official transcript with an indication that the course was an audit enrollment. An "AU" appears where the grade would normally appear. The "AU" does not contribute to a student's GPA, and no credit hours are earned for the course.

Audit enrollments follow the same resident and non-resident tuition and fee policies as credit enrollments. Late enrollment fees are waived for audit enrollments. Any individual 65 years or older may audit a class at no charge. The audit tuition and fees are also waived for faculty and staff who have retired from the University under the Oklahoma Teacher Retirement System's "Rule of 80" or "Rule of 90" regardless of age at time of retirement (*OSU Policy 2-0108*).

5.12 Minimum Class Size. The minimum number of students required in order for a class to meet is as follows: 20 students for lower-division classes, 12 students for upper-division classes, and eight students for graduate-level classes.

6. GRADES AND GRADING

6.1 Official Transcripts. All official transcripts of the student's academic record at OSU are prepared and released by the Office of the Registrar. Copies of transcripts from other institutions cannot be furnished.

6.2 Grade Interpretation. The quality of student performance in all classes is indicated by the following letter grades: "A," "B," "C," "D," "F," "F!," "I," "NP," "P," "S," "U," "W," or "R," "SR," or "UR." Descriptions of the grades are:

Grade "A"	Excellent
Grade "B"	Good
Grade "C"	Average
Grade "D"	Below average
Grade "F"	Failure

Grade "F!" (pronounced F shriek). The "!" indicates that the student failed the course because of a violation of academic integrity. Students may remove the first "!" (though not the "F") from their transcripts by completing an academic integrity educational program. The "F!" will appear on the transcript for a minimum of one semester. (See also http://academicintegrity.okstate.edu)

"Incomplete" Grade. This grade is given to a student who satisfactorily completes the majority of course work (i.e., material amounting to more than 50% of the course grade as outlined in the course syllabus) and whose work averaged "D" or better, but who has been unavoidably prevented from completing the remaining work of the course. This grade is considered temporary. When the instructor specifies the conditions the student must fulfill in order to complete the course, he or she will also specify the grade the student would receive based on total course requirements and evaluation of completed work, and assign a composite incomplete grade. This temporary grade ("IB," "IC," "ID," or "IF") will reflect the percentage of work completed by the student as well as the grade earned on the completed work. This will be the projected grade if the student received a zero for the remaining course work, with the "I" representing the incomplete status of the course. Neither a grade of "IA," nor a condition that the student must repeat the course, is permitted.

The "composite incomplete" grade ("IB," "IC," "ID" or "IF") will be recorded on the online grade form and on the unofficial transcript until the final grade is assigned. The official academic transcript will reflect an "I" grade for the course until the final grade is assigned.

The maximum time allowed for a student to complete the course is one calendar year after the end of the semester for which the incomplete grade was awarded. The dean of the student's college (for graduate students, this is the Graduate Dean) may recommend to the Office of the Registrar an adjustment of this period in exceptional circumstances, which must be clearly documented with supporting evidence when deemed appropriate. Instructors have the prerogative to require a shorter period of time to complete the remaining requirements.

It is the responsibility of the student to satisfy the requirements stipulated by the instructor at the time the incomplete grade is assigned; it is the responsibility of the instructor to initiate action to have any new permanent grade entered as soon as possible after the student completes the course or, after one year, partially fulfills the remaining requirements.

Upon completion of any or all of the remaining requirements, or at the end of the one-year period (whichever occurs first), the temporary grade on the transcript is changed to reflect the final grade for the course (e.g., "IC" is changed to "B" on the unofficial transcript, and "I" is changed to "B" on the official transcript). Any course in which none of the remaining requirements are fulfilled will, after one year, have the incomplete grade changed to the default grade (e.g., "IC" or "I" is changed to "C"). If the student opts to graduate prior to the end of the one year period and if the course is required for graduation, the remaining course requirements must be completed and the final grade assigned by the deadline for course work completion for his or her final graduating semester. If the course is not required for graduation, the standard completion time limits apply. When the temporary incomplete grade is replaced with the permanent grade, this action is not considered a violation of the policy that states a grade will not be lowered after graduation.

An incomplete grade that was assigned prior to the Fall 2008 semester and is not changed within the designated time limit remains a permanent "I" grade on the transcript.

Grade "NP." This grade is given for unsatisfactory work (including that evaluated as "D") in courses on the pass-no pass grading system. Both credit hours and grade-points are ignored in calculating grade-point averages.

Grade "P." This grade is given for passing work in OSU courses approved for pass-no pass and pass-fail grading systems. Both credit hours and grade points are ignored in calculating grade-point averages.

Grade "S" or "U." This grade is given for satisfactory (equivalent to a "C" or better) or unsatisfactory work in remedial courses in English, mathematics, reading, and science. Both credit hours and grade points are ignored in calculating grade-point averages, and neither grade is counted in total hours.

Grade "W." This grade indicates that the student dropped the course.

Grade "R." This grade is given to a student in a master's degree creative component course, and other courses as appropriate, when course work is still in progress. It is the responsibility of the instructor to initiate action to have a permanent letter grade entered as soon as possible after the student completes the course work. Effective Fall 2008, this grade is no longer acceptable for courses numbered 5000 or 6000.

Grade "SR" or "UR." These grades are given for satisfactory and unsatisfactory work, respectively, in thesis or dissertation courses (5000 or 6000). Both credit hours and grade points are ignored in calculating grade point averages, but courses in which a grade of "SR" is earned may be used toward minimum degree requirements.

Mark of "AU." An "AU" indicates that the student enrolled as an auditor in the course. An "AU" is not a grade and is not used in calculating grade-point averages.

Mark of "N." An "N" indicates that at the time grades were due in the Office of the Registrar, a final grade was not reported by the student's instructor. An "N" is not a grade and will be changed to the grade earned within a reasonable time. It is not used in calculating grade-point averages.

6.3 Grade-point System. The following grade-point system is used in calculating the grade-point average.

Grade "A" yields 4 grade points per semester credit hour.

Grade "B" yields 3 grade points per semester credit hour.

Grade "C" yields 2 grade points per semester credit hour.

Grade "D" yields 1 grade point per semester credit hour.

Grade "F" yields 0 grade points per semester credit hour.

6.4 Grade-point Average Calculating. In calculating grade-point averages, the total number of grade points earned is divided by the total number of hours attempted. The grade of "I," "NP," "P," "S," "U," "W," "R," "SR," "UR," or the mark of "AU" or "N" will not affect the grade-point average.

—Semester Grade-point Average. For purposes other than retention, all grades are included in the calculation. For retention purposes, activity, remedial and research courses are excluded from the calculation. These courses remain on the transcript with a notation that they are excluded from the GPA.

—Retention and Graduation Grade-point Averages. All courses in which a student has a recorded grade are included in the calculation, excluding any courses repeated (with an original grade of "D" or "F") or reprieved based on State Regents policy and excluding remedial courses and physical education activity courses. (See Academic Regulation 6.13 *Academic Forgiveness*.)

—Cumulative Grade-point Average. All courses in which a student has a recorded grade are included in the calculation.

6.5 Six Week Progress Reports. Faculty are expected to report six week progress grades for all students (regardless of classification) enrolled in 1000- and 2000-level classes and are encouraged to submit six week grades for students in all courses. This will normally occur shortly after the sixth week of classes. Student athletes will have all six week grades reported, not just 1000- and 2000-level. Progress reports are made available to students and to the students' advisers through the computer (SIS) Web site.

6.6 Pass-No Pass Grading System. An undergraduate student may elect to take no more than four courses or 15 hours (whichever is greater) during his or her academic career with the pass-no pass grading option. The option is restricted to those students who:

a. have passed 28 or more semester credit hours;
b. have at least a 2.50 grade-point average in all hours attempted;
c. have met all of the prerequisites for enrollment in the course in question;
d. do not need the course in question for meeting any requirements for graduation or certification other than as a general (unrestricted) elective;
e. have approval of the academic adviser.

A student who chooses the pass-no pass option must do so by the last date on which a course may be added. Once the deadline has passed, a student may not change the choice of grading systems. The pass-no pass option is not identified on the official class roll and thus is not known to the instructor. The instructor assigns a normal grade based on the quality of the work performed. The grades of "A," "B" and "C" are recorded on the transcript as "P"; the grades of "D" and "F" are recorded as "NP." "W" and "I" grades are recorded without change. The pass-no pass grade will not affect the grade-point average.

Graduate students should refer to the "Graduate College" section of the *Catalog.*

6.7 Pass-Fail Grading System. Some courses are taught only on a pass-fail basis. Such courses are so designated in the "Course Descriptions" section of the *Catalog*. Students who pass the course are awarded the grade of "P"; those who fail the course are awarded the grade of "F."

Graduate students should refer to the "Graduate College" section of the *Catalog.*

6.8 Grade Reports. Reports of the final grades of all students are compiled shortly after the end of each semester and are made available electronically to the students, the students' advisers and the students' deans via the Student Information System.

6.9 Correcting Grades Reported in Error. The only permitted reasons for changing a final grade are to correct a grade that was reported in error, to remove an incomplete grade, or to change a grade at the direction of the Grade Appeals Board or Academic Integrity Panel. An instructor may not allow students to perform extra work after the end of the course in order to raise their grade. Grade change requests must be submitted in writing to the Office of the Registrar and must have both the department head's and the dean's approvals. A grade may not be lowered after the student has graduated unless the degree has been revoked.

6.10 Grade Appeals. A student may appeal a grade given by an instructor in cases in which he or she believes the grade awarded is inconsistent with announced grading policy. (See "Student Rights and Responsibilities" or contact the Office of the Provost and Senior Vice-President.)

6.11 Honor Rolls. *Full-time Students.* Full-time undergraduate students (12 or more semester credit hours in a regular semester or six or more in a summer session) who complete at least 12 enrolled hours (or six in a summer session) with a semester (not cumulative) grade-point average of 4.00 (i.e., all "A's") are placed on the President's List of Distinguished Students. The grade of "P," "S" or "W" or grades earned through correspondence may not be included in meeting the minimum enrollment required or grade-point average required for an honor roll. Students who have completed their courses under the same requirements as outlined above, with a grade-point average of 3.50 or higher and no grade below "C," are placed on the Dean's List of Distinguished Students. (See also Academic Regulation 6.4 *Grade-point Average Calculating*.)

—Part-time Students. Part-time undergraduate students (11 or fewer semester credit hours in a regular semester or five or fewer in a summer session) who have accumulated at least 12 semester credit hours of "A" during the most recent consecutive enrollments at OSU, and who complete all enrolled hours with a combined grade-point average of 4.00 (i.e., all "A's") are placed on the President's List of Distinguished Students. The grade of "P," "S," or "W" grades earned through correspondence may not be included in meeting the minimum enrollment required or grade-point average required for an honor roll. Dropping a course prohibits a part-time student from being listed on an honor roll. Special (non-degree-seeking) students are not included on an honor roll. Students who have completed their courses under the same requirements as outlined above, with a combined grade-point average of 3.50 or higher and no grade below "C," are placed on the Dean's List of Distinguished Students. (See also Academic Regulation 6.4 *Grade-point Average Calculating*.)

Once a part-time student is placed on an honor roll, the student must complete an additional 12 credit hours before the student is considered again for an honor roll. The student must meet all the above criteria at the time of subsequent consideration.

6.12 Violation of Academic Integrity. Oklahoma State University is committed to maintaining the highest level of academic integrity and ethical behavior. It is necessary that all members of the University support and promulgate the values of honesty and responsibility appropriate for an academic community. Not only does such academic integrity and ethical behavior contribute to the status of the University, but it also represents an important component of the educational process. To assure a high level of integrity among students, behaviors that violate academic integrity (e.g., unauthorized collaboration, plagiarism, multiple submissions, cheating on examinations, fabricating information, helping another person cheat, unauthorized advance access to examinations, altering or destroying the work of others, and fraudulently altering academic records) will not be condoned nor tolerated. Violations may subject the student to disciplinary action including the following: receiving a failing grade on an assignment, examination, or course; receiving an "F!" notation of a violation of academic integrity on the transcript; and suspension from the University. In the event an incident is not resolved at the time grade reports are due to the Registrar (e.g., an alleged violation is discovered during the final examination period), the instructor will assign an incomplete grade until the allegation is resolved. (See also http://academicintegrity.okstate.edu)

6.13 Academic Forgiveness (Undergraduates). ***Repeated Courses.*** A student shall have the prerogative to repeat a course and have only the second grade, even if it is lower than the first grade, included in the calculation of the retention/graduation grade-point averages up to a maximum of four courses but not to exceed 18 credit hours in which the original grade was a "D" or "F." If a course is repeated more than once, all grades except the first attempt are included in the grade-point averages. The original course and grade remain on the transcript identified with a statement under the course "Repeated (excluded from GPA)." All other repeated courses, those in excess of the 18-hour, four-course maximum and those with a grade of "C" or better in the original course, are included in the grade-point averages and identified with a statement under the course "Repeated (included in GPA)."

—Academic Reprieve. A currently enrolled student may request an academic reprieve for all courses in one semester or two consecutive semesters if the following conditions are met: (a) at least three years must have elapsed between the period in which the grades being requested reprieved were earned and the reprieve request; (b) the student must have earned a GPA of 2.00 or higher with no grade lower than a "C" in all regularly graded course work (a minimum of 12 hours) excluding activity, performance and remedial courses since the semester requested to be reprieved; (c) the student has not previously been granted an academic reprieve for a semester; (d) there were extenuating circumstances which caused the student to perform poorly during the semester.

The request for an academic reprieve must be submitted on the appropriate form to the Associate Vice President for Undergraduate

Education. A committee appointed by that office reviews each request and either approves or denies a request based on whether or not the student meets the conditions stated above and the committee's judgment concerning the extenuating circumstances reported by the student. The courses for a semester that is reprieved are excluded from the retention and graduation grade-point averages and identified with a statement under the course "Reprieved (excluded from GPA)".

—Academic Renewal Policy. A student may request an academic renewal for all courses if the following conditions are met: (a) at least five years must have elapsed between the last semester being renewed and the renewal request; (b) prior to requesting academic renewal, the student must have earned a GPA of 2.00 or higher with no grade lower than a "C" in all regularly graded course work (a minimum of 12 hours) excluding activity or performance courses; (c) the request will be for all courses completed before the date specified in the request for renewal; (d) the student has not been granted a reprieve after December 5, 2003; (e) neither the content nor credit hours of renewed course work may be used to fulfill any degree or graduation requirements. The request for an academic renewal must be submitted on the appropriate form to the Associate Vice President for Undergraduate Education.

7. GRADUATION

7.1 Graduation Requirements. The responsibility for satisfying all requirements for a degree rests with the student. Advisers, faculty members and administrators offer help to the student in meeting this responsibility.

7.2 Residence Credit Requirements. Students must earn at least 30 semester credit hours at OSU. At least 15 of the final 30 hours applied toward the degree or at least fifty percent of the upper-division hours required by OSU in the major field must be satisfactorily completed at OSU. Prior approval by the academic dean is required. In the Spears School of Business, a minimum of 15 of the last 30 hours applied toward the degree and at least 50 percent of the upper-division hours required in the major field must be satisfactorily completed at OSU.

7.3 College Enrollment Requirement. A candidate for graduation must be enrolled in the college from which he or she wishes to receive the degree for at least two semesters, or one semester and one summer session, or three summer sessions immediately preceding graduation. For the award of a second baccalaureate degree, this requirement may be waived by the dean of the college awarding the second degree. (See Academic Regulations 7.2 *Residence Credit Requirements* and 3.10 *Second Baccalaureate Degree*.)

7.4 Residence Waiver for Certain Premedical Students. Students who complete at least 94 semester credit hours in a recognized premedical science program and then transfer to a professional program leading to the doctoral degree at an accredited professional school of medicine, osteopathic medicine, veterinary medicine, dentistry or optometry will be awarded the appropriate baccalaureate degree upon the successful completion of 30 semester credit hours in basic medical science courses applicable to the OSU major. This option is available only to students who have completed all other degree requirements for the major and have taken at least the last 30 semester credit hours of work at OSU prior to transferring to a professional school. (See Academic Regulation 7.2 *Residence Credit Requirements*.)

7.5 Minimum Hours for Graduation. Each degree program requires a specific minimum number of semester credit hours for graduation, as indicated in the *Catalog*. No degree program shall require fewer than 120 semester credit hours for graduation. (By OSRHE policy, these 120 hours are exclusive of physical education activity courses.) No student shall be permitted to graduate having completed fewer total hours than the requirement specified for that degree. At least 40 hours of upper-division course work shall be required in every baccalaureate degree program. (By OSRHE policy, these 40 hours are exclusive of physical education activity courses.) A minimum of 30 hours is required in the major field. Of these 30 hours, fifty percent must be upper division. Hours of "S" or "U" earned in remedial courses may not count toward total hours.

7.6 Grade-point Average for Graduation. A retention/graduation grade-point average of 2.00 or higher is required for all courses in which a student has a recorded grade, excluding any courses repeated or reprieved and excluding remedial courses and physical education activity courses. (See Academic Regulation 6.13 *Academic Forgiveness*.) This is in addition to the 2.00 or higher grade-point average required by the department in the major or minor fields.

7.7 Payment of Graduation Fees. Basic graduation cost is included in the records maintenance fee.

7.8 Requirements for Honors Degrees. The individual colleges have specific requirements for degrees with honors. Students should consult the office of their academic dean for information. (See the "Academic Enrichment Programs" section of the *Catalog*.)

7.9 Diploma Application. All degree candidates must submit a diploma application (online via SIS or with the Office of the Registrar) before or during their final semester to be eligible for graduation. Undergraduates must be classified as a senior before they can submit a diploma application, and graduate students must have filed an approved Graduate Clearance Form with the Graduate College before they are eligible to submit a diploma application.

Students must submit their diploma application by November 1 for their name to appear in the fall commencement program, and by April 1 for spring and summer graduate names to appear in the spring commencement program. Students who will complete all degree requirements in the summer should file their diploma application for the summer term, but are invited to participate in the spring commencement ceremony.

Students who have filed a diploma application and need to modify their expected graduation term should file a Diploma Application Extension form with the Office of the Registrar. This form allows you to change the expected graduation term on your diploma application, and allows you to register for classes in the following semester.

7.10 Presence at Commencement Exercises. The University will hold Commencement exercises at the close of the fall semester and at the close of the spring semester. Students who plan to meet the graduation requirements at the close of the following summer session are invited and encouraged to participate in the Commencement exercises at the close of the previous spring semester.

The University encourages all candidates for degrees to be present at the Commencement exercises. Attendance is not compulsory.

7.11 Graduation with Distinction. Students who earn an OSU undergraduate degree can also earn a level of distinction based upon the final retention/graduation grade-point average. (See also Academic Regulation 6.4 *Grade-point Average Calculating*) The level of distinction added to the diploma and transcript is:

Graduation/retention grade-point average	Distinction
3.90 to 4.00	Summa cum laude
3.80 to 3.89	Magna cum laude
3.70 to 3.79	Cum laude

This grade-point average calculation is two decimal places only, e.g., 3.69. In actuality, this GPA may be 3.69785 if additional digits were to be added. However, the value used to determine distinction is 3.69, which does not qualify for a level of distinction.

7.12 Professional Education. Professional Education requires a minimum 2.50 GPA for admission to Professional Education, student teaching and graduation. This requirement is consistent with state standards for students who complete professional education programs and seek licensure in the state of Oklahoma.

College of Agricultural Sciences and Natural Resources

Robert Whitson, PhD - *Dean and Vice President of Agricultural Programs*
Edwin L. Miller, PhD - *Associate Dean for Academic Programs*
Cheryl DeVuyst, PhD - *Assistant Dean for Academic Programs*
David M. Henneberry, PhD - *Assistant Dean for International Programs*
James Leising, PhD - *Assistant Dean for International Agricultural Programs*
Amy Gazaway, MS - *Coordinator, Career Services*
Mary Ann Harris, PhD - *Coordinator, Student Development*
Natalie Still, BS - *Coordinator, Prospective Student Services*

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Web site: www.casnr.com • **e-mail:** info@okstate.edu

The College of Agricultural Sciences and Natural Resources is the academic arm of the Division of Agricultural Sciences and Natural Resources, and offers outstanding undergraduate and graduate programs that are recognized at the state, regional, national and international levels. In collaboration with the Oklahoma Cooperative Extension Service (OCES)and the Oklahoma Agricultural Experiment Station (OAES), the College of Agricultural Sciences and Natural Resources (CASNR) provides great breadth and exceptional quality in teaching, advising, outreach, research and service. Undergraduate and Graduate students have come to expect and receive academic programs of excellence in CASNR.

Career opportunities in Agriculture and Natural Resources are highly diverse. Majors are supported in the very traditional agricultural and natural resource areas such as animal science and crop science, emerging areas such as plant and animal biotechnology, food science, communications and leadership, and many fields not commonly associated with agriculture such as turf management, biochemistry, environmental science, leadership and pre-medical sciences. As a result of this wide variety of majors, CASNR students come from both traditional agricultural roots and urban settings. This diversity adds strength to the college experience for all CASNR students. Active international programs are available to students in every CASNR major and add a unique dimension to the college experience.

In 2006, a new department was created to serve students interested in natural resources. The Department of Natural Resource Ecology and Management (NREM) brings together programs in forestry, wildlife, fisheries and rangeland ecology. Students studying in these areas have many common interests and career goals. Graduate programs are available in these areas and departmental faculty has research interests to complement their teaching responsibilities.

The College of Agricultural Sciences and Natural Resources prepares students to analyze information, communicate effectively, think critically, problem solve, and assume leadership roles in their respective fields of study. Students also receive a solid general education in communications, humanities and social sciences. In agriculture or natural resources, the graduate will have an opportunity for a rewarding career that will last as long as food is consumed, fiber is grown and soil, water and wildlife resources are valued.

Accreditation

Agricultural Sciences and Natural Resources include broad and diverse professions and do not have a single accrediting society as do some other professions. Programs in agricultural education, agricultural engineering, forestry, landscape contracting and landscape architecture are accredited by their professional organizations.

Academic Programs

—Undergraduate Programs. The Bachelor of Science in Agricultural Sciences and Natural Resources degree is offered in the following major fields of study: agribusiness, agricultural communications, agricultural economics, agricultural education, animal science, biochemistry and molecular biology, entomology, environmental science, food science, horticulture and landscape architecture, natural resource ecology and management, plant and soil sciences, and pre-veterinary science. The Bachelor of Landscape Architecture is also offered in the College of Agricultural Sciences and Natural Resources.

—Graduate Programs. Graduate study is available in all academic departments in the College. In addition to the Master of Agriculture and Master of Science degrees that may be obtained through several departments, the Doctor of Philosophy degree (PhD) may be earned in the following areas: agricultural economics, agricultural education, biosystems engineering, animal breeding, animal nutrition, biochemistry and molecular biology, crop science, entomology, food science, plant pathology, soil science, natural resource ecology and management and in horticulture through interdisciplinary programs in crop science, environmental science, and plant science.

High School Preparation and Admission Requirements

The high school preparation and admission requirements for the College are the same as the general University requirements. A solid background in English, algebra, and natural science is important preparation for the many academic programs in the various agricultural disciplines.

Transfer Students

Students who transfer from an accredited college or two-year college must meet the general University admission requirements. All transferred courses are recorded on the OSU transcript; however, no more than 65 hours from a two-year college will be used to meet the College's degree requirements. Specific departmental requirements needed for graduation are determined by the department in which the student plans to earn his or her degree.

Scholarships

Students enrolled and entering the College of Agricultural Sciences and Natural Resources were awarded approximately $800,000 in scholarships by the College and its departments for the 2006-2007 academic year. The following areas are considered in the awarding of scholarships: scholastic standing in high school or college; leadership qualities which have been shown in school, church, community or youth groups; financial need; sincere interest in the various agricultural disciplines.

Additional information may be obtained from the Office of the Associate Dean, College of Agricultural Sciences and Natural Resources, Oklahoma State University, 136 Agricultural Hall, Stillwater, OK 74078. Applications are available online at www.casnr.com.

Academic Advising

All students in the College have the advantage of being advised by a faculty member working in the individual student's academic discipline. Such advisers are readily available to students and work closely with the students throughout their academic careers.

Special Academic Programs

—Honors Program. The Honors College through the College of Agricultural Sciences and Natural Resources is designed to provide outstanding students with opportunities to pursue new challenges and academic excellence. Honors courses, seminars, and special honors contracts provide for discussions and independent study by students who have the desire and ability to explore academic subjects beyond the normal class work material. Honors awards available in the College are:

1. General Education Honors.
2. Departmental Honors.
3. The bachelor's degree, with honors.

Awards (1) and (2) may each be earned independently of the other. Award (3) is earned by satisfying the requirements of both (1) and (2). The completion of each award is noted on the student's transcript. Students who complete all three receive the bachelor's degree with honors diploma.

All entering freshmen who have ACT composite scores of 27-29 and a high school GPA of 3.75 or better, or an ACT composite score of 30 or higher and a high school GPA of 3.50, are eligible to become a part of The Honors College. Sophomores, juniors, and seniors, with minimum cumulative grade-point averages of 3.25, 3.37, and 3.50, respectively, may enroll in The Honors College. Additional information may be obtained from the director of The Honors College, 510 Library.

—Pre-Veterinary Medicine Curriculum. The program in pre-veterinary medicine, as offered in the College of Agricultural Sciences and Natural Resources, includes all courses required for admission to the Center for Veterinary Health Sciences.

Applicants must have completed at least 60 semester hours and have a minimum grade-point average of 2.80 in the required courses listed below (applicants must have satisfied all academic requirements by the last day of the spring term of the year in which admission is desired):

English composition (6 hours minimum):
ENGL 1113 and 1213; or 1313 and 1413.

Technical report writing or English elective (3 hours minimum).

Inorganic chemistry and lab (8 hours minimum):
CHEM 1314 and 1515.

Organic chemistry and lab (5 hours minimum):
CHEM 3015 (or 3053, 3153, and 3112).

Biochemistry (3 hours minimum): BIOC 3653.

Mathematics (3 hours minimum):
MATH 1513 (or any higher level mathematics).

Physics (4 hours minimum): PHYS 1114 and 1214.

Animal nutrition (3 hours minimum): ANSI 3543.

Biological science (8 hours minimum): BIOL 1114 and ZOOL 1604.

Microbiology and Lab (5 hours minimum): MICR 2123 and 2132.

Genetics (minimum 3 hours):
ANSI 3423 or PLNT 3554 or BIOL 3024.

Humanities/Social Sciences (6 hours minimum).

Although these course requirements may be completed within two years, most pre-veterinary medicine students complete at least three years of preparatory course work or a bachelor's degree. For more information on application requirements, refer to the "Center for Veterinary Health Sciences" section in the *Catalog* and the current brochure, *OSU Veterinary Medicine Admission Requirements*. Students are also encouraged to contact the Office of the Assistant Dean for Academic Programs in the College of Agricultural Sciences and Natural Resources.

General Education Requirements

The College of Agricultural Sciences and Natural Resources is committed to providing graduates both a depth of knowledge in their chosen field of study as well as breadth of knowledge outside their major. General education requirements are the same as those of the general University. Specific course offerings are given in the respective plans of study.

Graduation Requirements

General University requirements for graduation are stated elsewhere in the *Catalog*. In addition, specific requirements must be met for the Bachelor of Science in Agricultural Sciences and Natural Resources and Bachelor of Landscape Architecture degrees. For the BS degree, the required total semester credit hours vary by department, major and option. A minimum of 40 semester credit hours and 100 grade-points must be earned in courses numbered 3000 or above. The Bachelor of Landscape Architecture is a five-year program requiring 160 credit hours.

College and Departmental Clubs, Organizations and Honor Societies

Ag Communicators of Tomorrow
Aggie-X Club (agricultural economics)
Agriculture Ambassadors
Agriculture Student Council
Agronomy Club
Alpha Epsilon
Alpha Zeta (college honor society)
American Fisheries Society
American Society of Agricultural & Biological Engineers
Biochemistry Club
Biochemistry & Molecular Biology Graduate Student Association
Block and Bridle Club (animal science)
Collegiate Farm Bureau
Collegiate 4-H
Collegiate FFA (agricultural education)
Cowboy Motorsports
Cowboys for Christ
Dairy Science Club
Environmental Science Club
Food Industry Club
Forestry Club
Golf Course Superintendent's Assoc. of America
Horseman's Association
Horticulture Club
Leadership League
Meat Science Association
Oklahoma Collegiate Cattlewomen
Pi Alpha Xi
Pre-veterinary Science Club
Professional Landcare Network
Rodeo Association
Sanborn Entomology Club
Sigma Alpha
Sigma Lambda Alpha (horticulture and landscape architecture)

Society of American Foresters
Society of Landscape Architects
Society for Range Management
Soil and Water Conservation Society
Turf Club
Wildlife Society
Xi Sigma Pi (Forestry Honor Society)

Agricultural Communications

Charles Cox, EdD - *Professor and Interim Head*

Modern agriculture, with its diversity and specialization, requires accurate communication between industry leaders and the public. Education in agricultural communications prepares students to provide the necessary communications link.

By majoring in agricultural communications, students gain renaissance communications education with classes in advertising and public relations, Web design, magazine writing and production, radio and television broadcasting, photography, reporting and news writing, or research report writing. Opportunities also are available for the student to develop a double-major program with other departments in the College of Agricultural Sciences and Natural Resources.

For the graduate with a bachelor's degree with a major in agricultural communications, career opportunities are abundant in the agricultural production industry and in service organizations as well as with publishing firms, broadcast stations, trade publications or related media.

Graduate Programs

The Master of Science degree in agricultural communications is designed to build mastery of knowledge in key areas such as communication theory, history, philosophy, computer technology, advanced communication skills and research and data analysis. The Master of Science degree in agricultural communications reflects the distinctive body of knowledge, research base, professional delivery and program focus of the discipline. In addition, the program introduces and requires students to apply research tools and methods.

The Master of Science program serves two primary purposes: (1) encouraging mastery of discipline-specific knowledge with an introduction to research and data analysis and (2) offering discipline-specific knowledge with professional application to the work setting.

The Master of Science program offers students two options for completion of the degree: thesis option and formal report option. The thesis option requires 30 approved credit hours of course work, which includes a six credit hour formal thesis following the graduate college format. The formal report option requires 32 approved semester credit hours of course work, which includes a two credit hour formal report.

Students applying for the Master of Science program without a background in the appropriate option will be expected to complete course work to bring their preparation to the appropriate level.

—Admission Requirements. All students accepted into the agricultural communications Master of Science degree program will be expected to meet all University and Graduate College requirements and to have earned a degree in agricultural communications or related field from an accredited university. Applicants from outside agricultural communications will be required to complete prerequisite courses equivalent to the knowledge and competencies expected in the agricultural communications undergraduate program.

An undergraduate grade-point average of 2.80 overall on a 4.00 scale or 3.00 in the last 30 hours is required. The applicant must complete the Graduate Record Examination, submit a statement of goals for pursuing the master's degree and submit letters of reference from at least three people knowledgeable of the applicant's professional qualifications. These references should include statements relating to (a) the applicant's success in professional settings or commitment to professionals allied with the disciplines in the College of Agricultural Sciences and Natural Resources, (b) the applicant's prior academic record as a reflection of ability to succeed in a Master of Science program, and (c) the applicant's potential for success in research, writing and course work at the Master of Science level. If such references are not available, the applicant should submit references from one or more faculty members familiar with the applicant's academic career. Other references should be from individuals capable of addressing the applicant's ability to successfully complete a Master of Science program.

—Review Process for Admission. The Office of the Associate Dean of Graduate Studies manages all procedures and records pertinent to admission. The admission process is ongoing with admission recommendations rendered by the graduate faculty in agricultural communications and agricultural education. To be eligible for committee review, each applicant must submit an application for admission to the Graduate College, transcripts of all academic records, reference letters, goal statement and GRE scores.

Agricultural Economics

Michael D. Woods, PhD - *Professor and Head*

The Department of Agricultural Economics at Oklahoma State University offers programs of study leading to the BS, MS, MAg and PhD degrees in agricultural economics and the BS degree in agribusiness. Agricultural economics and agribusiness curricula study the economic relationships among individuals, firms and service agencies in agriculture and between the agricultural sector and other sectors of the economy. The department's courses emphasize the economic issues and concepts associated with producing, processing, marketing, and consuming agricultural goods and services and those used in the industry.

Undergraduate programs in agricultural economics and agribusiness combine instruction in technical agricultural sciences with education in the application of economic and business management principles and tools. The agricultural economist or agribusiness person draws upon the physical and social sciences to outline, understand, and solve economic problems created by agriculture's dynamic operating environment. Curricula in the Department of Agricultural Economics emphasize the decision-making and problem-solving skills used in the management of agricultural production and marketing firms.

Study in agricultural economics or agribusiness prepares students to excel in many challenging careers. Many graduates work to improve food production and processing throughout the world. Other graduates work with government policies that affect the food and fiber sector. Others assist rural communities to adjust and thrive in the rapidly changing world. Graduates also help protect and maintain natural resources and the environment for the greatest benefit of society. Many graduates choose career paths that lead them far from the farm.

Agricultural Economics

The agricultural economics BS degree trains students to analyze problems and make decisions using a solid framework of economic and business principles. Study plans may be tailored to a wide variety of career interests. In addition to a base agricultural economics BS degree plan, the agricultural economics student can choose from two degree options: international agricultural marketing and double major with accounting. In addition, the base agricultural economics degree plan offers specializations in quantitative studies, environmental and natural resources, and community and regional analysis. Each of the study plans in agricultural economics equips students for a variety of employment opportunities at competitive salaries in private industry and government agencies.

Agribusiness

Like the agricultural economics degree the agribusiness BS degree trains students to analyze problems and make decisions using a solid

framework of economic and business principles. In addition, the agribusiness degree targets the skills needed for careers in agribusiness firms, including all areas of food and fiber production, processing, and marketing. In addition to the base agribusiness degree plan, students may choose from seven degree options: farm and ranch management, agribusiness management, agribusiness marketing, agribusiness finance, plant and soil science, pre-law, or pre-veterinary business management. Agribusiness students also may develop a minor area of study or a double major by selecting various course electives. Employment opportunities for agribusiness graduates are widely diverse, including jobs with farms, agricultural advisors, processing firms, wholesalers and retailers of food and fiber products, farm input supply firms, banks and other financial services firms, utilities and educational institutions.

Graduate Programs

The department offers graduate work leading to the Master of Science, the Master of Agriculture and the Doctor of Philosophy degrees. Both thesis and non-thesis options are available at the MS level. PhD students complete a teaching practicum in addition to the research thesis as a part of the degree requirements.

The graduate program stresses development of superior professional competence, suited to the demands of the modern business, academic, government and research environments. Advanced courses concentrate on economic analysis applied to problems of production, distribution and consumption of agricultural products. Courses in economic theory, econometrics, mathematical economics and statistics are an integral part of the program. Agricultural policy, natural resource use and rural development and planning are also important topics.

The faculty give direction and individual guidance to student research in marketing, production, management of agricultural enterprises, demand and price analysis, land and water use and development, non-market valuation, rural development and planning, agricultural finance, international trade, farm appraisal, agricultural policy, econometrics, and experimental economics. Students specialize through course electives and research topics. In addition, an advisory committee guides each student in preparing the program of study to ensure that the student's background, graduate course work, and research program together lead to the desired depth and breadth of proficiency.

—Admission Requirements. Prerequisites to advanced training in agricultural economics are (1) the desire to understand and solve the complex and changing economic problems faced by agriculture and rural society, and (2) the desire and ability to learn methods of rigorous logical analysis.

In addition, differential calculus, statistics, and intermediate macro- and microeconomic theory constitute a minimum background for advanced study in agricultural economics. In certain cases, a part of this work can be taken after admission but will not count towards a graduate degree.

Acceptance by an advisor in the department is not required prior to admission to the departmental graduate program.

Agricultural Education

Charles Cox, EdD - *Professor and Interim Head*

The programs of study offered in agricultural education are designed to provide both comprehensive and specialized training to prepare graduates for careers in a wide range of fields of agriculture. In addition to being prepared for licensure as teachers, graduates are professionally prepared for work in cooperative extension and other federal and state programs and services, as well as international education endeavors. Graduates also may find employment as educational directors and consultants with agribusiness firms and organizations. Studies may culminate in the BS, MAg, MS or PhD degrees.

The undergraduate teaching option is designed to qualify the bachelor's degree recipient for the Oklahoma Agricultural Education Teaching License. This license is recognized as meeting requirements for initial employment as a teacher in most states. Graduates look forward to careers ranging from agricultural education teacher and cooperative extension educator to agricultural sales, marketing and production positions. Some students find it advantageous to elect a dual major, thus meeting requirements in both agricultural education and another major within the College of Agricultural Sciences and Natural Resources. The undergraduate agricultural education major is structured to provide educational experiences in general education, agriculture and professional education.

Graduate Programs

Graduate programs in agricultural education are designed to (1) prepare students for entry into or advancement in teaching careers and (2) provide for further development of professional leadership skills for other educational careers in agriculture, agribusiness, government service, extension, or adult education. To meet the needs of both international and domestic students, plans of study are developed for academic excellence specific to students' career goals. The selection and organization of courses are made in consultation with the adviser and the student's advisory committee.

The Master of Agriculture is offered to further knowledge and skills of agriculture and education in preparation for and advancement in teaching, extension administration and other professional areas. The Master of Agriculture program requires 32 approved semester credit hours of course work, including a two-credit-hour creative component, which may involve curriculum, teaching methods, research literature review or some similar area.

The Master of Science develops the theoretical and research foundation for further graduate studies in addition to further knowledge and skills in agriculture and education. It is designed primarily for those students interested in research. Two options are offered in the Master of Science program. The thesis option requires 30 approved credit hours of course work, which includes a six-credit-hour formal thesis following the graduate college format. The formal report option requires 32 approved semester hours of course work, which includes a two-credit hour formal report.

The Doctor of Philosophy program is designed to prepare graduates for careers in professional education, supervision, administration, curriculum development and other areas of professional leadership in agriculture, agricultural extension, career and technology, and agricultural communications. Within the minimum 60 credit hour requirement, 15 credit hours must be completed in agricultural education. In addition, 15 credit hours must be completed in an area of specialization such as agricultural extension, technical agriculture, educational administration, or other similar areas. The additional hours include 15 hours of research design and statistics and 15 hours for the dissertation.

—Admission Requirements. Students seeking admission to the master's degree program must have earned a bachelor's degree in agricultural education, agriculture or education. A student with background deficiencies must compensate for such deficiencies before completing the masters degree. Evidence of academic ability (2.80 GPA or above) in undergraduate course work is required. Three letters of reference and a statement of purpose are also required. Graduate Record Exam (GRE) scores are required for students seeking admission to the Master of Science degree program.

Admission to the doctoral degree program is based upon evidence that the applicant meets the general requirements of the Graduate College, has demonstrated superior achievement, and can successfully complete a doctoral program as evidenced by three letters of recommendation, GRE scores, a minimum of 2.80 undergraduate grade-point average and 3.00 graduate grade-point average, three years of successful professional experience, and a philosophy statement and goals. Alternative criteria may be considered by the graduate committee for those who submit ample supportive evidence of other exemplary qualifications.

Agricultural Leadership

Charles Cox, EdD - *Professor and Interim Head*

With its far-reaching impacts, the agricultural industry needs strong leaders. The ever-increasing intricacies of the agricultural industry make it all the more important to have employees in the industry who understand the technical aspects of agriculture as well as the human aspects. The Agricultural Leadership major provides an opportunity for students to prepare as generalists in agricultural sciences and natural resources while developing a strong understanding of leadership theory and its application. Agricultural Leadership graduates have careers in extension, politics, governmental agencies, non-profits, corporate agriculture, higher education and small business.

The Agricultural Leadership curriculum at Oklahoma State University is guided by five core values: commitment to agriculture, authentic leadership, open minds, critical thinking and professionalism. Agricultural leadership faculty aligns course objectives, learning opportunities and student experiences with the five core values. Beginning students study historical and theoretical foundations in leadership, authentic leadership and transformational leadership before exploring contemporary leadership issues, leadership program facilitation and current scholarship in the discipline. Specific topics within course work include leadership styles, power, decision-making, ethical leadership, motivational theories and team processes.

In addition to leadership course work, the curriculum provides a broad introduction to the agricultural sciences and natural resources and allows students to develop an area of emphasis or pursue a minor in areas such as animal science, soil science or agricultural economics.

—Minor in Leadership Education. The minor is designed to prepare students to serve as leadership educators within the context of their chosen major. Students explore career options in leadership education, develop an understanding of their own leadership style and philosophy, acquire knowledge about leadership theories, explore contemporary issues in leadership, evaluate current leadership research and learn to facilitate leadership in training. Requirements of the minor include 20 hours of leadership course work, including six hours of controlled electives.

Graduate Programs

Students may pursue graduate studies in agricultural leadership through Agricultural Education. Degree options include the Master of Agriculture, the Master of Science and the Doctor of Philosophy. Graduate course work in agricultural leadership includes leadership theory and practice, leadership in agriculture, leadership program facilitation, contemporary issues in leadership and a leadership seminar. More information on graduate studies in agricultural leadership is available under Agricultural Education graduate programs.

Agriculture

Edwin L. Miller, PhD - *Professor and Associate Dean*

Graduate Programs

The Master of Agriculture degree is designed for students interested in graduate professional training with a strongly applied research orientation. The degree is offered in the following specialization areas: agribusiness, agricultural economics, agricultural education, agricultural leadership, animal science, entomology, horticulture, natural resource ecology and management, plant pathology, plant science, and soil science. New to CASNR is the interdisciplinary option, international agriculture.

—Purpose. The purpose of this degree is to provide a program which will give additional specialization in technical fields, as well as increased breadth of training. Students who are interested in working toward the PhD degree should follow the regular Master of Science degree program.

—Character of Program. This program will provide a greater breadth of study than the Master of Science program. Emphasis will be given to practical application of the technical aspects of the discipline as well as discipline interrelationships. The principal focus, however, is on an applied research concept and a broader program than is normally available with the specialized research degree.

—Admission Requirements. A baccalaureate degree in agriculture or a related field is required for admission. The candidate must meet requirements for acceptance into the Graduate College and be recommended by the departmental graduate committee responsible for the program.

—Degree Requirements. The requirements for this degree are the same as those listed in the *Catalog*, "Graduate College" section, under "The Master's Degree."

In addition, each candidate approved for study under this program will be assigned an adviser and advisory committee with whom he or she will develop a plan of study in accordance with guidelines established in the department. A preliminary plan of study must be approved by the Office of the Associate Dean for Academic Programs and must be filed in the Graduate College Office prior to enrollment for the 17th credit hour. Departmental comprehensive final examinations will be required of all Master of Agriculture candidates.

Degree Options

Option A Requirements. A total of 32 approved semester credit hours of work, including an approved report having a credit hour value of not more than two credit hours, is required.

Option B Requirements. A total of 36 approved semester credit hours of work is required and must contain a creative component. No report is required.

Option C Requirements. A total of 36 approved semester credit hours of work, including six hours of credit for a professional internship, is required. The internship includes professional practice and a report.

Animal Science

Ronald Kensinger, PhD - *Professor and Head*

Animal science is concerned with the science, art and business of the production of beef cattle, dairy cattle, horses, poultry, sheep and swine and pets/companion animals. An animal scientist is concerned with the application of the principles of the biological, physical and social sciences to the problems associated with domestic animal production and management.

Animal science is also concerned with the products of food. The food industry is one of the largest and most important industries in the United States. Food scientists are concerned with the processing, safety, quality control and marketing of food.

Undergraduate students may elect to pursue a Bachelor of Science degree in the department by majoring in either Animal Science or Food Science. Internship programs providing three to six months of off-campus work experience are available in all Animal Science options and are part of the curriculum for Food Science. Participation in undergraduate clubs (Block and Bridle, Dairy Science, Horsemen's Association, Food Science, Meat Science, Oklahoma Collegiate Cattlewomen) or judging teams (livestock, meats, horses, or dairy cattle) improves social, communication and leadership skills. Participation in judging teams and academic quadrathlon programs, including honors programs, provides excellent training opportunities.

Animal Science

Undergraduate students may elect study emphasis programs in the areas of animal biotechnology, business, international, livestock merchandising, pre-veterinary animal science, production, and ranch operations, or a double major with agricultural communications or with

agricultural education. In addition, students have the opportunity to concentrate their studies on one or more animal species.

Students interested in veterinary medicine may complete the pre-veterinary medicine requirements at the same time they are working toward a BS degree in animal science. In addition, pre-vet students gain valuable insight into the care and management of animals throughout the animal science curriculum.

Undergraduate students follow a similar curriculum during the first two years which includes basic courses in the physical, biological and social sciences, and a series of introductory courses in agriculture and business. Upper-class students take a basic core of advanced animal science courses, including genetics, physiology, and nutrition. As seniors, students complete a series of advanced animal science courses which are designed to apply knowledge obtained in previous courses to livestock systems. Every opportunity is taken in teaching to utilize the excellent herds and flocks owned or operated by the department.

Students completing a degree with a major in animal science have a wide choice of challenging careers, including ownership or management of farms, ranches, feedlots; employment with state and federal agencies concerned with inspection, grading or regulation; banking and financial activities, sales and service positions with companies involved with feeds, pharmaceuticals or other animal products; biotechnology; opportunities in agricultural extension or teaching; and work in the processing, distributing and merchandising of dairy, poultry and meat products.

Food Science

Food Science is an applied field. A Food Scientist is someone who applies the basic sciences: biology, physics, chemistry, and mathematics to further our understanding of the factors that affect food quality, safety, nutrition. Food science is applied to the selection, preservation, processing, packaging, distribution, and use of safe, nutritious, and wholesome foods.

There are two study emphasis programs in the Food Science major: Science and Industry.

The Science emphasis gives students a well-grounded background in chemistry, physics, mathematics and biology as well as food science. Students who elect this option usually have a primary interest in science and will be prepared to enter graduate education programs in food science.

This Science emphasis is also an excellent choice for students interested in professional schools such as Medical School, Dental School, Pharmacy, Physical Therapy and Veterinary Medicine. Students who elect not to pursue a graduate degree or a professional degree are prepared to work in any facet of the food industry, especially those jobs focused on research, product development and food analysis.

The Industry emphasis provides a basic understanding of the chemical and physical processes of food processing. Students pursuing this option are prepared to enter food plant management, quality assurance, quality control, product development and sales.

Graduate Programs

The Department of Animal Science offers graduate work leading to the Master of Science degree in animal science or food science. Research work at the MS level is available in the areas of animal breeding (genetics), animal nutrition, animal physiology or food science (meat or milk products). A Master of Agriculture degree in the emphasis area of animal science is also available. The department offers programs leading to the Doctor of Philosophy degree in animal breeding and reproduction, animal nutrition, and food science.

—Prerequisites. Admission to the graduate program requires an undergraduate major in animal science, dairy science or poultry science, or in closely-related biological sciences or biochemistry. In addition, students with a major in dairy manufacturing, microbiology, human nutrition, food science, or food technology can qualify for the program in food science. A student enrolling in a degree program must have been accepted by an adviser prior to official admission. In all cases, the student's graduate adviser or committee may recognize specific undergraduate deficiencies and require measures to attain proficiency.

Biochemistry and Molecular Biology

Gary A. Thompson, PhD - *Professor and Head*

Biochemistry, the central scientific discipline linking the chemical, physical and biological sciences, exerts a profound influence on the progress of medicine and agriculture. By applying concepts and methods of chemistry and physics to the fundamental problems of biology, biochemists have made great progress in their effort to understand the chemistry of living organisms. Major discoveries concerning the biochemistry of genetic material provide the tools of molecular biology that are essential to contemporary life sciences research.

Biochemists and molecular biologists are concerned with living things. They must acquire some knowledge of the biological sciences. Since a biochemist's tools are the physical sciences, he or she must receive sound education in mathematics, physics and chemistry.

Challenging positions for well-trained biochemists and molecular biologists are available in colleges and universities, state and federal laboratories, research institutes, medical centers and in an increasing number of industrial organizations, particularly the pharmaceutical and food industries. Biochemists are involved with research on the chemistry of processes occurring in plants, animals, and various microorganisms, and with the discovery and development of antibiotics, vitamins, hormones, enzymes, insecticides and molecular genetics techniques.

At the undergraduate level a major in biochemistry and molecular biology administered by the Department of Biochemistry and Molecular Biology is available through the College of Agricultural Sciences and Natural Resources. The department also offers a BS degree in biochemistry through the College of Arts and Sciences. An honors program is available. The curriculum provides a broad background in chemistry and biological science and permits flexibility in meeting particular interests of the student. Courses in biochemistry are based on general, organic and analytical chemistry. The biochemistry and molecular biology curriculum provides students with sufficient background in the basic sciences of mathematics, physics, chemistry and biology to meet the needs for graduate study in most fields of modern science related to either agriculture or medicine and other allied health programs. The curriculum is excellent for pre-professional students. The department's research activities provide opportunities for part-time employment of undergraduate majors to improve their professional competence.

Graduate Programs

Because many of the opportunities in biochemistry require advanced course work, a major part of the program in the Department of Biochemistry and Molecular Biology is concerned with its graduate program leading to the MS or PhD degree. This graduate program is an integral part of extensive basic research activities in the Oklahoma Agricultural Experiment Station.

—Prerequisites. Although the BS in chemistry or biochemistry is preferred, students with strong backgrounds in other biological or physical science disciplines are eligible. Individuals not having at least eight semester credit hours each of organic chemistry and calculus plus four credit hours each of analytical and physical chemistry must take appropriate undergraduate courses to make up deficiencies. The results of the three general GRE exams (verbal, quantitative, analytical) are required for entrance. An advanced GRE subject matter exam (biochemistry, chemistry or biology) is also recommended. A GRE score of 500 verbal, 650 quantitative and 4.0 analytical is normally required.

—Degree Requirements. A more detailed description of the graduate study program in biochemistry is available from the department upon

request. The requirements listed below complement the general graduate requirements described in the "Graduate College" section of the *Catalog*. After the first semester, continuous attendance and participation in the departmental seminar is expected.

—The Master of Science Degree. Twenty-four credit hours of formal graduate courses are required, including BIOC 5753, 5824, 5853, and 5930. In addition, a student must present an acceptable research thesis (six hours) and pass a final oral examination covering it and related material. Research advisers are selected at the end of the first semester.

A non-thesis Master of Science degree is also available. It does not require a research thesis, but requires a report and extensive technical training in the laboratory. The non-thesis MS is not recommended for students wishing to pursue a PhD later.

—The Doctor of Philosophy Degree. The course requirements are determined with the aid of the student's graduate advisory committee. Usually they follow these guidelines: total of 30-40 credit hours of formal graduate course work which includes all the courses listed for the MS degree, at least four of the advanced graduate courses in biochemistry (6000 level) and two offerings of Special Topics (6820). Additional course requirements, appropriate to the student's interests, are determined by the advisory committee. The advisory committee is selected at the end of the second semester. Each student will take a series of cumulative examinations beginning in January of his or her first year. A more comprehensive qualifying examination is also given, usually during the fourth semester of graduate study.

One year of a foreign language at the college level is required. The student must present, and defend in a final oral examination, an acceptable research thesis which contains a substantial original contribution to the field of biochemistry. The department offers research experience in a variety of areas of biochemistry.

Biosystems and Agricultural Engineering

Ronald L. Elliott, PhD, PE - *Professor and Head*

The Department of Biosystems and Agricultural Engineering is administered jointly by the College of Agricultural Sciences and Natural Resources and the College of Engineering, Architecture and Technology.

Biosystems engineers are professionals who create and adapt engineering knowledge and technologies for the efficient and effective production, processing, storage, handling and distribution of food, feed, fiber and other biological products, while at the same time providing for a quality environment and preserving and protecting natural resources. Biosystems engineers directly address problems and opportunities related to food, water, energy, and the environment - all of which are critical to the quality of life in our society. Subject-matter specialization is provided through the following four undergraduate option areas: biomechanical, bioprocessing and biotechnology, environment and natural resources, and food processing.

Biosystems engineering courses integrate engineering sciences, physical sciences, and biological sciences, and teach students to address real-world challenges. With the guidance of experienced faculty, students work both as individuals and in teams to design creative solutions to complex problems.

The undergraduate biosystems engineering degree program provides the comprehensive education necessary to prepare students for successful, productive and rewarding careers in engineering for agricultural, food and biological systems. Graduates of the program will be:

- able to apply mathematical, physical, engineering, and biological principles needed to understand, analyze and solve problems in food, agricultural, environmental and/or biological systems.
- effective in oral, written and visual communication.
- effective in accomplishing tasks, both as an individual, and as a contributor to multi-disciplinary teams.
- able to understand the social, environmental, safety and economic impacts of their work in local and global contexts, and to perform in a professional and ethical manner.
- committed to enhancing knowledge and skills through continuing education.

The undergraduate educational program is divided into two components—pre-professional and professional. In the pre-professional portion of the biosystems engineering program (usually equivalent to two years of study) the focus is on the underlying biological, physical, chemical and mathematical principles of engineering, supplemented by appropriate general education courses in English, social sciences and humanities. Students who demonstrate proficiency in this portion of the program are eligible for admission to the professional school in biosystems engineering.

The professional school of biosystems engineering curriculum (typically two years) builds systematically upon the scientific knowledge acquired in the preprofessional curriculum. In professional school, students have the opportunity to focus on the option areas given above. The degree is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology under agricultural engineering and similarly named programs.

Each professional school course builds upon preceding engineering courses to develop in the student the ability to identify and solve meaningful engineering problems. The course work is specifically sequenced and interrelated to provide design experience at each level, leading to progressively more complex, open-ended problems. The course work incorporates the social and economic aspects of technical problems, and stresses the responsibilities as engineering professionals to behave ethically and promote occupational and public safety. The program culminates in senior year design courses in which students integrate the analysis, synthesis and other abilities they have developed throughout the earlier portions of their study into a capstone experience. At this point, they are able to design components, systems and processes that meet specific requirements, including such pertinent societal considerations as ethics, safety, environmental impact and aesthetics. The students have also developed and displayed the ability to conduct experiments essential to specific studies and to analyze the experimental results and draw meaningful conclusions.

An integral part of this education continuum from basic science through comprehensive engineering design are learning experiences that facilitate the students' abilities to function effectively in both individual and team environments. Moreover, the program provides every graduate with adequate learning experiences to develop effective written and oral communication skills. State-of-the-art computational tools are introduced and used as a part of their problem-solving experiences. Finally, the students' experience in solving ever-more-challenging problems enables them to continue to learn independently throughout their professional careers.

A wide variety of employment opportunities are available for biosystems engineers in industry, public service and education. Some of these opportunities include positions in governmental agencies, consulting engineering firms, and agricultural and food equipment industries. Biosystems engineers are employed throughout the U.S. as well as internationally.

Students interested in a degree in biosystems engineering may initially enroll in the College of Agricultural Sciences and Natural Resources or the College of Engineering, Architecture and Technology. Students who enroll in the College of Agricultural Sciences and Natural Resources should request a biosystems engineering adviser and transfer to the College of Engineering, Architecture and Technology by the end of their first semester.

Graduate Programs

The Department of Biosystems and Agricultural Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees in Biosystems Engineering. These degrees emphasize research and development.

Excellent laboratory and computer facilities are available for students to explore research and design in such areas as bioprocessing and food engineering, machine vision, sensor and control technology, waste management and utilization, hydrology, water quality, porous media flow, and intelligent systems for agricultural production.

Research projects are supported by the Agricultural Experiment Station and by state, federal and private grants and contracts. A well-trained faculty, many of them registered professional engineers with research, consulting and design experience, guide the graduate students' activities and plan programs to meet students' needs. Graduate students design experiments and special equipment to conduct their work. They are expected to demonstrate, by supporting research or by designs, the ability to identify a problem, define alternatives, propose a solution, organize a design or an experimental investigation, carry it to completion and report the results.

—Admission Requirements. Admission to either the Master of Science or Doctor of Philosophy degree program requires graduation from an engineering curriculum accredited by the Accreditation Board for Engineering and Technology. Students without accredited degrees may be admitted provisionally and may be required to take additional courses. A student must be accepted by an adviser in the department prior to official admission to the graduate program.

—Degree Requirements. A candidate of either of the graduate degrees listed above follows an approved plan of study which must satisfy at least the minimum University requirements for that particular degree.

Entomology and Plant Pathology

Phillip G. Mulder, Jr., PhD - *Professor and Interim Head*
Carmen Greenwood, PhD - *Undergraduate Coordinator*
Nathan Walker, PhD - *Graduate Coordinator*

The mission for the Department of Entomology and Plant Pathology is to discover, develop and disseminate science based knowledge concerning arthropods and plant pathogens. Entomology is the science and study of insects and related arthropods. Plant Pathology is the science and study of bacteria, viruses, fungi and nematodes that cause diseases in plants. A strong academic background in the physical and biological sciences is essential for success in both disciplines. Research and education programs range from basic studies of cellular, physiological and genetic aspects to broad ecological and population studies and focus on the development of practical pest management strategies.

The undergraduate program in entomology leads to the BS in Entomology and offers students opportunities to explore the diversity of nature through the study of arthropods and their interactions with plants, animals and human culture. Specialized course work in entomology includes insect identification, biology, ecology, physiology, biochemistry, population dynamics, medical and veterinary entomology and insect pest management.

Plant pathology as a discipline encompasses the science required to understand the causes of plant diseases as well as prevention and controlling diseases. Undergraduate level courses are available in Plant Pathology and are valuable additions to programs in entomology, horticulture, agronomy, ecology and botany. Specialized course work in plant pathology includes pathogen identification, genetics, host-parasite physiology, biotechnology, molecular genetics and disease management.

There are many, and diverse, career opportunities for graduates of these programs, including positions involved with pest management in crops and livestock production, stored products such as grains and processed foods and protecting structural systems such as houses from termites and agricultural biotechnology. Undergraduates of the entomology program are prepared to enter graduate programs in several disciplines, including entomology and have been successful in medical and veterinary programs. Others gain employment with private industry, research laboratories or county, state or federal agencies. Some develop their own businesses as consultants and/or entrepreneurs.

Graduate Programs

The Department of Entomology and Plant Pathology offers programs of study that lead to the MS of Entomology and Plant Pathology, the PhD in Entomology or the PhD in Plant Pathology. These programs offer students opportunities to specialize in a wide range of basic or applied research fields. To qualify for graduate study in entomology and/or plant pathology an applicant should obtain a solid background in the basic sciences, especially biology, chemistry, mathematics, English and communications skills. All requirements of the Graduate College must be satisfied for entry to the graduate programs. In addition, applicants for graduate programs should take the Graduate Record Examination and submit their scores. Students applying to the graduate program must be accepted into a research program by a major professor. The applicant must secure appropriate financial support in the form of a scholarship, fellowship or graduate assistantship to be negotiated with the major professor and department and be approved by the departmental screening committee and department head before being admitted to the Graduate College. Each graduate student is under the direction of the major professor as adviser and a selected faculty advisory committee. The program of study will be adapted to the individual's needs within the departmental and Graduate College guidelines. Graduate students are required to meet with their advisory committees every six months for program reports and examinations. Each student will follow a program of study and research approved by the student's committee and, except for the Master of Agriculture degree, must submit an approved thesis or dissertation and present a public defense. Students supported as half-time research assistants are expected to be active participants in the research projects of their major professors. Additional information regarding the graduate programs in Entomology and Plant Pathology may be obtained from the Department's Web site at: www.ento.okstate.edu.

Environmental Sciences

Jeffory A. Hattey, PhD - *Professor and Director*

The College of Agricultural Sciences and Natural Resources offers an undergraduate major in environmental sciences. This program is an interdisciplinary study of the biological, physical, quantitative, and social sciences, with application to environmental concerns. Applications are designed to improve the current and future welfare of the human race through establishments of environmental policies based on scientific principles in accordance with the true benefits and costs as evaluated by an informed society.

As an interdisciplinary and science-oriented major, the student takes basic courses in biology, chemistry, math, physics, statistics, and several social sciences. The student may choose one of three areas of emphasis (options): environmental policy, natural resources, or water resources. Depending on the option, upper-division course work will involve problem-solving work in water and soil quality, economic and social policy, political science, resource management and engineering. The student will also be exposed in general education subjects, including communications, philosophy, ethics and sociology.

A primary goal is to enable graduates to solve environmental problems based on scientific principles and in accordance with society's needs. Through successful completion of this major the student earns the Bachelor of Science in Agricultural Sciences and Natural Resources.

The environmental sciences undergraduate major is directly supported by faculty from the departments of Agricultural Economics, Biosystems and Agricultural Engineering, Entomology and Plant Pathology,

Horticulture and Landscape Architecture, Natural Resource Ecology and Management, and Plant and Soil Sciences. The major and its students also benefit from working in and out of the classroom or laboratory with faculty who are conducting cutting-edge research related to environmental problems through the Freshman Research Scholars Program.

Graduates work in such areas as land-use planning, environmental management, natural resources management, waste disposal, water and soil quality, environmental remediation and policy analysis. Industries associated with the extraction, utilization and manipulation of natural resources have increased the number of employees with environmental training to address regulation compliance, litigation, monitoring, public relations and management practices.

Graduates may also work with federal, state and local government agencies involved in regulation, resource management and policy development. Graduates, particularly those who have gone on to earn advanced degrees, find employment with consulting firms that are involved with solving environmental problems. Many graduates go on to graduate school or pursue a degree from a professional school, such as law or medicine.

Horticulture and Landscape Architecture

Dale M. Maronek, PhD - *Professor and Head*

Horticulture is the science and art associated with the culture, production, preservation and processing of flowers, trees, shrubs, turfgrass, vegetables, fruits and nuts. It also includes the proper environmental use and maintenance of plants in the landscape. Thus, horticulture is involved with the production and processing of a significant part of the nation's food supply, it involves production and landscape environmental and sustainability applications, and provides a major source of the beauty in and around homes, cities, parks, highways, golf courses and other public areas.

Today, horticulture requires highly trained and capable people to help meet the food demands of society and to be involved in activities that lead to a better quality of life. The horticulture student must have a good understanding of plant biology and commercial production/maintenance, environmental and business practices.

Educational opportunities for study in horticulture cover a wide variety of plants and subjects and range from the cellular to the whole plant level. Factors such as nutrition, irrigation, genetics, propagation, control of flowering, and fruit and seed production are considered in their relationship to culture, production, conservation of resources, harvesting, processing and storage. Students can prepare themselves for careers in public grounds administration (arboreta, parks and zoos), golf course management, horticulture business, sales and marketing, production, teaching, extension and research.

The training that the student obtains is related to the specific area of emphasis that is chosen. Regardless of one's interest, objectives, or area of emphasis, a good knowledge and understanding of horticulture is a necessity. A student can receive a BS degree and choose from the following four options:

Horticulture Science emphasis is on preparing students for science-based careers, including laboratory science or graduate study. This option provides the training and expertise for production maintenance and preservation of fruits, nuts, vegetables, nursery crops, flower crops, etc. Training can be general or be chosen to emphasize a particular commodity area of horticulture. Students learn plant care techniques and the role plants and landscape applications play in sustaining the environment.

Horticulture Business option features opportunity to combine horticulture with principles of running a business. A built-in requirement for a formal academic minor in a business area is a feature of this option.

Turf management provides the training for turfgrass production and for management of turfgrass in golf courses, parks, athletic fields, home landscapes, and along highways.

Public horticulture emphasizes the administration, leadership, and management of public gardens and their diverse operations. This four-year program is one of a very few in the United States and is appropriate for individuals interested in careers in arboreta, botanic gardens, zoos, horticultural societies, park systems, museums, habitat creation and restoration (especially disturbed areas and/or wetlands) civic garden centers, and other public sector institutions. Students complete a well-rounded selection of horticulture courses and courses in business management, design, leadership, education and botany. The option can also lead to graduate study. Students have the opportunity to be involved in the OSU Botanical Garden and the department's television show, *Oklahoma Gardening.*

After the BS degree is completed, a qualified student may choose to pursue a graduate degree, specializing in any option. Students from other departments may also choose to pursue a formal academic minor in horticulture.

Landscape architecture as a field deals with the planning and design or arrangement of natural and artificial elements on the land through preservation of existing natural and synthetic resources, and through application of cultural and scientific knowledge.

Landscape architecture is the study of design of outdoor spaces, with supporting courses in art, construction, ecology, horticulture, environmental sciences and social science in a five-year professional program leading to the Bachelor of Landscape Architecture (BLA) degree. The BLA degree is accredited by the American Society of Landscape Architects. Typical employers include landscape architecture firms, architectural engineering firms and government agencies dealing with land planning, environmental applications, urban planning, parks and recreation.

In an effort to maintain an effective balance between students, faculty, and facilities, enrollment in the fourth and fifth years of the program is limited to 15 students each. Students will be evaluated during their third year by the faculty in order to select the most qualified candidates based upon academic achievement and professional potential. Minimum requirements may vary each year; however, a student must have completed a minimum of 60 credit hours.

Landscape contracting is a program that emphasizes the construction and management phases of landscape development. It is a four-year program leading to an accredited BS degree. The degree is accredited by the Professional Landcare Network. Course work includes basic landscape architectural design, construction technology, business and horticulture. Students may emphasize either landscape construction or landscape management. Graduates are employed by landscape contracting companies, design-build firms, landscape maintenance companies and landscape nurseries.

Graduate Programs

The department offers programs of study leading to the degrees of Master of Science in horticulture (with areas of specialization in horticultural sciences, landscape architecture, phytochemistry and turfgrass science), Master of Agriculture with specialization in horticulture, and to the PhD degree in crop science, environmental science, food science, and plant science, each with a specialization in horticulture. Areas of study include floriculture crops, fruit and nut crops, vegetables, ornamental nursery crops, and turf. In addition to commodity-oriented specialities, students may emphasize food processing, environmental applications, plant extraction applications, postharvest physiology, or stress physiology disciplines. Applicants should indicate their interest area(s). Research opportunities range from whole plant production/management studies to fundamental cellular studies. Additional information on programs, application procedures, and financial assistance is available via the Internet at: www.hortla.okstate.edu/hortla/graduateprogram.htm.

—Prerequisites. Admission requires a bachelor's degree in horticulture or a related field with at least a 3.00 ("B") grade-point average. Students with course work deficiencies in fundamental areas may be required to take remedial courses to attain proficiency in accordance with the advisory committee's guidance. In addition to Graduate College requirements, applicants must submit official GRE scores, a statement of research and career interests, and three letters of reference.

Admission to the program requires approval by the graduate committee, a departmental adviser on the Graduate Faculty, the department head, and Graduate College. The program of study and research will be directed by the student's graduate adviser and advisory committee.

Natural Resource Ecology and Management

M. Keith Owens, PhD - *Professor and Head*

Faculty in the Department of Natural Resource Ecology and Management (NREM) have expertise in conducting interdisciplinary instruction, research, and extension education which focus on the natural resources of fisheries, forests, rangeland, and wildlife within and beyond the boundaries of Oklahoma. Increased public understanding of the ecology and management of these natural resources which are important in agriculture, hunting and fishing, ecotourism, forest production and use, as well as the conservation of wildlife habitat is an important goal of the faculty in NREM.

The NREM faculty support undergraduate and graduate programs in fire ecology, fisheries, forestry, rangeland, and wildlife. The NREM curriculum prepares students to plan, implement, and research the management, protection, and sustainable use of natural resources within Oklahoma and throughout the world. The department provides an integrated education in renewable natural resource management, conservation, and utilization, as well as a valuable perspective for understanding and solving critical contemporary environmental problems at local, regional, and global scales.

NREM Degree Options

The *Fire Ecology and Management* option was developed in response to the need for understanding the ecological role and management of wildland fire in natural ecosystems, and the importance and implementation of prescribed fire in land management. This option offers students the opportunity to accomplish specific land management objectives through the proper use of prescribed fire. The curriculum combines experience with prescribed fire plans, policy and law, weather, equipment, conducting prescribed burns, and post-burn management. In addition, students will be assisted in completing federal fire training requirements.

Fisheries and Aquatic Ecology is an option designed for students with interest in the management of fish populations and habitats. Courses offer research techniques and methodology in fisheries science, including sampling design, habitat measurements, sampling techniques and abundance estimation, age and growth analysis, recreational surveys, data analysis and report writing.

Forest Management emphasizes the biological, political, and managerial skills needed to ensure the sustainability of the many renewable forest resources on which society depends. Successful completion of the curriculum will provide competency in the general areas of basic science, forest biology, forest mensuration, forest economics, natural resource policy, decision-making and problem solving, and communications.

The *Urban and Community Forestry* option produces graduates who are able to assess ecological and biological characteristics of the forest in an urban environment, the managerial and political context within which forest management takes place, as well as direct involvement in resource management or in specialized supporting roles in areas such as urban planning and environmental education.

Forest Conservation Resource emphasizes the science-based conservation and management of forest lands, ecosystems and related natural resources. Students gain the skills that are necessary for the measurement, assessment, and valuation of natural resources and the evaluation of management strategies for forest and related wildlands.

The *Forest Management and Forest Conservation Resource* options are accredited by the Society of American Foresters (SAF). SAF is recognized as the specialized accrediting body for forestry programs in the U.S. Requirements for these options include the successful completion of two, three-week summer camps, which are scheduled to follow the sophomore and junior years, and are held annually in diverse forest settings. Past summer camps have been held across the U.S. Field forestry skills, forest ecology, and state-of-the-art operations are emphasized at camp.

The *Rangeland Ecology and Management* program emphasizes understanding management of grasslands, shrublands, and forests for forage and habitat production. This includes the effects of grazing, fire, and other disturbances on biotic and abiotic processes. Students learn to integrate their knowledge of soil, water and vegetation attributes into management of public or private wildlands for multiple uses.

The *Wildlife Ecology and Management* option provides insight into the biological basis for management of wildlife populations and habitats, with emphasis on current management problems. This option combines research techniques, including aging and sexing, wildlife and vegetation sampling, and wildlife population and habitat analysis with the methodology of wildlife science.

The *Natural Resource Communications* option allows students to gain knowledge and expertise in the various natural resource disciplines represented in the department combined with the skills necessary to compete in the world of communication. Students are allowed to choose from a variety of courses in forestry, fisheries, fire ecology, rangeland ecology and management, and wildlife while at the same time taking courses in journalism and broadcasting.

Courses in these programs fulfill the requirements for many other applied and professional careers in the natural resource disciplines, including preparation for graduate programs and certification with the Society of American Foresters, The Wildlife Society and The American Fisheries Society. Graduates may be employed by governmental agencies, non-profit organizations, private agencies or individuals. Federal agencies hiring NREM graduates include U.S. Department of Agriculture, U.S. Forest Service, U.S. Bureau of Land Management, U.S. Geological Survey, U.S. Fish and Wildlife Service, Agricultural Research Service, Bureau of Indian Affairs, National Park Service, Animal and Plant Health Inspection Service, and the Natural Resources Conservation Service. In addition, state, county, and municipal governments employ NREM graduates in a variety of resource management consultant, restoration, service, and technical positions.

Students entering the NREM department are encouraged to join and become active members of one of the many student organizations: Society of American Foresters, Society for Range Management, The Wildlife Society, and the Society of American Fisheries. Participation in one or more of these organizations provides students the opportunity to attend state, regional, or national meetings where they will gain valuable advantages through networking, student competitions, and interacting with various career-related activities.

Graduate Programs

The Department offers the MS and PhD degrees in Natural Resource Ecology and Management with specializations in Fisheries and Aquatic Ecology, Forest Resources, Rangeland Ecology and Management, and Wildlife Ecology and Management. In addition, students may work toward the MS and PhD degrees in the Environmental Science Graduate Program and the PhD degree in the Plant Science Graduate Program with faculty members from the Department.

The overall goals of the Department are to provide high quality advanced training and instruction in the application of the scientific method to

problems in natural resource ecology and management. This includes problem analysis and identification, research methods, synthesis of results and communication of findings. The Department strives to develop the capability for original and creative work under the guidance of established professionals and scientists. Graduate instruction is a critical component of the research, instruction and extension missions of the Department.

Students work directly with a member of the faculty to design a program of study to serve individual career goals. The prerequisite for graduate study in the Department is a bachelor's degree in an area aligned with the student's research interests with a minimum overall GPA of 3.00. Please refer to the Web site http://nrem.okstate.edu for a full description of the application process. A student must be accepted by a member of the Department's faculty prior to official admission to the program.

Plant and Soil Sciences

David R. Porter, PhD - *Professor and Head*

The mission for the Department of Plant and Soil Sciences is to discover, develop, and disseminate knowledge that advances the management, sustainability, and restoration of plant and soil ecosystems. The goal of the department is to meet societal needs for food, fiber, energy, and intrinsic value related to the conservation and management of plant and soil resources. Teaching, research and extension efforts are designed to assist decision makers in matters regarding land management.

Many landscapes have been fragmented by past management decisions in an effort to improve production efficiency. The resulting landscape fragmentation has created zones of intensive crop production, managed grazing areas and zones of extensive management or undisturbed sites all managed by the same decision maker. This presents the unique challenge of balancing the societal desire for a safe, secure food supply with the desire to maintain renewable natural resources that support native species.

Undergraduate students select an option of study from: agribusiness, bioenergy production, forage and livestock production, plant biotechnology, plant science, soil geotechnology or soil and water resources. Targeted topics a student may choose to purse include: crop production, precision agriculture, plant genetics, soil conservation, soil chemistry, soil fertility, weed science, or waste management. Options of study provide flexibility for students to work with their academic advisers to develop a plan of study to suit their interests. Upon completion of their education, students are encouraged to pursue professional certification available in their respective areas of expertise.

The knowledge base regarding land management continues to grow as the department's nationally recognized research faculty, discovers new information. Emerging issues in plant breeding and genetics, biotechnology, plant physiology, crop production, applied landscape ecology, weed science, weed ecology, soil nutrient management, soil chemistry, soil physics, invasive species management, and land restoration assist decision makers in finding solutions that sustain natural resources and are economically viable. Many undergraduate students work with the research faculty on projects providing the student an opportunity to assist in gathering new information.

Upon completion of a Bachelor of Science program, students are employed by private firms, public institutions, state and federal agencies, or non-profit organizations that require personnel with expertise in plant and soil systems. Typical careers include: federal employment in soil and rangeland conservation; crop consulting; technical sales and service for seed, fertilizer or agricultural chemical supply companies; farm or ranch operation; research positions as plant and soil scientists with federal agencies, state experiment stations or private industries; teaching and extension positions with colleges and universities; and a broad range of employment or ownership in retail businesses supplying feed, seed, grain, fertilizers, equipment, agricultural chemicals and other agricultural supplies and services. Demand for individuals with experience in management of landscapes will continue as long as society demands a safe, secure food supply balanced with a desire to conserve natural resources.

Graduate Programs

Programs of course work and research are offered leading to the Master of Agriculture in the emphasis area of plant and soil sciences and the Master of Science degree in plant and soil sciences. The Doctor of Philosophy degree can be attained in crop science, environmental science, plant science, and soil science. Specific programs are available in the areas of plant breeding and molecular biology, biotechnology, cytogenetics, forage management, weed science, crop physiology, soil morphology and genesis, soil microbiology, soil fertility and plant nutrition, soil physics, soil-water management, soil chemistry, and waste management. Applicants should indicate their specific area of interest upon application.

The graduate programs in plant and soil sciences prepare individuals for successful careers in a variety of areas, including farming and ranching, extension education, agricultural business, research, teaching, environmental sciences, waste management, and all aspects of crop production.

—Prerequisites. Admission to the graduate program requires a BS degree in plant and soil sciences, agronomy or a closely related field. Applicants should have completed basic courses in plant and soil sciences, agronomy, biology, chemistry and mathematics required of undergraduate majors. Deficiencies in fundamental course requirements will be met by the student with the direction of the student's advisory committee. Applicants must be accepted by an adviser in an appropriate discipline prior to official admission.

—Degree Requirements. Students must follow approved plans of study that meet the minimum University and program requirements for the respective degrees they are pursuing.

The Master of Science degree in plant and soil sciences may be earned by using the thesis option. This plan requires a minimum of 30 credit hours of course work, including six credit hours of PLNT, or SOIL 5000, master's thesis.

The Master of Agriculture degree may be earned by utilizing one of three options:

Option A—Formal report (non-thesis), minimum of 32 credit hours of course work, including two credit hours of PLNT or SOIL 5000, master's thesis.

Option B—Minimum of 36 credit hours of course work and a creative component.

Option C—Minimum of 36 credit hours of course work including six hours of credit (PLNT or SOIL 5230, Research) for a professional internship. The internship will consist of professional practice and an informal report. Internships for students with previously established vocations and career experience must be in areas other than the specific vocational field of the students.

The degree plans of study for the Doctor of Philosophy degree in crop science, environmental science, plant science, and soil science are developed individually for each candidate. Doctoral programs in crop science and soil science require 60 credit hours beyond the MS degree, including a minimum of 15 credit hours of PLNT or SOIL 6000 (Dissertation). All students must meet certain requirements in basic disciplines such as statistics, mathematics, botany, and chemistry. Study of a foreign language is not required, but can be incorporated if the student and advisory committee feel that it is desirable. Degree plans for doctoral students in plant science that include molecular, organismal, or ecological programs of study, and in environmental sciences, that include a broad spectrum of soil, water, and waste management issues, are developed for candidates in conjunction with advisory committee approval.

College of Arts and Sciences

Peter M.A. Sherwood, PhD, ScD - *Dean*
Bruce C. Crauder, PhD - *Associate Dean for Instruction and Personnel*
Thomas A. Wikle, PhD - *Associate Dean for Academic Programs*
Ronald A. Van DenBussche, PhD - *Associate Dean for Research*
Amy Martindale, EdD - *Student Academic Services Director*
Jason Caniglia - *Director of Development*
H. Walter Shaw, MA, MBA - *Outreach Director*
Renee G. Tefertiller - *Fiscal Affairs Director*

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The College of Arts and Sciences not only offers a wide variety of programs in teaching, research and outreach, but also supports and reinforces all the other programs of the University. Apart from strong programs in the natural and social sciences and in the liberal and fine arts, the College provides a number of more specialized and interdisciplinary strengths and a variety of professional and pre-professional training. The College's 22 departments and two schools offer 65 degree programs and options at the bachelor's level, and in conjunction with the Graduate College, 25 master's and 15 doctoral degrees.

The Department of Economics and Legal Studies in Business in the William S. Spears School of Business offers BA and BS degrees through the College of Arts and Sciences. The Department of Biochemistry and Molecular Biology in the College of Agricultural Sciences and Natural Resources also offers the BS through the College of Arts and Sciences.

The College of Arts and Sciences provides academic preparation for a wide variety of professions and graduate programs including: law, medicine, nursing, optometry, veterinary medicine, graphic arts, teaching, writing, Foreign Service, urban and regional planning, journalism, public service, radio/TV, advertising, public relations, medical technology, military science, public affairs, corrections, social services, and fine and performing arts.

Accreditation

Refer to departmental listings that follow for information on accreditation of specific programs.

High School Preparation

In addition to the curricular requirements for admission specified by the Oklahoma State Regents for Higher Education, The College of Arts and Sciences *strongly recommends* that high school students have a fourth year of mathematics; a third year of laboratory science; at least two years of a single foreign language; one year of arts such as music, theatre, or studio art, and computer literacy.

Scholarships

A number of undergraduate scholarships are available through the College and through the departments and schools within the College. Interested students should inquire in the Office of Student Academic Services or access the OSU Internet site for a list of available scholarships. Arts and Sciences students are also encouraged to apply for the variety of scholarships available through the University's Office of Scholarships and Financial Aid.

Student Success Center

The Arts and Sciences Student Success Center is comprised of four units listed below. University-wide coordination of pre-professional advising is provided through the Center, so regardless of major, pre-law students may consult with an adviser in Student Academic Services, and pre-health students may consult with an adviser in the Life Sciences and Pre-Health Advising.

—Student Academic Services. The academic advising process in Arts and Sciences is coordinated by Student Academic Services. The advising staff in Student Academic Services advises freshmen and undecided students. Departmental advisers provide advising for students who have declared their majors. The general education program in the College of Arts and Sciences allows undecided freshmen to make progress toward most degrees for up to three semesters, while exploring possible fields of study with an academic adviser. The responsibility for satisfying all requirements for a degree and for ensuring that a degree plan has been submitted rests with the student. Advisers assist students in curriculum planning, and students are encouraged to consult fully with their advisers.

The Student Academic Services staff represents the College in the University's recruiting activities and represents the dean in such matters as petitions for excessive hours, change of major or college, and student withdrawals. Services also include graduation certification, information about college programs and requirements, and referral of A&S students to campus support services.

—Career Services. The primary goal of A&S Career Services is to promote academic excellence to enhance career planning and lifelong success. Services offered include career counseling, job and internship search strategies, and assistance with preparation of resumes and cover letters. Presentations on a wide-range of career-related topics are offered to classes and clubs.

—Life Sciences and Pre-Health Advising. This unit advises students within the major fields of life science study through the departments of botany, microbiology & molecular genetics, and zoology and students interested in pursuing a career in health professions. The pre-health professions curriculum at OSU prepares students to be competitive applicants to health professions program through a wide variety of educational, research, leadership and volunteer opportunities and a comprehensive advising system.

—Outreach. The mission of A&S Outreach is to extend intellectual resources, disseminate knowledge to learners at any time and any place, and provide lifelong learning opportunities. This is accomplished through offering high school and collegiate distance learning courses, international credit courses, and field trip courses. Outreach also coordinates academic conferences, industry workshops and seminars, and cultural outreach opportunities.

Academic Programs

—Undergraduate Programs. Requirements for all degree programs and options are detailed in *Undergraduate Programs and Requirements* publication available online at http://registrar.okstate.edu. Separate sheets, stating the requirements for any particular degree, may be obtained on request from the department or college in which the degree is offered.

BACHELOR OF ARTS (BA):

- American studies
- art
- economics
- English
- French
- geography
- German
- history
- journalism and broadcasting
- liberal studies
- mathematics
- music
- philosophy
- political science
- psychology
- Russian language and literature
- sociology
- Spanish
- theatre

BACHELOR OF SCIENCE (BS):

- biochemistry
- biological sciences
- botany
- chemistry
- communication sciences and disorders
- computer science
- economics
- geography
- geology
- journalism and broadcasting
- liberal studies
- mathematics
- microbiology/cell and molecular biology
- physics
- physiology
- political science
- psychology
- sociology
- statistics
- zoology

BACHELOR OF FINE ARTS (BFA):

- art (graphic design and studio)
- theatre (acting and design and technology)

BACHELOR OF MUSIC (BM):

- music (elective studies in business; performance)
- music education (instrumental/vocal certification)

—Second Bachelor's Degree. To secure a second bachelor's degree, a student must complete a minimum of 30 semester credit hours in addition to those required for the first degree. The number actually needed depends on what a student must do to satisfy all the requirements for the second degree.

A student seeking a second degree in the College of Arts and Sciences at OSU should ask his or her second adviser to submit a degree plan for the second degree, clearly headed "second degree," and showing how *all* the requirements of the second degree are to be satisfied. The plan should also state the major, date of award and total credit hours of the first degree, and indicate those courses which represent the minimum of 30 additional hours. The second degree plan should be sent to the College of Arts and Sciences Office of Student Academic Services within two weeks after the student's last enrollment.

Students wishing to complete degrees in two different colleges at OSU should consult with each office of student academic services. Concurrent enrollment in two colleges is possible, but a student must be enrolled in a college for at least two semesters before becoming eligible for a degree from that college.

—Second Majors and Minors. A student majoring in one field may also complete the specified requirements for a "major" or a "minor" in other fields, the additional majors or minors may be noted on the student's transcript. Such specified requirements may be obtained from the department in which the second major or minor is sought, or from the Office of Student Academic Services. During the semester in which the student is enrolled in courses that will complete the second major or minor the student should ask the adviser in the second major or minor to submit certification of completion of the required courses to the Office of Student Academic Services in the College of Arts and Sciences.

—Graduate Programs. Twenty-five master's degrees are offered in the College along with 15 doctoral degrees. For details, see the departmental entries that follow or consult the "Graduate College" section in the *Catalog*.

Special Academic Programs

—The Honors College. The College of Arts and Sciences has offered honors courses since the 1960s and has the greatest number of students and faculty participating in The Honors College at Oklahoma State University. The Honors College provides outstanding students with the opportunity to study, conduct research and interact with faculty and other honors students in a variety of settings designed to assist talented students who seek to make the most of their educational opportunities. Honors sections of many general education courses allow participating students the benefits of small classes taught by experienced members of the faculty, thus combining the extensive resources of a major comprehensive university with personal faculty attention to each student. Special honors seminars provide coverage of topical issues each semester in formats that encourage the exchange of ideas through discussion and writing. Honors seniors complete the requirements of The Honors College by undertaking a senior honors thesis (or similar creative activity), and honors seniors also may earn honors credit by enrollment in graduate seminars.

Three Honors College awards are available to A&S students—the General Honors award, the Departmental Honors award in the student's major field, and The Honors College degree (which is earned by completing both General and Departmental Honors requirements with a minimum of 39 honors hours with 3.50 OSU and cumulative grade-point averages). These awards are reflected on the student's transcript and a special honors diploma is awarded to students completing the requirements for The Honors College degree.

Priority enrollment is provided for students who are active in The Honors College. This allows honors students to select honors courses and other courses taught by outstanding faculty at the earliest possible date each semester and facilitates the development of class schedules tailored to the special needs of honors students. Eligibility for admission to The Honors College as a first-semester freshman is based on an ACT composite score of 27 or higher (or comparable SAT score) with a high school grade-point average of 3.75 or higher. Later entry for students with seven or more credit hours is permitted on the basis of OSU and cumulative grade-point averages. Transfer students with seven or more credit hours are eligible on the basis of cumulative grade-point average.

—Bachelor of University Studies (BUS). The BUS in the College of Arts and Sciences allows students with unique educational objectives that cannot be fulfilled by any of the existing degree programs to design an individual plan of study fitted to the student's particular needs. BUS plans must be approved by the director of A&S Student Academic Services, and the Office of the Provost and Senior Vice-President.

—Geographic Information Systems Certificate. The Geographic Information Systems (GIS) certificate provides a specialized course of study for interested students. The flexible program provides students with a theoretical and applied foundation concerning the rapidly growing field of GIS. The program is open to any student at Oklahoma State University. For more information, contact the GIS Certificate coordinator in the Department of Geography, 225 Scott Hall.

—High School Teaching Preparation. Students earning degrees in the College of Arts and Sciences may, by completing certain courses, receive state licensure for teaching in the secondary schools. Full details may be obtained from the OSU Professional Education Unit in the College of Education, 325 Willard.

It is possible to qualify for teaching licensure and the bachelor's degree within the minimum semester credit hours required for graduation. If not possible, students may meet the requirements for the degree and then complete the licensure requirements by taking additional courses.

Students who wish to qualify for teaching licensure should consult as early as possible with the adviser in their fields of interest, and apply for admission to professional education as soon as possible, preferably before the end of their sophomore year. Full teaching certification is awarded by the State Department of Education when the licensed candidate has successfully completed a period of teaching in a school system.

—Pre-professional Programs in the Health Professions. Pre-medicine, Pre-dentistry, Pre-optometry, Pre-pharmacy, Pre-chiropractic and Pre-veterinary Medicine.

The pre-professional curricula for physicians, dentists, podiatrists, optometrists, pharmacists and veterinarians have the same basic core because they must prepare students for professional schools whose admission requirements are almost identical. These include a strong foundation in math, chemistry, physics and biology, the disciplines on which major advances in the health field depend. Included also are courses to develop written and spoken communication skills, which are highly important for a good relationship with patients, the public and other professionals.

Beyond this required core, pre-professional students may choose courses and a major as freely as any other students in the College of Arts and Sciences. Medical schools encourage study in the social sciences and humanities that contributes to the understanding of human beings in their entirety—their history and environment, their attitudes and values, their emotions, motivations, interpersonal relationships and cultural heritage. All of these may affect sickness and health.

Although most students entering a professional school in one of the above fields have a bachelor's degree, it is possible to apply for admission after three years of college work (two years for a few veterinary schools). OSU permits pre-professional (health-related) students to choose between two alternative bachelors degree programs: (1) in a specific discipline that requires a minimum of 120 semester credit hours at OSU, or (2) a degree with a biomedical option which allows a "3 plus 1" approach, requiring at least 90 semester credit hours at OSU and up to 30 hours to be transferred from a chiropractic, dental, medical, osteopathic, pharmacy or veterinary school.

Some professional schools do not state a firm minimum grade-point average for admission, but a student should maintain better than a 3.00 grade-point average to be competitive. The specific admission requirements of medical, dental and veterinary schools are available on the Internet and in the Office of Life Sciences and Pre-health Advising. The OSU pre-medical and pre-veterinary course requirements are listed in the "Center for Veterinary Health Sciences" and the "Center for Health Sciences" sections of the *Catalog*. Students whose goal is admission to medical, dental, podiatry, optometry, pharmacy or veterinary programs should consult with a pre-health advisor in the Office of Life Sciences and Pre-health Advising for information regarding specific requirements of these programs.

All applicants for medical schools must take the Medical College Admissions Test (MCAT), dental applicants must take the Dental Admission Test (DAT), and optometry applicants must take the Optometry Admissions Test (OAT) prior to admission. The OSU College of Veterinary Medicine requires the General Test and the Advanced Biology Test of the Graduate Record Examination (GRE) taken within the previous four years.

—Allied Health Professions. The allied health professions for which one can prepare at Oklahoma State University include dental hygiene, nursing, occupational therapy, physical therapy, physician's associate and medical imaging and radiation sciences. The College of Arts and Sciences offers the general education and basic science courses that a student must complete before he or she can be accepted into a professional program. Competitive students may be accepted into these programs after completing 60-90 hours of course work, depending on the health profession. Students whose goal is admission to a professional program in the allied health professions should consult with a pre-health advisor in the Office of Life Sciences and Pre-health Advising, located in room 213 Life Sciences East for information regarding the specific requirements of particular programs and schools.

—Clinical Laboratory Science. See "Department of Microbiology and Molecular Genetics."

—Pre-Law Preparation. Law schools have no single preference for a specific undergraduate major. Admission to law school is primarily based on a strong record achieved in a rigorous undergraduate program and a competitive score on the Law School Admission Test (LSAT). Other admission considerations include course of study and difficulty of curriculum; letters of recommendation; work and leadership experiences; and applicant's background and motivation as revealed in an application essay.

Law school admissions officers most frequently recommend students include in their undergraduate programs courses in economics, literature, languages, psychology, history, government, mathematics, logic, philosophy, accounting and speech. Courses in these areas are especially helpful in developing the verbal and analytical abilities that are particularly critical for success in law school.

Personal assistance in selecting an academic major, planning a solid pre-law curriculum, preparing and registering for the Law School Admissions Test and applying to law school is available through the pre-law adviser in Student Academic Services.

Graduation Requirements

—General Education Requirements. The General Education Requirements for the degrees offered by the College are shown for each program in *Undergraduate Programs and Requirements*. At least 40 credit hours of General Education are required for all degrees.

All degrees include a common core of 12 credit hours. *Three credit hours of American history and three hours of American government* are required. These must be satisfied by HIST 1103, 1483 or 1493, and POLS 1113. *Six credit hours of English composition* is a University requirement, and this must be satisfied by ENGL 1113 or 1313 and 1213 or 1413. Students who obtain a grade of "A" or "B" in ENGL 1113 may substitute ENGL 3323 for ENGL 1213 with permission of their departments.

The remaining 28 credit hours must be distributed as follows: six hours of analytical and quantitative thought, six hours of humanities, eight hours of natural sciences, six hours of social sciences, and two hours of General Education elective.

—College Requirements. In addition to the 40 hours of general education, the college requires one credit hour of orientation, (A&S 1111), for all degrees. For the BS, nine additional hours of natural or mathematical sciences are required, as well as three additional hours from the arts and humanities. For the BA, nine additional hours of arts and humanities are required, as well as three additional hours of natural or mathematical sciences and a course focused on non-Western culture. College requirements define the BA or BS degree in the College of Arts and Sciences.

—Foreign Language Proficiency Requirement. The foreign language requirement for the BA may be satisfied by 10 hours of college credit in the same language, or equivalent proficiency (e.g., passing an advanced standing exam or completing a second-year or higher college-level course in the language; etc.). RUSS 3053, 3123, 4113, and 4223 do not satisfy this requirement.

The foreign language requirement for the BS, BM, and BFA degrees may be met by presenting a high school transcript that demonstrates successful completion of two years of study in a single foreign language. It may also be satisfied by any of the options listed above for the BA.

—Non-Western Requirement (BA and BFA only). One three-hour course in Non-Western studies from: A&S 2000 (Intro to African Studies), ANTH 3443, 4223; ART 3693, 4603, 4653, 4663, 4673, 4683; ECON 4643; ENGL 3173, 3183; FLL 3500(Japanese only); GEOG 3053, 3753, 3763, 3783; HIST 1713, 3013, 3053, 3203, 3403, 3413, 3423, 3433, 3503, 3513, 3523, 3543, 3553; JAPN 1225, 2113, 2223; MUSI 3583; PHIL 3943; POLS 3053, 3223, 3233, 3313; REL 3573, 3613, 4113; RUSS 3053; SOC 4533, 4950 (Gender in the Middle East).

—Diversity Requirement (all degrees). One course which emphasizes one or more socially constructed groups (e.g. racial, ethnic, religious, gender, age, disability, sexual orientation) in the United States. Courses satisfying this requirement are designated "D" in the Catalog and a list is available from the Office of Arts and Sciences Student Academic Services or on the SIS Internet site.

—International Dimension Requirement (all degrees). One course which fosters understanding of, or the ability to communicate with, peoples and cultures of other countries. Courses satisfying this requirement are designated "I" in the *Catalog* and a list is available from the Office of Arts and Sciences Student Academic Services or on the SIS Internet site.

—Scientific Investigation Requirement (all degrees). One course including an investigative laboratory that provides experience with scientific method. Courses satisfying this requirement are designated "L" in the Catalog and a list is available from the Office of Arts and Sciences Student Academic Services or on the SIS Internet site.

The non-western, international dimension, and scientific investigation requirements may be satisfied by courses used also to satisfy any other part of a student's degree program (i.e., in General Education, College, Major, or Electives requirements). No additional hours are required.

—Additional College Requirements. For all degrees, six hours of general education designated courses (excluding courses in the major prefix) are to be taken at the 3000 level or above.

—Major Requirements. At least 40 semester credit hours as specified by the department, including courses in the major and in supporting fields, must be completed.

—Upper-Division Credit. A student must successfully complete at least 48 semester hours of upper-division credit, i.e. credit in courses at the 3000 or 4000 level.

—Hours in One Prefix. If a student seeking a BA or BS degree takes more than 48 semester credit hours in one subject, including lower-division and upper-division credit, the hours in excess of 48 will be added to the minimum total hours required for the degree.

This "48 hour maximum" applies to all courses taken in a subject, whether they are required or elective, with the exception of required courses in English composition and American history and government.

—Total Semester Credit Hours and Grade-point Average. The minimum number of semester credit hours for an Arts and Sciences degree is 120. The minimum grade-point average is 2.00 and must be earned in all major courses, in Major Requirements, and in all courses applied toward the degree. A minimum cumulative grade-point average of 2.00, as calculated for graduation purposes, is also required. (See "University Academic Regulations" in the *Catalog*.)

Particular degree programs may specify higher grade-point requirements or exceed the 120 hour minimum. Details are given in the *Undergraduate Programs and Requirements* publication, available online at http://registrar.okstate.edu.

—Endorsement of Student's Plan (Graduation Check). Immediately after their last enrollment, and before their last semester, students should check with their advisers to be certain a degree plan has been sent to the Arts and Sciences Office of Student Academic Services.

—Changes in Degree Plan. Once a degree plan has been submitted, a student will not graduate until all requirements on it have been fulfilled. Any deviation in the plan must be recommended by the adviser on a "Change in Plan of Study" card, and sent to the Arts and Sciences Office of Student Academic Services for approval.

—Checklist of Graduation Requirements.

1. *Total hours.* Minimum 120 (see degree sheet). Hours of "F" or "I," or in repeated courses (unless allowed in course descriptions in the *Catalog*), do not apply. Zero-level courses and all athletic participation and leisure activity courses are not applicable to a degree. Students must confirm grade changes for the removal of "I's" have been sent to the Office of the Registrar by the instructor who gave the "I."
2. *Grade-point average.* See individual degree sheets for all grade-point minima: overall, in major prefix courses, and in major requirements.
3. *Validity of credits.*
   a. No more than two courses from the same prefix may be used to meet each of the following General Education (GE) and College/Departmental (C/D) combinations: GE Analytical and Quantitative Thought (A) and Natural Sciences (N) combined with C/D Natural and Mathematical Sciences (except MATH, three courses permitted): and GE Humanities (H) combined with C/D Arts and Humanities.

      The General Education Controlled Elective does not count against the two-course maximum. Three hours of MUSI or TH may substitute for one three-hour course.

   b. A course used in the Major Requirements may not be used to satisfy any other degree requirement, except the international dimension, scientific investigation, upper-division general education, and non-Western requirements.

   c. Pass-No Pass Grading System. Courses taken on this campus under the Pass-No Pass Grading System (see "University Academic Regulations") may be used only as elective hours. They cannot satisfy any other requirement (General Education, Departmental, Major Requirement, and certification).
4. All degree requirements listed above and specified in "University Academic Regulations" and *Undergraduate Programs and Requirements* must be satisfied.
5. *Exemption.* A student who believes he or she has a valid reason for exemption from a College requirement should file a written request that has been approved by his or her adviser with the director of Student Academic Services.

Departmental Clubs and Honor Societies

Advertising Club
Alpha Delta Sigma (advertising honor society)
Alpha Epsilon Delta (health pre-professional honor society)
Alpha Kappa Delta (sociology honor society)
American Association of Petroleum Geologists
American Choral Directors Association
American Institute of Graphic Arts Student Chapter
American Medical Student Association
American Student Dental Association
Army Blades
Arnold Air Society
Art Club
Art History Organization
Arts and Sciences Student Council
Association for Computing Machinery
Association for Women in Communications
Association of Women in Geoscience
Beta Beta Beta (national biological sciences honor society)
Botanical Society
Claude Rains Appreciation Society (film society)
Collegiate Music Educators National Conference
Creative Writers Association
Delta Nu Alpha (biochemistry club)
ECO-OSU
English Club
English Graduate Student Association
Forum of Geography Graduate Students
French Club
Friends of the Forms (philosophy)
Gamers of OSU
Gamma Theta Upsilon (geography)
Geographic Information Systems Club
Geological Society
German Club
History Club
JB Ambassadors
Kappa Kappa Psi (band honor society)
Kappa Tau Alpha (journalism and mass communication honor society)
KXZY (broadcasting)
Latin Dancing and Cultural Club
Mathematics Graduate Student Society
Medieval Studies Group
Microbiology and Molecular Genetics Graduate Student Association
Microbiology Club
Music Student Advisory Council
National Broadcasting Society/Alpha Epsilon Rho
National Society of Pershing Rifles
National Student Speech Language Hearing Association
Oklahoma State Anime Society
Oklahoma State Secular Society
Oklahoma Student Chapter of the American Fisheries Society
Opera Performance Educational Resource Association
Papyrus (publication society)
Phi Alpha Delta (pre-law)
Phi Alpha Theta (history honor society)
Phi Lambda Upsilon (chemistry honor society)
Phi Mu Alpha Sinfonia (music)
Phi Sigma Tau (philosophy honor society)
Pi Alpha Nu (religious studies)
Pi Mu Epsilon (mathematics)
Pi Sigma Alpha (political science honor society)
Pre-Health Professions Club (chiropractic, pharmacy, occupational and physical therapy, nursing, radiologic technology)
Pre-Optometry Student Association
Pre-Physician Assistant Club
Pi Sigma Alpha (political science honor society)
Psi Chi Honorary (psychology honor society)
Psychology Club
Psychology Graduate Student Association
Public Relations Student Society of America
Quiz Bowl Team
Russian Club
Sigma Alpha Iota (music)
Sigma Delta Pi (Spanish honor society)
Society of Physics Students
Society of Professional Journalists
Sociology Club
Sociology Graduate Student Association
Spanish Club
Sports Media Club
Statistics Club
Tau Beta Sigma (band honor society)
TESL-Linguistics Association
Theatre Council
Wildlife Society - Student Chapter
Zoology Graduate Student Society

American Studies

Laura Belmonte, PhD - *Associate Professor and Director*

American Studies is an area studies program focused on the social relations and the cultural and intellectual life of the United States of America in a global, comparative context. Its students analyze the American past and present from the perspectives of several disciplines, learn to synthesize their knowledge, and learn the habit of mind needed for cultural analysis.

Our curriculum combines structure with latitude in course selection. In addition to two required courses in American Studies, students gain a foundation in American literature and history. Additional courses are selected in the fine arts, humanities and social sciences to develop a plan of study tailored to meet specific goals and interests.

Work in American Studies can lead to and enrich a wide variety of careers. Many of our graduates have gone into journalism, radio, TV and film work, museum curating, law, public relations, editing, advertising, government service, secondary school teaching and administration, and creative writing. With additional education, a significant number of American Studies majors have gone on to become scholars at the college and university level or into professional careers in law and public diplomacy.

Art

Chris Ramsay, MFA - *Professor and Interim Head*

The Department of Art provides courses for students interested in: (1) a strong general education background, (2) major concentrations in studio art, graphic design and art history, (3) minors in studio art and art history.

Two degrees are offered in art: Bachelor of Art (BA) with options in art history and studio art that can be combined with teacher certification; and the Bachelor of Fine Arts (BFA), a professional degree with options in studio art or graphic design. Fields of concentration are available in drawing, oil and watercolor painting, printmaking, graphic design, illustration, electronic media, ceramics, jewelry/metalsmithing, sculpture and art history.

Art majors must attain a grade-point average of 2.50 in art courses in order to qualify for licensure and graduation.

Students wishing to major in graphic design must have a minimum overall GPA of 2.75 to enroll in 2000 level graphic design courses. Three 2000 level courses are prerequisite for a portfolio review scheduled for the latter portion of each spring and fall semester. Students wishing to transfer into the graphic design program with earned credit in these courses are subject to the same review and must submit portfolio materials with application for admission into the program no later than April 1 or November 1. This portfolio review determines those students qualified to proceed to 3000 level graphic design courses.

Because of a large endowment, the department is able to offer substantial scholarships at all levels, freshman through senior.

The Department of Art maintains an exhibition gallery, the Gardiner Art Gallery in the Bartlett Center for the Visual Arts, with approximately 200 linear feet of exhibition space and 2600 square feet of floor space. Works by artists of national and international reputation, faculty and student works and cultural artifacts are shown.

Biochemistry and Molecular Biology

Gary A. Thompson, PhD - *Professor and Head*

Biochemistry, the central scientific discipline linking the chemical, physical and biological sciences, exerts a profound influence on the progress of medicine and agriculture. By applying concepts and methods of chemistry and physics to the fundamental problems of biology, biochemists have made great progress in their effort to understand the chemistry of living organisms. Major discoveries concerning the biochemistry of genetic material provide the tools of molecular biology that are essential to contemporary life sciences research.

Biochemists and molecular biologists are concerned with living things. They must acquire some knowledge of the biological sciences. Since a biochemist's tools are the physical sciences, he or she must receive sound education in mathematics, physics and chemistry.

Challenging positions for well-trained biochemists and molecular biologists are available in colleges and universities, state and federal laboratories, research institutes, medical centers and in an increasing number of industrial organizations, particularly the pharmaceutical and food industries. Biochemists are involved with research on the chemistry of processes occurring in plants, animals, and various microorganisms, and with the discovery and development of antibiotics, vitamins, hormones, enzymes, insecticides and molecular genetics techniques.

At the undergraduate level a major in biochemistry and molecular biology administered by the Department of Biochemistry and Molecular Biology is available through the College of Agricultural Sciences and Natural Resources. The department also offers a BS degree in biochemistry through the College of Arts and Sciences. An honors program is available. The curriculum provides a broad background in chemistry and biological science and permits flexibility in meeting particular interests of the student. Courses in biochemistry are based on general, organic and analytical chemistry. The biochemistry and molecular biology curriculum provides students with sufficient background in the basic sciences of mathematics, physics, chemistry and biology to meet the needs for graduate study in most fields of modern science related to agriculture or medicine. The curriculum is excellent for pre-professional students of medicine, dentistry, pharmacy, and veterinary medicine. The department's research activities provide opportunities for part-time employment of undergraduate majors to improve their professional competence.

Graduate Programs

Because many of the opportunities in biochemistry require advanced course work, a major part of the program in the Department of Biochemistry and Molecular Biology is concerned with its graduate program leading to the MS or PhD degree. This graduate program is an integral part of extensive basic research activities in the Oklahoma Agricultural Experiment Station.

—Prerequisites. Although the BS in chemistry or biochemistry is preferred, students with strong backgrounds in other biological or physical science disciplines are eligible. Individuals not having at least eight semester credit hours each of organic chemistry and calculus plus four credit hours each of analytical and physical chemistry must take appropriate undergraduate courses to make up deficiencies. The results of the three general GRE exams (verbal, quantitative, analytical) are required for entrance. An advanced GRE subject matter exam (biochemistry, chemistry or biology) is also recommended. A GRE score of 500 verbal, 650 quantitative and 4.0 analytical is normally required.

—Degree Requirements. A more detailed description of the graduate study program in biochemistry is available from the department upon request. The requirements listed below complement the general graduate requirements described in the "Graduate College" section of the *Catalog*. After the first semester, continuous attendance and participation in the departmental seminar is expected.

—The Master of Science Degree. Twenty-four credit hours of formal graduate courses are required, including BIOC 5753, 5824, 5853, and 5930. In addition, a student must present an acceptable research thesis (six hours) and pass a final oral examination covering it and related material. Research advisers are selected at the end of the first semester.

A non-thesis Master of Science degree is also available. It does not require a research thesis, but requires a report and extensive technical

training in the laboratory. The non-thesis MS is not recommended for students wishing to pursue a PhD later.

—The Doctor of Philosophy Degree. The course requirements are determined with the aid of the student's graduate advisory committee. Usually they follow these guidelines: total of 30-40 credit hours of formal graduate course work which includes all the courses listed for the MS degree, at least four of the advanced graduate courses in biochemistry (6000 level) and two offerings of Special Topics (6820). Additional course requirements, appropriate to the student's interests, are determined by the advisory committee. The advisory committee is selected at the end of the second semester. Each student will take a series of cumulative examinations beginning in January of his or her first year. A more comprehensive qualifying examination is also given, usually during the fourth semester of graduate study.

One year of a foreign language at the college level is required. The student must present, and defend in a final oral examination, an acceptable research thesis which contains a substantial original contribution to the field of biochemistry. The department offers research experience in a variety of areas of biochemistry.

Other references should be from individuals capable of addressing the applicant's ability to successfully complete a Master of Science program.

—Review Process for Admission. The Office of the Associate Dean of Graduate Studies manages all procedures and records pertinent to admission. The admission process is ongoing with admission recommendations rendered by the graduate faculty in agricultural communications and agricultural education. To be eligible for committee review, each applicant must submit an application for admission to the Graduate College, transcripts of all academic records, reference letters, goal statement and GRE scores.

Botany

Linda Watson, PhD - *Professor and Head*

Plants continue to fascinate biologists, as they regulate global processes, form complex relationships with other organisms, and have intriguing patterns of development and diversity. Plants provide medicinal compounds, shelter, fuel, food, and oxygen, and support the existence of life on Earth. It is important that plants be thoroughly understood as survival and ecological balance depend upon this knowledge. As populations increase, the need for more and better supplies of food, fiber, and biofuels also increases. The study of botany underlies several applied sciences such as agronomy, forestry, natural resource management, horticulture, and plant pathology.

To major in botany a student should have a strong interest in science with a good background in chemistry and mathematics. Majors with a BS degree are qualified to hold positions in federal and state agencies in areas such as conservation biology, habitat restoration, environmental biology, and plant inspection. They may be qualified for various research positions in private industry involving plants, such as plant biotechnology and drug development, and may qualify for secondary school science teaching licensure.

Facilities used in undergraduate teaching include well-equipped plant physiology and ecology laboratories, environmental chambers, the 160-acre McPherson Preserve, and a herbarium with over 140,000 plant specimens. Faculty members teach and do research in their specialty areas of plant ecology, biodiversity, evolution, physiology, taxonomy and systematics, genetics and development, algal ecology, and cell and molecular biology.

Graduate Programs

Programs of research and study leading to the degrees of Master of Science and Doctor of Philosophy are offered in many areas of botany, including plant cell biology, ecology, evolution, physiology, taxonomy and systematics, population biology, genetics and development, and biotechnology-related areas.

—Prerequisites. Applicants for admission must have received a baccalaureate degree from an accredited college and should have had 40 semester hours (or equivalent) in upper-division courses in the biological and physical sciences. A grade-point average of 3.00 (on a 4.00 scale) or above is required for unconditional admission. All applicants are required to submit scores for the Aptitude portion of the Graduate Record Examination.

Prerequisites for graduate degrees include successful completion of courses in the areas of plant taxonomy or field botany, plant anatomy, plant physiology, genetics and ecology, and organic chemistry. Students with an undergraduate major in biology or plant science will have completed a substantial portion of these courses; those with a less closely related major may be required to take some background courses without graduate credit. Final authority for each student's plan of study, including courses to be taken at the undergraduate level, resides with the student's advisory committee.

—Degree Requirements. Demonstrated research competence through submission and acceptance of a thesis or dissertation is required for all botany graduate degrees. A minimum of one semester teaching experience is required of all MS and PhD candidates. This requirement may also be satisfied by enrollment in a college teaching practicum course (GRAD 5990).

All graduate students are expected to attend and participate in departmental seminars.

—The Master of Science Degree. Plans of study must contain 30 credit hours including at least 21 semester credit hours numbered 5000 or above, six credit hours of thesis and two credit hours of seminar. A minimum of 16 semester credit hours must be in the major department or field, above the prerequisites required for entrance into the MS program.

—The Doctor of Philosophy Degree in Plant Science. The Department of Botany is one of seven departments participating in the multidisciplinary PhD in plant science program. Students in this program have great flexibility in research and course work. The student who chooses botany as a home department has a botany faculty adviser from within the department and will take BOT 6000 research hours in the department. To receive the PhD in plant science, students must enroll in a total of 90 credit hours beyond the BS or 60 credit hours beyond the MS. No fewer than 36 or more than 60 hours of BOT 6000 are allowed in the plan of study. Two hours of seminar (BOT 5850) must also be included in the plan of study. Students may choose as a specialization area either cellular and molecular, organismal, or ecological plant science. After a PhD candidate has completed most of the course work, qualifying examinations are scheduled. These exams cover major areas of the student's plan of study and relevant subdivisions of plant science.

Chemistry

Frank D. Blum, PhD - *Professor and Chair*

Chemistry is the science that deals with the composition, structure and interactions of matter. Materials obtained from the earth, such as ores, petroleum and natural gas, as well as those from plants and animals, such as food, fibers and medicines, are all studies and modified through chemical means. From natural materials, chemists create new and useful substances that add to the enjoyment of life. They develop new drugs to fight disease and new agents to combat pests that destroy crops. Chemists are at the forefront in advancing new technologies to solve problems involving human and animal health, the environment, energy alternatives and conservation, new materials, detection of hazardous substances and crime scene investigations.

A student considering a career in chemistry should have a strong curiosity about natural phenomena, good problem solving skills and an above average work ethic. The student should want to learn more about the changes that take place in materials and to use this knowledge for the betterment of humankind. Interest and ability in mathematics and physics are also helpful since these subjects are basic to the study of chemistry.

Chemists are employed in industry, government and education. In industry, jobs range from highly focused problem solving and product development to quality control, environmental testing and even sales. A great deal of industrial research is devoted to food and drug production as well as new energy sources, materials and detection devices. State and federal agencies also employ chemists for basic research and analysis. Finally, many chemists become teachers in high schools, colleges, and universities. In addition to teaching classes, many college and university faculty members train students to do research in their laboratories. Generally, an MS or PhD degree is required for those interested in research or college level teaching.

The Department of Chemistry offers two bachelor's degrees: (1) a BS degree that is accredited by the American Chemical Society; and (2) a BS degree that requires less specialization.

Our chemical laboratories are modern and well-equipped with instruments for the determination of chemical properties, the study of chemical reactions and the detection and structure elucidation of small quantities of materials. Undergraduate research is encouraged.

Graduate Programs

—Prerequisites. The student should have at least eight semester credit hours (or the equivalent) in general, analytical, organic, and physical chemistry. The physical chemistry should have been based on mathematics through calculus.

—Admission Requirements. Admission requirements are minimal. For admission without qualification a grade-point average of 3.00 or better is required. Deserving applicants with grade-point averages less than 3.00 are infrequently admitted under probationary conditions. Additional support of the application is sought in the form of three letters of recommendation. Graduate Record Examination scores are not used as a criterion for admission. Recommendations on admission to the Graduate College are made on behalf of the applicant by the departmental admission officer. Acceptance by a permanent adviser is not a prerequisite to admission to the program.

—Degree Requirements. A more detailed description of the graduate study program in chemistry is available in a brochure supplied by the department upon request, or on the Internet www.chem.okstate.edu. The requirements set forth below complement the general requirements stated in the "Graduate College" section of the *Catalog*. Attendance and participation in the departmental colloquium and CHEM 5011 and 6011 are required.

—The Master of Science Degree. Students must complete at least 30 credit hours of graduate course work in chemistry or related fields.

Each student must present an acceptable thesis dealing with a research problem and pass a final oral examination covering it and related material. Research on the thesis problem should be started as early as possible in the graduate program.

—The Doctor of Philosophy Degree. Work is offered which leads to the degree with specialization in analytical, inorganic materials, organic or physical chemistry. A major in biological chemistry is offered by the Department of Biochemistry. The student must pass a qualifying examination in the student's field of specialization.

An acceptable dissertation must be presented which contains a substantial original contribution to the field of chemistry. The student must pass a final oral examination covering the dissertation and related material.

The Doctor of Philosophy degree requires the completion of at least 90 semester credit hours of work beyond the bachelor's degree.

The course requirements are determined by an advisory committee which is appointed for each student.

Communication Sciences and Disorders

Martin A. Fischer, PhD - *Professor and Interim Head*

The Department of Communication Sciences and Disorders offers Bachelor of Science and Master of Science degrees in Speech-Language Pathology. The undergraduate program focuses on the scientific study of normal and disordered communication processes. Emphasis is placed on developing background knowledge in phonetics, speech and language development, anatomy and physiology, speech science, and the neurogenic basis of communication. During the senior year, students are introduced to a variety of communication disorders in preparation for the Master of Science degree. All students participate in 25 hours of applied clinical observation.

Graduate Programs

The Master of Science degree program is designed to provide students with intensive course work in the various communication disorders and with a wide variety of challenging clinical rotations both on and off campus. Research opportunities are available under the direction of the graduate faculty. Graduates are prepared to take positions in hospitals, community speech and hearing centers, private practices, schools and other related settings, and to pursue additional graduate education at the doctoral level. All graduates meet the academic and clinical requirements for the Certificate of Clinical Competence in Speech-Language Pathology from the American Speech-Language-Hearing Association, and the Oklahoma license in Speech-Language Pathology. Additionally, most students elect to earn the state teaching certificate required to practice speech-language pathology in the Oklahoma school system. The program holds national accreditation from the Council on Academic Accreditation of the American Speech-Language-Hearing Association.

—Prerequisites. Admission to the graduate program requires a bachelor's degree in Communication Sciences and Disorders, or an out-of-field bachelors degree plus 24 hours of prerequisite course work.

—Admission Requirements. Applicants for unconditional admission should have a minimum grade-point average of 3.00 in the major, strong letters of recommendation from those familiar with the student's previous academic background, a minimum combined verbal and quantitative GRE score of 900, a minimum verbal GRE score of 450, and a minimum analytical writing score of 3.5. Students not meeting the above requirements may be admitted on a provisional basis. Admission is competitive, and all application materials must be received by February 15, 2010 for fall 2010 admission. Completed applications must include: an online application, GRE scores, three letters of recommendation, transcripts from all undergraduate institutions, and a personal statement indicating why you desire to be a speech-language pathologist.

International students follow the same application procedure as U.S. students with one addition. If English is not the student's native language he or she is required to score a minimum of 550 on the Test of English as a Foreign Language (TOEFL) and a minimum of 60 on the Test of Spoken English (TSE). It is especially important that students have readily intelligible spoken English, because they will be conducting therapy sessions in English. The International Student Services Office is available on campus to assist international students.

—Financial Aid. All students are eligible to apply for graduate assistantships and fee waiver scholarships. Graduate assistants qualify for out-of-state tuition.

—Program Requirements. Requirements for the Master of Science degree include 36 credit hours of academic course, 2-6 hours of portfolio or thesis, and 15 credit hours of clinical practicum. The program typically can be completed in two academic years including one summer semester.

—Examinations. Students enrolled in a thesis option complete a master's thesis under the direction of a member of the graduate faculty. Student enrolled in a non-thesis option complete an academic/clinical portfolio, and a comprehensive examination.

Computer Science

Subhash Kak, PhD - *Professor and Head*

Computer science is concerned with theoretical and practical methods of storing, processing and communicating information by means of computers and computer networks. Professional computer scientists obtain a formal education through the BS, MS or PhD degrees and apply their knowledge to many diversified fields of science, engineering, business and communications. Computer science offers opportunities to both specialists and generalists.

In little more than three human generations, the computing field has evolved from one associated primarily with engineering and scientific calculations of only casual interest to the layperson, to a factor of significant influence in almost every aspect of modern life. Technical careers in computer architecture and software design, as well as applications in the business and scientific areas, require a thorough knowledge of the principles of computer science. In addition, most managers in any field require some familiarity with computers, not only to be able to understand them, but also to incorporate them into their own decision-making processes.

The department offers the full range of degree programs—BS, MS and PhD. All programs are offered in both Stillwater and Tulsa. To be admitted to the BS degree program the student must have minimum overall GPA of 2.0. The student must also have taken and maintained a 2.5 GPA for CS 1113, CS 2133, MATH 2144 and MATH 2153, with no course grade less than "C."

CS majors whose semester GPA is below 2.0 or 2.5 for their major core courses will be placed on departmental academic probation, regardless of overall GPA. Students on CS departmental probation must complete a minimum of 9 hours at Oklahoma State University with a GPA of 2.5 or higher to have their probationary status removed. Students who are not able to have their CS probationary status removed following the completion of a minimum of 9 hours (or the entire semester's work, if more than 9 hours) will not be allowed to enroll again as an undergraduate major in CS regardless of their overall GPA.

A student who experiences a catastrophic event that plays a significant role in his or her being placed on CS academic probation has the right to appeal to the Head of the Computer Science Department. With a successful appeal, a student will be given a semester to raise his or her GPA to the minimum level both overall and/or in his or her core courses before any probationary action is taken.

Most BS and MS graduates obtain positions in industry. Approximately half of the PhD graduates take university teaching and research positions and half are employed in industry.

The Department of Computer Science has a Sun server, Sunfire v880, as its primary computing resource. A Sun Enterprise 3000 computer and others are also available to students in the department. Graduate students have access to a several research labs and a special projects room in the department.

Computers can be accessed through the OSU Information Technology Division. There are a number of personal computer labs located in various buildings on campus. Some of the residence halls have personal computer labs available. All of these labs have access to personal computer application software and all mainframe computers on campus, as well as Internet access. Both University and department computers can be accessed 24 hours a day.

Graduate Programs

The department offers degree programs leading to the Master of Science degree and to the Doctor of Philosophy degree. These programs are designed to prepare an individual to pursue a career in either an academic or an industrial setting. In addition to taking a prescribed set of core courses, a student must take sufficient courses in one specialized area. In addition to course work, a student must complete a thesis for an MS degree. A student must complete a dissertation in addition to course work for a PhD degree.

The core course requirement assures the student of breadth of knowledge in computer science; the freedom to choose an area and additional research assures the student of enough depth in some facets of computer science to be able to carry out independent investigations in those areas and put concepts and ideas learned to practical use.

For a master's degree, 30 hours of graduate credit, including a six-credit-hour thesis, are required. A master's degree student is required to pass an oral examination over the thesis and a comprehensive course work examination. There is no foreign language requirement for the MS.

For the PhD, 60 credit hours beyond a master's degree or 90 hours beyond a bachelor's degree are required; there is also a non-thesis option that requires 36 hours of graduate credit. A dissertation of no more than 30 hours is required. The PhD dissertation must describe original research. PhD students must pass (at an appropriate level) written preliminary examinations in areas of specialization. In general, both academic and industrial positions exist for each PhD graduate.

The candidate's baccalaureate degree need not be in computer science in order to enter the MS program. Students with degrees in other areas may be admitted provisionally and required to take specified prerequisite courses.

Economics and Legal Studies in Business

James R. Fain, PhD - *Professor and Head*

See "Economics and Legal Studies in Business" in the "William S. Spears School of Business" section for additional information.

Economics is a science of choice. The study of economics centers on individuals' attempts to improve their living standards. It provides a comprehensive view of how a society is organized to transform the limited resources available into want-satisfying goods and services. It investigates the principles underlying the operation of the economic system and seeks to determine its weaknesses and to prescribe policy measures that will improve its operation. In the process, economics ranges over a host of the most important problems confronting contemporary society—the causes of and remedies for depression and inflation, the determinants of and methods for improving income distribution, poverty problems and welfare measures, the role of the government in economic activity, the requisites for economic growth and development, pollution and congestion and their control.

The primary objectives sought in the undergraduate curriculum are to develop a broad understanding and perspective of the economic aspects of people's activities, coupled with thorough training in the fundamental tools of economic analyses. Toward these ends is the development of elementary mathematical and statistical skills and complementary study in the social and behavioral sciences.

A major in economics prepares students for positions with business firms, non-profit private organizations and government agencies—both national and international. It provides an excellent background for the study of law. An international economic relations option is also offered. A degree option in business economics and quantitative studies is offered

through the Spears School of Business to provide additional training in analytical methods and communication skills for both public and private sector occupations. An economics degree qualifies competent students to undertake the graduate work necessary for professional positions in economic research and college or university teaching.

Graduate Programs

The department offers programs leading to the Master of Science degree and the Doctor of Philosophy degree. The graduate program in economics prepares economists for academic careers as well as research and administrative positions in business and government agencies.

Graduate fields of specialization include regional and urban economics, public finance, international economics, and economic development. In addition, graduate courses are offered in game theory, industrial organization, labor, environmental economics, and econometrics.

Admission to a graduate program is determined by an elected graduate studies committee on the basis of the applicant's previous academic record; verbal, quantitative and analytical scores of the Graduate Record Examination; and letters of recommendation.

—The Master of Science Degree. Admission to the master's program in economics is granted to college graduates with superior academic records whose preparation has been broad and thorough. They need not have majored in economics as undergraduates but must be well grounded in economic theory. A good background in one or more such fields as history, philosophy, mathematics, statistics, political science, English, sociology, accounting, finance, psychology, or management is particularly helpful to the graduate student in economics. An applicant whose prior preparation is deficient in some respect, may, if otherwise qualified, be admitted to the program and required to take prerequisite courses for non-graduate level credit. A total of 30-33 graduate credits are required to earn an MS in economics.

Each graduate student is guided in the preparation of a plan of study by the graduate program director. At the master's level there are two options: one provides the student with a well-rounded program that prepares the student for the doctoral program in economics or further graduate study in another related discipline. The second option is applied economics which stresses communication skills, quantitative analysis and course work from other disciplines related to a career objective.

The candidate for the master's degree is required to show competence in basic economic theory and statistical methods, together with an understanding of the fundamental institutional operations of the United States economy.

Each program contains enough electives to permit considerable choice among areas of emphasis. A research report or thesis is required of all students who take only the MS degree. Those accepted for the PhD program have the option of applying for and receiving the MS degree without a research report upon successful completion of the PhD qualifying examinations and successful presentation of a dissertation proposal. A foreign language is not required.

—The Doctor of Philosophy Degree. Admission to the doctoral program in economics is granted to college graduates who have superior academic records. A total of 60 graduate credits are required to earn a PhD with a previous earned MS degree. A total of 90 graduate credits are required to earn a PhD without a previously earned MS.

This program stresses balanced preparation in economic theory and in mathematics and statistics, as well as competence in subject-area fields of specialization. The student is required to pass qualifying examinations in the theory core and in one field of specialization. (The theory core is not considered a field of specialization.) Competence must be demonstrated in a second field of specialization, through course work. The graduate program director helps the student develop a plan of study to achieve these objectives. A foreign language is not required.

A dissertation based upon original research is required of the candidate for a PhD degree in economics. The final oral examination is the dissertation defense.

English

Carol L. Moder, PhD - *Associate Professor and Head*

The study of English literature and language, as well as film and other media, is fundamental to any education. Not only does it provide familiarity with the literary works and media that shape cultural heritage, but it also develops the abilities to think analytically, to speak and write effectively, and to consider various points of view when dealing with people and ideas.

The Department of English prides itself on the diversity of its course offerings and on its small lecture and discussion classes. The BA, MA and PhD degrees are awarded through the department and a full range of courses are offered in seven areas: literature, creative writing, screen studies, technical writing, linguistics, teaching English as a second language, and rhetoric and professional writing. The number of students in any English class rarely exceeds 30; and in a writing class, including freshman-level classes, the enrollment limits range from 18-25. The maximum number of students in a graduate-level class is 10.

An undergraduate English major has five options: a traditional English major, secondary education teaching certification, creative writing, screen studies, or professional writing, each of which emphasizes literature and writing in varying proportions. English majors may choose from courses in all historical periods of literature written in English from early to contemporary, and in all genres—novel, film, short story, poetry, and drama. Every literature course emphasizes literary appreciation and analysis and allows ample opportunity for discussion and writing. The student in the traditional major may also study fiction writing and poetry writing, with published writers. Also available are courses in linguistics, which is the study of language, and professional writing, which is writing for organizations. Screen studies courses emphasize criticism, history, and theory of film, television, and new media.

Many English majors pursue careers directly related to their major, such as those in professional writing or in teaching. An English major with a professional writing option would be well prepared to pursue a career as a writer, editor, publications manager, or information developer. Students who want to teach may earn secondary teaching certification in English through either the Department of English or the College of Education, or they may decide to go to graduate school in order to teach in a college or university. A great many English majors have found the teaching profession a rewarding and challenging one. Other students find that an English major is excellent preparation for law school because it develops the analytical and language skills attorneys use. But one need not have definite career goals to major in English. English majors regularly pursue careers not only in education, professional writing and law, but also in medicine, the ministry, publishing, government, and business. Professional schools and businesses value English majors both for their communication skills and for their ability to think critically.

The Department of English serves students other than those majoring in English. It offers a variety of writing courses to fulfill the University's composition requirements; and English courses in literature, professional writing, creative writing, and screen studies are very popular electives for students in all majors. Many students choose to complement their first major with a second major or minor in English.

The Department of English actively participates in the University Honors Program. Students who qualify for Honors are eligible to enroll in restricted courses and to write a Senior Honors Thesis. The department offers Honors courses at all levels, including an Honors seminar on a different topic each year.

A Bachelor of Arts in English requires 42 hours of lower- and upper-division English courses. An English minor requires 18 hours of English, at least nine of which must be upper-division. (These hours do not include Freshman Composition.)

Graduate Programs

The Department of English offers programs leading to the Master of Arts and the Doctor of Philosophy. Masters students may choose among four programs: Master of Arts in English; Master of Arts in professional writing; and Master of Arts in teaching English as a second language (TESL); and the Master of Fine Arts in Creative Writing. In consultation with their advisory committees, both master's and doctoral students have considerable flexibility in designing a degree that meets their own interests and professional goals. Students may take courses in creative writing, screen studies, technical writing, composition and rhetoric, TESL, linguistics, literary theory, and all periods of British and American literature. The diversity of choices and the flexibility of the program prepare students to meet the demands of a changing academic marketplace.

—Admission Requirements. Students seeking admission to the graduate program in English must be accepted by the Graduate College and by the departmental admission committee. In addition to the application and transcripts required by the Graduate College, students must submit to the Department of English graduate coordinator a statement of purpose; letters of recommendation; and a writing sample or the Graduate Record Examination general and subject area scores. Non-native speakers of English must submit scores for both the Test of Written English (TWE) and the TOEFL or IELTS. For fall admission the early decision deadline is January 15; the final deadline is March 1. The deadline for spring admission is October 15. Prerequisites are listed under each degree below.

—Teaching Opportunities. Depending on their levels of experience and areas of emphasis, graduate teaching assistants may tutor in the Writing Center, serve as discussion leaders for selected large lecture classes, or teach their own sections of freshman composition, composition for international students, technical writing, creative writing, screen studies, or literature. All teaching assistants are required to take an appropriate pedagogy course during their first year of teaching.

—The Master of Arts Degree. The MA in English allows students to develop expertise in a variety of areas: literature written in English, creative writing, literary theory and criticism, screen studies, composition and rhetoric, technical writing, linguistics, and TESL. In consultation with their advisory committees, students devise an individualized curriculum that reflects their own intellectual interests and prepares them to enter a doctoral program or to teach at the college level. The degree programs in TESL and professional writing prepare teachers for the bilingual classroom and professional writers for industry.

Prerequisites include a baccalaureate degree with an English major, or at least 24 hours in English (excluding freshman composition). Successful applicants usually have a minimum grade-point average of 3.00 on a 4.00 scale, particularly in English courses.

The MA in English consists of 30 credit hours, including six hours of thesis. In addition to these hours, students must demonstrate reading knowledge of a foreign language, pass the MA qualifying examination, and pass an oral defense of the thesis. The thesis is a work of original research prepared with the guidance of the student's advisory committee. Creative writing students may present as their theses original works in poetry or prose fiction. The programs in technical writing and TESL have separate degree requirements described below.

—Technical Writing. The MA in English program in technical writing consists of 30 credit hours (with thesis) or 33 credit hours (without thesis). In addition to these hours, students must fulfill the foreign language requirement and pass the MA qualifying examination in technical writing. Prerequisites are the same as those above.

—TESL. The MA in English program in teaching English as a second language is designed to provide students with the skills necessary to teach English to non-native speakers in a variety of situations, e.g., teaching English as a foreign language in an overseas school, college or university; teaching English as a second language to international students studying in intensive English programs in the U.S.; or teaching English to bilingual and bicultural students in American public school systems and adult education programs.

Prerequisites are the same as those above except that the major may be either in English or in a field related to second language acquisition or teaching. In addition, applicants to the TESL program must have six hours in a foreign language with a grade of "B" or better, or must complete this requirement prior to taking the qualifying examination.

The TESL program consists of 30 credit hours (thesis option) or 34 credit hours (non-thesis option). In addition to these hours, students must pass the MA qualifying examinations in TESL.

TESL is especially relevant to the public school classroom as a result of recent legislation concerning bilingual education. Teachers in English and other areas of expertise will find this program especially useful. The Oklahoma State Board of Education recently approved an "optional certification" for English as a Second Language. Already certified teachers can obtain this certification upon passing the required standardized examination. Several of the courses offered for the TESL option can prepare students for this examination, although the MA/TESL option degree does not confer certification.

—The Master of Fine Arts Degree. The MFA in Creative Writing allows students to focus on developing their abilities as poets and/or fiction writers, through a course of study emphasizing creative writing workshops, literature seminars, and electives in either of those areas or other areas in language and culture. In consultation with their advisory committees, students devise an individualized curriculum that reflects their own artistic and intellectual interests and prepares them to publish their artistic writing, enter a PhD program, or teach at the college level.

The MFA in Creative Writing consists of 42 credit hours, including twelve hours of thesis. In addition to these hours, students must present their creative work at a public reading following the completion of their thesis.

Prerequisites include a baccalaureate degree with an English major, or at least 12 hours in English (excluding freshman composition) and writing sample of high quality. Successful applicants usually have a minimum grade-point average of 3.00 on a 4.00 scale, particularly in English courses.

—The Doctor of Philosophy Degree. The Department of English grants one doctoral degree, the PhD in English. Students may, however, emphasize in their courses, their exams, and their dissertations a variety of areas: all periods of British and American literature, Native American literature and language, creative writing, literary theory and criticism, screen studies, rhetoric and professional writing, linguistics, and TESL. They may also choose an interdisciplinary emphasis. In consultation with their advisory committees, students devise an individualized curriculum that reflects their own intellectual interests and professional goals.

Prerequisites include a master's degree in English or a field related to the student's area of emphasis. Successful applicants usually have a minimum grade-point average of 3.50 on a 4.00 scale in their master's degrees. All PhD students are admitted provisionally and must take the first-year examination during their second semester of enrollment.

The PhD degree consists of 60 credit hours beyond the master's degree. Fifteen to 20 of these hours are devoted to the dissertation. In addition to these hours, students must take a first-year examination; demonstrate reading knowledge of two foreign languages or mastery of one language; pass the PhD qualifying examination in two areas; and pass an oral defense of the dissertation. The dissertation is a work

of original research prepared under the direction of the dissertation committee. Creative Writing students may present as their dissertations original works in poetry or prose fiction.

Additional information and requirements may be found in the *English Graduate Guidelines*, which may be consulted online at http://english.okstate.edu.

Foreign Languages and Literatures

Perry J. Gethner, PhD - *Norris Professor and Head*

The Department of Foreign Languages and Literatures offers French, German, Russian and Spanish as major fields of study. Minors may be earned in French, German, ancient Greek, Japanese, Latin, Russian and Spanish, or an Area Studies program.

In all languages offered by the department, elementary courses are available for students with no previous experience. First and second-semester Spanish are offered in intensive form in the summer session. Students with previous foreign language experience may take placement tests to find the course best suited for their level of proficiency. A major in a foreign language is often supported by study of another language or work in other fields.

The study of foreign languages is a vital and humanizing part of a general education. In a rapidly changing and shrinking world, it offers new cultural insights, breaks down insularity, fosters discipline of thought and expression, and leads to a better understanding of one's native language. Foreign language majors may expect to find openings in a wide variety of careers in law, medicine, government, industry and commerce, all of which require a liberal arts degree. Job opportunities are greatly enhanced for those who combine foreign language study with a major or minor in other disciplines. Moreover, there is a growing demand for foreign language teachers in secondary education. Bachelor of Arts candidates may qualify for teaching licensure without increasing the number of hours required for graduation.

In addition to the standard courses in language, literature and civilization for individual languages, the department offers literature-in-translation courses for general education, and courses in German for reading knowledge and Russian for reading knowledge.

Geography

Dale R. Lightfoot, PhD - *Professor and Head*

Geography is a diverse discipline concerned with the surface of the earth and its immediate atmosphere. Geographers study the similarities, the differences and interactions among phenomena in this region. Geographers are interested in the economic, social, political and environmental qualities of places, and in how these attributes interact.

Geographers attempt to understand human behavior by answering such questions as: Where do people work? Where do they play? Where do they live? Why do people make these locational choices? What are the consequences of these decisions and behavior?

Because the physical environment is important in many explanations of spatial behavior and spatial patterns, geographers have traditionally concerned themselves with relationships between humans and their environment. What impact do people have on the land? What impact does the land have on people? How do people perceive their environment? How does this perception influence their activities?

Finally, geographers examine spatial patterns and behaviors in specific regional contexts. These analyses occur at many levels—world-wide, national and local. These kinds of studies lead to suggestions for change and improvement—the application of geography to contemporary rural, urban and regional problems. Thus many aspects of urban, regional and national planning are geographic in nature.

No academic discipline has broader interests than does geography, and the Department of Geography allows students the flexibility to pursue studies that lead to a wide range of educational goals and careers. Students with interests in environment, planning, real estate, economic development, international affairs, travel, remote sensing, Geographic Information Systems, area studies, management or education are among those who can be accommodated. A geography minor program is also available for those who see geography as complementary to another field of study.

Those who wish to study geography tend to be interested in their own surroundings and in other places. They also possess a curiosity for maps, the basic tool of the field. Students of geography will become familiar with remote sensing, computer graphics, statistics, Geographic Information Systems and cartography—tools which facilitate geographic inquiry and analysis.

Many careers are available to the geography major or minor. Recent graduates have been employed in urban and regional planning, community development, locational analysis in both the public and private sector, resource planning and management, various forms of domestic and Foreign Service, cartography and teaching. Geography also provides an excellent foundation for a liberal education and is a good basis for a career in business, industry or government.

The department manages a simulations laboratory, the Center for Applications of Remote Sensing, a palynology/paleoecology laboratory, a computer mapping facility, spatial database facility, field mapping equipment such as Global Positioning System receivers, an interactive weather analysis system with satellite data feed, and an ARC GIS equipped geographic information system laboratory. Two national journals are edited and published by faculty members in the department, the *Journal of Cultural Geography,* and the *Journal of Central Asian Studies.*

The department specializes in three areas: cultural and historical geography, resource management, and urban/transportation geography. Complementary course work supporting these specialized areas is available in other departments.

The Department of Geography offers the BA and BS degrees. An advanced program leading to the MS and PhD degrees is also available. The department also sponsors students in the interdisciplinary MS and PhD programs in environmental science.

—Certificate in Geographic Information Systems (GIS). The certificate in GIS provides students with broad exposure to principles and applications of GIS. A student who has earned the certificate is well-versed in general GIS theory and has knowledge and/or practical exposure to the following: (1) hardware and software used in GIS, (2) planning and construction of spatial and non-spatial databases, (3) GIS analyses (performed on data related to the student's area of interest), and (4) representation of data in both mapped and tabular form. Requirements for the certificate are designed to parallel skills needed by GIS professionals. Through elective courses, students focus on one of several areas of specialization. Admission into the certificate program is open to anyone enrolled as an undergraduate student, graduate student or special student at OSU. To receive a certificate in GIS, a student must complete 21 hours of course work in GIS and related topics and hold a bachelor's or more advanced degree from OSU or an accredited college. Students may work toward the certificate while completing their bachelor's or graduate degree.

Graduate Programs

The Department of Geography offers work leading to the MS and PhD degrees. These degree programs emphasize preparation for employment in positions which are enhanced by an ability to recognize and to interpret spatial distributions, and to analyze regions.

Particular emphasis is placed on the applied aspects of geography, with many graduates employed by private business as well as city, regional, state and national planning agencies. Recipients of graduate degrees in geography have also gone on to a variety of successful careers in

various fields, including retail store location analysis, city planning, environmental assessment, and university teaching and research.

—The Master of Science Degree. Admission to the master's program in geography is granted to college graduates with superior academic records. An undergraduate geography major is not required. Majors from the social, physical, and behavioral sciences and from the humanities are encouraged to apply. Incoming graduate students must demonstrate competency in cultural geography, physical geography, statistics, and cartography. If a student lacks these prerequisite skills, an additional course in each of these subjects is required.

Two basic plans of study exist for the master's degree. One plan requires a minimum of 30 credit hours, including a thesis; the other is a 36-credit-hour non-thesis option. Plans of study can be developed to accommodate many interests. Major faculty interests include resource management, cultural and historical geography, urban and transportation geography, regional analysis and development, and cultural and political ecology.

—The Master of Science in Business Geographics Degree. The new Business Geographics degree program at OSU, jointly managed by the Department of Geography (College of Arts and Sciences) and Management Science and Information Systems (Spears School of Business) provides an advanced venue for learning aimed at students seeking professional opportunities in business and technology related organizations which use MIS and geographic technologies such as GIS to analyze business and public information from online mapping and application customization. Areas covered in this interdisciplinary market include marketing location analysis, systems development, and socio-demographic research. Admission to the master's program in Business Geographics is granted to college graduates with superior academic records. An undergraduate geography or business degree is not required, although a degree in one of these areas is preferred. The admission requirements for this program include an undergraduate GPA of 3.0 or higher, GRE or GMAT scores in the 70th percentile or higher, and an introductory background in GIS and/or MIS is strongly preferred. Exceptions to the test scores will be considered on an individual basis for students with an exemplary undergraduate record.

—The Doctor of Philosophy Degree. Admission to the PhD program is granted to students with superior records in their previous graduate study. A previous degree in geography is not required, but incoming students from other disciplines must demonstrate competency in cultural geography, physical geography, statistics and cartography. If a student lacks these prerequisite skills, an additional course in each of these subjects is required. A minimum of 61 hours of graduate credit beyond the master's degree is required for the PhD degree. These hours include core courses (13 hours), elective courses in geography (21 hours minimum), elective courses outside of geography (12 hours minimum), and dissertation hours (15 hours minimum). Each student chooses an individual doctoral committee that advises the student in the formulation of an approved plan of study for the degree. Students focus their studies in one of three department specialty areas: cultural and historical geography, resource management, and urban/transportation geography. Candidates for the PhD in geography must demonstrate either (1) proficiency in one language other than English, (2) reading knowledge of two languages other than English, or (3) proficiency in advanced quantitative methods, (4) proficiency in advanced qualitative methods, or (5) proficiency in a multi-skill track. To be advanced to doctoral candidacy, the student must demonstrate proficiency in three specialized subject areas within geography and related disciplines by passing written and oral comprehensive examinations. An important requirement for the PhD degree is the preparation and successful defense of a doctoral dissertation. The dissertation must demonstrate the candidate's ability to plan and complete independent, original research in geography.

Boone Pickens School of Geology

Jay M. Gregg, PhD - *V. Brown Monnett Chair of Petroleum Geology, Professor and Head*

Earth is the residence of the human race, therefore it is essential to develop a better understanding of the composition, internal and external processes that affect the Earth. Earth is an outdoor laboratory filled with opportunities to observe geologic processes in action. By applying knowledge of forces that shape Earth, geoscientists seek to reconstruct the past and anticipate the future. Geoscientists provide information to society for solving problems and establishing policy for resource management, environmental protection, and public health, safety and welfare.

Geology is concerned with the processes, the history, and the characteristics of the rocks and sediments that shape the Earth. Human activities, predominantly on or near the surface, have utilized rocks and rock products, mainly petroleum and metals, to contribute to the quality of life. Because the Earth is dynamic—that is, the land surface is constantly changing—knowledge of earthquakes, volcanoes, plate tectonics, floods and landslides, to name a few dynamic events, is critical to minimize human suffering and economic loss. Within geology, different specialties, such as petroleum geology, ground-water geology (hydrogeology), geomorphology (study of surface processes), structural geology, and paleontology (study of fossils), have developed.

The Boone Pickens School of Geology offers traditional academic program services, awards BS, MS and PhD degrees in geology and conducts various outreach programs. Geology majors are provided a quality education designed to develop leadership skills and enhance employment opportunities. The faculty of the Boone Pickens School of Geology conducts research in the areas of continental tectonics, conventional and unconventional energy resources, environmental issues, paleoclimatology, geophysics/remote sensing. In these areas, the school has already established a sound infrastructure—appropriate faculty appointments, laboratory and computer upgrades, and a sound record of productivity. Geology undergraduates are eligible for one of at least 10 available departmental scholarships, based on academic achievement and need. Teaching assistantships, research assistantships, and fellowships are available for qualifying geology graduate students.

Geologists are employed extensively in applied and pure research and in teaching. Applied research includes the exploration for, and development of, oil and gas fields, metallic and nonmetallic mineral deposits, and reservoirs of ground water. The geologist is well-prepared to pursue and direct environmental studies. Careers in research may be found with private employers, government agencies or universities. Teaching positions in geology are available at all levels, beginning with secondary education. As with most other sciences, more employment opportunities will be available to students with advanced training and a broad background. In general, careers as teachers in a college or university and in research are open only to those with graduate training.

Graduate Programs

—Prerequisites. The student should have at least 30 credit hours in geology, including courses in physical geology, historical geology, mineralogy, petrology, sedimentology/stratigraphy, structural geology and field camp. Additional undergraduate requirements to enter the master's degree program include: two classes in chemistry or geochemistry, two classes in physics, math through calculus II, and one biology course. Deficiencies in course work must be made up by the student after entering the program. The Graduate Record Examination is recommended, but not required, for admission to the program.

—The Master of Science Degree. The MS is awarded through the completion of a thesis. Each candidate must complete at least 30

semester credit hours of work beyond the prerequisites. As many as 12 of these may be taken in other departments of the University upon approval by the candidate's advisory committee. A final defense of the thesis and the research that it documents is required of all students.

—The Doctor of Philosophy Degree. The PhD is awarded upon completion of a doctoral dissertation. A minimum of 60 credit-hours (course work and research hours) beyond the MS or MA degree are required for the PhD. Under normal circumstances, students must hold a master's degree in geology or a related field to be accepted into the PhD program. However, under exceptional circumstances, students may be accepted directly into the PhD program without a master's degree. Such students will be required to complete a total of 90 semester credit-hours (course work and research hours) to earn their degree. Such decisions are made by the entire faculty of the School of Geology, upon recommendation of the Graduate Advisor. To be admitted to candidacy, students must pass a written and oral qualifying exam, and successfully defend their dissertation research proposal and pass an associated comprehensive exam. The dissertation is expected to take the form of a series of manuscripts published in the peer-reviewed literature. The PhD is conferred after the successful defense of the dissertation.

Gender and Women's Studies

Carol Mason, PhD - *Associate Professor and Director*

Gender and Women's Studies is an interdisciplinary program offering a minor for undergraduates, support for curricular development and research by faculty, and opportunities to collaborate with community and campus partners who are intrigued by how gender shapes the world. Faculty and courses from twelve departments across the university contribute to the program.

The minor is offered through the College of Arts and Sciences, but is open to all undergraduates regardless of major. In addition to two required courses in Gender and Women's Studies (GWST 2113 or 2123; 4113), students choose from courses focusing on gender and women (9 hours), and from classes that complement gender and women's studies (6 hours).

Students in Gender and Women's Studies pursue research in the history of women, in theories of gender, in feminism, in the cultural construction of masculinity, and in the cross-cultural intersections of race, class, nationality, and sexuality. Work in Gender and Women's Studies can lead to and enrich a wide variety of careers, including nonprofit development, graduate training in humanities and the social sciences, education, curatorial administration, human resources, creative writing and reportage, international relations, publishing, public relations, electoral politics, and advocacy.

History

Michael F. Logan, PhD - *Professor and Head*

History is the record, explanation, and interpretation of the totality of human activities. The study of history is unique in its concern for the role of time in human development. History enhances the individual's knowledge of self and gives perspective and deeper meaning to contemporary events. Courses in the Department of History are intended to give the student a broad understanding of the evolution of civilizations, peoples, countries, and institutions, and an insight into the meaning of this evolution. They are also designed to prepare graduates for many types of employment.

Because history is basic to many special fields, the Department's instruction is designed to aid students interested in education, law, journalism, scientific and technical disciplines, public service, and business administration. Students in colleges other than the College of Arts and Sciences who wish to pursue the study of history are encouraged to enroll in courses of interest. The Department of History offers a number of courses that satisfy General Education requirements in the social sciences and the humanities. It participates actively in the Honors Program and offers to its majors the option of pursuing a special plan of study leading to a Departmental Honors certificate. The Department of History also participates actively in interdisciplinary minors and in the Women's Studies minor.

Graduate Programs

The Department of History offers programs leading to the MA and PhD in history. In addition to the general Graduate College requirements, the candidate for the Master of Arts or Doctor of Philosophy degree with a major in history is expected to have prerequisites of approximately 30 semester credit hours (including 18 upper-division hours) of undergraduate history courses, with an undergraduate grade-point average of at least 3.00.

—The Master of Arts Degree. Admission to the master's program requires submission of scores for the verbal, quantitative, and analytical sections of the Graduate Record Examination. Candidates for the Master of Arts degree choose one of two alternative plans. Requirements common to both plans include completion of a course (HIST 5023) in historical methods of research and writing, several graduate seminars, and a two-hour oral examination at the end of the program. Students must maintain at least a 3.00 ("B") grade-point average. An advisory committee will be appointed for each student during the second semester of enrollment. The two plans are designed for different careers, and the distinctive requirements of each are summarized below:

PLAN I—(This plan is recommended for those planning to continue graduate studies at the doctoral level.) Students must complete a minimum of 30 hours of graduate courses in two fields. These hours must include at least 12 hours of seminar offered by the department (including at least one research seminar), Historical Methods (HIST 5023), and six hours of thesis (HIST 5000). Students will take at least 12 hours in the major field and at least 9 in a minor field. With the consent of their advisory committee, student may take course at the graduate level in a related discipline.

Fields of study include:

United States
Europe
World

Students must demonstrate satisfactory reading knowledge of one foreign language.

PLAN II—(Students must be pursuing Public History.) Students must complete a minimum of 36 hours of graduate courses. These hours must include at least 3 hours of research seminar, 6 additional hours of seminar offered by the department (reading and/or research), Historical Methods (HIST 5023), Introduction to Public History (HIST 5033), an internship (HIST 5030), and 6 hours of thesis (HIST 5000). Normally, students will also take Museum Studies (HIST 5053) and/or Historic Preservation (HIST 5063). With the approval of the student's advisory committee, as many as 9 of these hours may be taken in related disciplines.

—The Doctor of Philosophy Degree. Admission to the doctoral program requires a satisfactory score on the Graduate Record Examination. Each applicant must also meet Oklahoma State University requirements for the MA degree in history, with preference for applicants having at least a 3.50 grade point average (on a 4.00 scale).

All doctoral students must have taken Historiography (HIST 6023), Historical Methods (HIST 5023) and Teaching History at the College Level (HIST 5021), and must take at least 12 hours seminar, including at least one research seminar in addition to any seminars taken as a master's student. Work necessary to prepare the student for his or

her written and oral examinations will be indicated in a plan of study which is prepared and approved by an advisory committee. Generally, a minimum of 60 semester graduate credit hours beyond the MA degree with at least a "B" grade average for all courses is required.

The prospective doctoral student must offer four fields for examination, one of which may be a pertinent field outside of history. Students specializing in United States history must offer for examination:

1. The United States history field.
2. One chronological or topical field from the following:

   Early America to 1787
   Nineteenth-century United States, 1787-1877
   Modern United States, 1877-present
   United States economic
   United States military
   United States social and intellectual
   United States South
   United States West
3. Two fields from the following:

   Ancient Mediterranean world
   Medieval Europe
   Early modern Europe to 1789
   Europe since 1789
   East Asia
   England to 1714
   Latin America
   Middle East
   Russia and East Europe
   Women's history
   Public history

Students specializing in non-United States history must offer for examination:

1. Three fields from the following:

   Ancient Mediterranean world
   Medieval Europe
   Early modern Europe to 1789
   Europe since 1789
   East Asia
   England to 1714
   Latin America
   Middle East
   Russia and East Europe
   Women's history
2. Any field in United States history.
3. With the consent of their advisory committee, students may substitute for one of the fields (except United States history) a pertinent field outside history. At least 9 hours of graduate course work in a field outside history would normally be expected.

Upon admission to do graduate work at the doctoral level, the student's temporary adviser is the departmental director of graduate studies. Before the middle of the student's second semester, an advisory committee is appointed to assist the student in preparing the plan of study. This committee will consist of four members of the graduate faculty (one from each of the examination fields), including the student's major advisor, who acts as chairperson.

No student is admitted to candidacy until he or she has (1) demonstrated a reading knowledge in at least one foreign language; (2) completed all course work on the plan of study; (3) completed with a grade of “B” or higher graduate courses in historical methods, historiography, and teaching history at the college level; (4) obtained approval of a proposed dissertation topic; and (5) passed comprehensive written and oral examinations in each of the areas of concentration.

Upon admission to candidacy, the student begins work on the dissertation. Supervised by the major advisor and members of the advisory committee, the dissertation provides the student an opportunity to do original research on a topic within the major area of study. The final dissertation must be submitted to the Graduate College in accordance with the regulations contained in the "Graduate College" section of the *Catalog*. Upon completion of the dissertation, the student undergoes a final examination. Oral in nature and no more than two hours in length, the examination is primarily a defense of the dissertation.

School of Journalism and Broadcasting

Derina Holtzhausen, PhD - *Professor and Director*

At Oklahoma State University, the professional areas of mass communication are grouped in the School of Journalism and Broadcasting (SJB). These areas seek to complement each other with a minimum of duplication.

A modern democratic society cannot live by its ideals if its mass media practitioners are merely competent technicians who worry less about *what* is reported to the people than *how* it is reported. Citizens must have accurate information about social, political and economic problems as well as knowledge of actions taken by government agencies at all levels. From village council to Supreme Court, there can be no exception from the rule that public business is the public's business.

To speak to people through radio, television or the printed page requires knowledge of the people to whom one wishes to speak and an understanding of the world in which they live. Therefore, the curriculum of the School of Journalism and Broadcasting is designed to offer more than training in communication techniques. Three-quarters of the SJB student's time at the University is devoted to a liberal education in the arts and sciences. At the same time, the student gains competence in a professional field through courses in the SJB.

Undergraduate students in the School of Journalism and Broadcasting will:

1. Demonstrate an understanding of the relevant constitutional freedoms, legal issues and ethical principles in mass communications.
2. Demonstrate an understanding of the relevance of human diversity in mass communications.
3. Demonstrate an understanding of the history and social role of mass communications.
4. Demonstrate critical, creative and individual thinking.
5. Demonstrate an understanding of the relevant theories and concepts of mass communications.
6. Demonstrate an understanding of the methods and techniques of research and information gathering.
7. Demonstrate appropriate writing, editing and production techniques in mass communications.
8. Demonstrate an understanding of relevant planning and management methods in mass communications.

Accreditation

The undergraduate programs of study in the School of Journalism and Broadcasting are accredited by the Accrediting Council on Education in Journalism and Mass Communication.

Admission to the Undergraduate Program

Admission into the School requires completion of 28 hours with a minimum graduation retention GPA of 2.50. Enrollment in all upper-division JB courses except JB 3173 and 4253 requires admission into

the School, a passing score on the SJB language proficiency exam, and a minimum grade of "C" in JB 2003. The ability to type a minimum of 30 words a minute and either a computer course or computer literacy is also required for enrollment in all writing courses beginning with JB 2003.

—Requirements for Graduation. The programs of study offered in the School of Journalism and Broadcasting are built around strong writing, liberal arts and professional components. Of the 127 hours required to earn a degree in SJB, students must complete up to 45 semester hours in journalism and broadcasting courses and a minimum of 65 hours in traditional liberal arts courses.

Students must have a minimum 2.5 GPA in all JB courses and major requirements with a minimum grade of "C" in each course. No more than 12 hours in JB courses may be transferred from other institutions.

All students majoring in Journalism and Broadcasting are also required to develop and maintain a portfolio exhibiting their best and most appropriate work as well as assignments required for the portfolio. School faculty, staff and industry professionals will evaluate these portfolios periodically and offer guidance and constructive criticism. It is anticipated that the portfolios will be helpful in showcasing students' performance when they apply for internships or jobs.

Advertising

Ideas ranging from the introduction of new products and services to public service messages are communicated to mass audiences through advertising. Advertising also provides the economic base for the mass media—newspapers, radio and television, magazines, cable—thus freeing them from the political control found in many countries.

Upon a strong liberal arts foundation, majors in advertising build educational experiences that prepare them for work in copywriting and layout, production, management, media selection, market analysis, sales and campaign planning. The program focuses on decision-making and problem-solving, and includes courses in marketing, psychology, sociology, management and economics. Opportunities for part-time jobs, summer internships, participation in the Advertising Club and the National Student Advertising competition round out the student's experience.

The program is also designed for students who wish to write, sell and produce commercial messages, and to move into management or ownership positions in media or other parts of the industry.

The program is affiliated with the American Advertising Federation and the American Academy of Advertising.

News-Editorial

News coverage today has gone beyond routine reporting on police and city hall activities. The modern newspaper tries to spotlight the diverse components of our complex society. This objective calls for writers with broad interests and special knowledge in politics, religion, science, business, economics, art and public welfare.

The news-editorial program prepares students for writing and editing positions on newspapers, magazines, and trade journals, in radio and television news departments, and in book editing and publishing.

Students may combine other areas of interest and journalism to prepare for specialized work in technical writing and editing.

Journalism majors assist in the publishing of a campus newspaper, *The Daily O'Collegian*, in the newsroom of radio stations KOSU and KXZY, and in audio and video news programming cablecast over a local cable station. Many juniors and seniors find this work a source of revenue to assist them in the cost of their education. Advanced news-editorial students also spend one summer on an internship with a commercial newspaper or broadcasting station, and some spend the spring or fall semester on a daily newspaper. Some hold part-time jobs as campus correspondents for various publications or work for media in the Stillwater area. Part of the laboratory work in JB 3263, 3313, 4313, and 4423 is done on *The Daily O'Collegian* or other publications.

The news-editorial program is affiliated with the Oklahoma Press Association, Southwest Journalism Congress, and the Society of Professional Journalists.

Public Relations

Public relations practitioners work in a variety of organizational situations including businesses, public relations agencies and non-profit groups of all types. The work involves a wide variety of activities from planning public relations campaigns and special events to preparing various kinds of communication such as brochures, newsletters, news releases, speeches and annual reports. The purpose of public relations work is to help develop mutual understanding between an organization and the audiences who are important to the success of the organization.

The public relations program of study is designed to provide students with the ability to: (1) write and communicate well, (2) recognize the public relations implications of real situations and the needs of organizations, (3) understand the public relations process and how to apply it, and (4) understand the characteristics of the mass media and their importance in public relations.

The public relations program is affiliated with the Society of National Association Publications, International Association of Business Communicators, and the Public Relations Society of America.

Broadcast Journalism

The hands-on broadcast journalism curriculum prepares students for careers in such performance-based fields as broadcast news and sports reporting and anchoring, while also providing extensive training in such behind-the-scenes jobs as videographer, writing, editing and news production, and station management positions. Optional course work in the broadcast sequence also acquaints students with the basics of executive-level careers in radio and television programming, station promotion, and management.

Students learn the basics of audio, video and computer-mediated production on state-of-the-art equipment and are challenged to put those skills to use by participating in the daily operation of cable radio station KXZY and various video productions. Internships at broadcast and cable outlets in the region also provide students with on-the-job experience and a valuable opportunity to work with seasoned media professionals.

The broadcast program is affiliated with the National Association of FM Broadcasters, Radio Advertising Bureau, Oklahoma Association of Broadcasters, Oklahoma Broadcast Education Association, National Association of Broadcasters, Broadcast Education Association and National Public Radio.

Sports Media

This program, one of very few undergraduate degrees in sports media in the United States, offers students the option of concentrating in sports broadcasting, sports journalism or sports public relations and promotion.

Students pursuing an undergraduate degree in sports media from OSU receive classic hands-on training in all aspects of the industry. Depending on the area of concentration, course work may include sports writing, play-by-play announcing and field production.

Oklahoma State University and the School of Journalism and Broadcasting enjoy a special relationship with sports media throughout the country. As a major sports venue, the OSU campus is visited regularly by national and regional sports media - both print and broadcast - to cover major sporting events. These media organizations routinely utilize SJB student workers. The 2004 debut of ESPNU was telecast from Stillwater because the campus represents classic collegiate sports, and because the network producers were able to rely on a supply of ready and trained Journalism and Broadcasting students.

The sports media faculty has strong professional backgrounds in the field and offers students the solid foundation in both theory and practice that prepare them for a variety of career paths.

Graduate Programs

The School of Journalism and Broadcasting offers courses leading to the degree of Master of Science in mass communications. Preferred qualifications for admission to the master's program include a bachelor's degree in an area of mass communication with an overall grade-point average of 3.00. The Graduate Record Exam (GRE) is required. Graduates of a non-mass communication discipline may enter the Master of Science program, with the stipulation that they complete, without graduate credit, foundation courses relevant to career interests during the first year of their graduate education.

Basic emphasis is on media management, application of current communication theories and research methods and designs to the professional aspects of mass communication. Electives in the behavioral sciences are encouraged.

Liberal Studies

Thomas A. Wikle, PhD - *Director*

Liberal Studies degrees meet the needs of students who desire greater breadth in the major than typical degrees allow. By combining course work across several Arts and Sciences social sciences and humanities disciplines, students tailor their curriculum to unique academic and career goals.

The major requires 45 hours distributed across at least three Arts and Sciences disciplines. To ensure coherence among courses selected across disciplines, a three semester hour senior project is required as a part of the major. The senior project is examined and approved by a panel of two faculty members who represent the disciplines in which the candidate concentrates course work.

Mathematics

Dale E. Alspach, PhD - *Professor and Head*

Contemporary mathematics is concerned with investigations into far-reaching extensions of such basic concepts as space and number and also with the formulation and analysis of mathematical models arising from varied fields of application. Mathematics has always had close relationships to the physical sciences and engineering. As the biological, social and management sciences have become increasingly quantitative, the mathematical sciences have moved in new directions to develop interrelationships with these subjects.

Mathematicians teach in high schools and colleges, do research and teach at universities, and work in industry, business and government. In industry, mathematicians usually work in research, although they have become increasingly involved in management. Firms employing large numbers of mathematicians are in the aerospace, communications, computer, defense, electronics, energy, finance, and insurance industries. In industry, a mathematician typically serves either in a consulting capacity, giving advice on mathematical problems to engineers and scientists, or as a member of a research team composed of specialists in several fields. Among the qualities which he or she should possess are breadth of interests and outlook, the ability to think abstractly and a keen interest in problem solving.

An undergraduate specializing in mathematics will begin with calculus or sometimes with college algebra and trigonometry. Well-prepared students are encouraged to establish credit in elementary courses by passing advanced standing examinations. All majors take courses in differential equations, and linear and abstract algebra and analysis. The remainder of the field of concentration is determined by the student's interests and future plans. Students are encouraged to acquire proficiency in computer programming and to take substantial work in related fields in which they have a special interest.

Undergraduate degree tracks are available to prepare students for: (1) employment in industry, business or government; (2) secondary school mathematics teaching; and, (3) graduate study in mathematics. Students choosing secondary school teaching complete all requirements for state licensure as part of this program.

Many of the more challenging positions in mathematics require study beyond a bachelor's degree. For example, university teaching requires a PhD, while teaching in a junior college requires at least a master's degree and possibly a doctorate. Approximately 25 percent of the students receiving a bachelor's degree in mathematics go on to graduate work.

Graduate Programs

The Department of Mathematics offers programs leading to the Master of Science and Doctor of Philosophy degrees.

—Prerequisites. A student beginning graduate study in mathematics is expected to have had, as an undergraduate, at least 18 semester hours in mathematics beyond elementary integral calculus including courses in differential equations, linear algebra and modern algebra. An applicant whose preparation is deficient may be admitted to the program, if otherwise qualified, but will be required to correct the deficiency, increasing somewhat the time required to complete work for the degree. Prospective graduate students are advised to take at least introductory courses in related fields such as physics, statistics, and computer science.

—The Master of Science Degree. The department offers three tracks in the Master of Science degree, computational and applied mathematics, mathematics education and pure mathematics. Each degree requires 32 credit hours of graduate course work in mathematics or related subjects. Two of these hours are waived if a master's thesis is written. Each student must have a grade of "A" or "B" in 18 hours of core course work.

—The Doctor of Philosophy Degree. The department offers three tracks for the PhD degree: applied mathematics, mathematics education and pure mathematics. Admission to the PhD program is granted only to students with superior records in their previous graduate or undergraduate study. A minimum of 90 semester credit hours of graduate credit beyond the bachelor's degree is required for the PhD degree. This may include a maximum of 24 hours credit for the thesis. Each student has an individual doctoral committee which advises the student in the formulation of an approved plan of study for the degree. Each student must pass three comprehensive exams from a selection of core topic areas, or pass two such exams and complete a minor thesis.

The most important requirement for the PhD degree is the preparation of an acceptable thesis. This thesis must demonstrate the candidate's ability to do independent, original work in mathematics, or mathematics education.

Microbiology and Molecular Genetics

William D. Picking, PhD - *Professor and Head*

Microbiology/Cell and Molecular Biology

Microbiology is the study of bacteria, viruses and fungi and their many relationships to humans, animals and plants. Cell and molecular biology is the study of how cellular components interact to promote life processes. Microbiologists apply their knowledge to public health and sanitation; food production and preservation, industrial fermentations which produce chemicals, drugs, antibiotics, alcoholic beverages and various food products; prevention and cure of diseases in plants, animals and humans; biodegradation of toxic chemicals and other materials present in the environment; insect pathology; and other activities which

seek to control microbes, to enhance their useful activities and prevent those which are harmful. Microbiology is the basis for the exciting and expanding field of biotechnology which endeavors to utilize living organisms to solve important problems in medicine, agriculture, and environmental science.

Microbes live in a great variety of environments and carry out many of the processes found in higher organisms. They are thus interesting in their own right as model systems for the study of reactions which occur in higher organisms. As subjects for research in biochemical and molecular genetics, microbes have contributed most to the current knowledge of genetics at the molecular level (microbial systems are in the forefront of genetic engineering).

Departmental courses are designed to provide comprehensive training and the skills required for working with microorganisms, as well as a broad understanding of all aspects of microbial life. Many of the microbiology positions require graduate level studies. The undergraduate program includes five options: Molecular Genetics, Microbial Ecology/ Environmental, Microbial Pathogenesis, Clinical Laboratory Science, and Biomedical Science. In addition to the BS degree, the department offers graduate studies leading to the MS and PhD degrees in various areas of concentration, including virology, microbial physiology, microbial genetics, microbial anatomy, immunology, and several applied areas.

Opportunities for employment exist at all scholarly levels, in many local, state and national government agencies and in varied industries. The record for employment of microbiologists has been excellent for many years and with the increased interest in biotechnology, employment opportunities look even brighter for the future.

These fields require a solid knowledge of other sciences and students should take high school courses in mathematics, biology, chemistry and physics. Students should have broad interests in how living cells work and have aptitudes for biology and chemistry.

Molecular Genetics Option

This option includes the study of DNA and RNA synthesis and how genes are expressed to allow differentiation of a single-celled egg into a complex multicellular organism. Molecular biologists study protein synthesis, cell ultrastructure, organelle structure and function, enzymology, and the collection of concepts and procedures commonly known as "biotechnology" or "genetic engineering."

With the advent of modern molecular biology, studies of the fundamental processes of living cells have taken dramatic strides. This option at Oklahoma State University has been designed to allow students to acquire training in a multidisciplinary atmosphere that prepares them for employment in the rapidly growing fields of bioinformatics, molecular genetics, biotechnology, and several other areas. Students following this avenue of study will be well prepared to continue toward the MS or PhD degrees at this or other institutions or to find employment directly upon graduation.

Microbial Ecology/Environmental Option

Microorganisms play an astonishingly important role in the evolution, ecology, and biogeochemical processes of our planet and in sustenance of its inhabitants. This option deals with the role of microorganisms in the environment, their diversity and interactions with each other and with the environment in which they live. The application of the latest molecular tools in retrieving genomic information directly from the environment has provided access to the vast microbial world of uncultivable organisms and in exploring their identity, in-situ activity, genetic diversity, and their importance to human health and the environment. The development of innovative cultivation strategies has helped isolate elusive microbes from some of the most unusual and extreme environments, and thus providing glimpses into their novel genes and metabolic potential that can be exploited for the development of biotechnology. The Microbial Ecology - Environmental Microbiology is truly an interdisciplinary science. To explore the inner workings of microbes and the processes they catalyze in complex ecosystem, a multidisciplinary integrative approaches involving disparate disciplines such as microbiology, geology, molecular biology, and computation biology are required.

Microbial Pathogenesis Option

The aim of the Microbial Pathogenesis option is to train undergraduate students seeking to pursue graduate studies in this field or a career in medically related fields. A third of all preventable deaths on this planet are due to infectious diseases. Over a period of several decades, there has been a significant decline in infectious diseases due to the considerable impact of medicine and scientific research. However, there is an upsurge of infectious threats to human beings in the recent years. This has been due to a number of reasons, including the emergence of new and antibiotic resistant infectious agents and a scarcity of effective vaccines.

This option focuses on the study of the various groups of infectious agents, the mechanisms employed by these agents to subvert the host immune system and cause tissue damage, and their interactions with host cells. A comprehensive understanding of the complex mechanisms of microbial pathogenesis requires study of molecular biology of the pathogens, eukaryotic cell biology and the host immunological defense strategies. Our BS degree program in Microbiology with the Microbial Pathogenesis option is designed to expose the students to this exciting area of science so that they are well equipped to pursue their chosen careers.

Clinical Laboratory Science Option

This option is designed to give the student the broad general education and the highly technical skills that are required for a successful career in this important medical science. The minimum requirement for the BS degree in clinical laboratory science (CLLS) is three years of university work that includes general chemistry, organic chemistry, biochemistry, immunology, genetics, anatomy & physiology, physics, upper-division courses in microbiology, calculus, and one year of clinical laboratory education (internship) in an approved school of clinical laboratory science.

For the BS degree and certification, the students will, after three years of university work, complete one year of clinical internship in a school of clinical laboratory science accredited by the National Accrediting Agency for Clinical Laboratory Science (NAACLS) and currently affiliated with Oklahoma State University. Schools of clinical laboratory science/ medical technology are located at the following hospitals: Comanche County Memorial Hospital, Lawton, OK; St. Francis Hospital, Tulsa, OK; Valley View Hospital, Ada, OK.

Clinical Laboratory Science is unique in that students are able to enter a health profession directly after obtaining a BS degree. Clinical laboratory scientists comprise the third largest segment of the healthcare professions and are an important member of the healthcare team, working with doctors and nurses. This is a very versatile profession and allows the graduate to seek employment opportunities in healthcare laboratories, administration, health law, medicine, dentistry, veterinary medicine and more.

Biomedical Science Option

Students electing this option plan to complete at least 90 hours of course work toward a microbiology/cell & molecular biology major, including professional program prerequisites, and apply to their professional program (chiropractic, dental, medical, optometry, pharmacy, podiatry, veterinary) during their sophomore year. Students accepted into one of these professional programs in their junior year can transfer credits earned in the first year of professional school back to Oklahoma State University to count toward a Bachelor of Science degree in microbiology/ cell & molecular biology.

Graduate Programs

Programs of course work and research leading to the degrees of Master of Science and Doctor of Philosophy are offered by the department in microbiology or cell and molecular biology. Students may elect either microbiology or cell and molecular biology within the MS and PhD program.

—Prerequisites. Applicants for admission must have received the baccalaureate degree from an accredited college and must have completed a minimum of 30 semester credit hours in biological and physical sciences. The Aptitude Test portion of the Graduate Record Examination is required of all applicants. An applicant will not be accepted unless at least one member of the departmental graduate faculty agrees to act as the applicant's adviser at the MS level. A majority of the departmental graduate faculty must approve an applicant at the PhD level.

—The Master of Science Degree. In addition to the general requirements for the degree, the following departmental requirements must be met in attaining 30 credit hours with thesis. The plan of study must include six credit hours in MICR 5000 and one credit hour in MICR 5160.

All candidates for the MS degree are expected to attend and participate in all departmental seminars. A final oral examination covering the thesis is administered by the advisory committee.

—The Doctor of Philosophy Degree. The study plan of a student entering the program with a bachelor's degree must include 30 credit hours in courses other than MICR 5000 and MICR 6000. Those entering with a master's degree must include 15 hours in courses other than MICR 6000 which were not included in the master's study plan. Three hours of MICR 5160 must be included.

All candidates for the PhD are expected to attend and participate in all departmental seminars. Candidates for the PhD degree must pass both a written and an oral qualifying examination. The final examination covering the dissertation research is given promptly after the candidate has given a public seminar on his or her research work.

Departments of Military Studies

Peter M.A. Sherwood, PhD, ScD - *Coordinator*

In agreement with the U.S. Air Force and the U.S. Army, OSU recognizes separate departments of Aerospace Studies and of Military Science as integral academic and administrative departments of the University. These two departments are administered within the framework of the College of Arts and Sciences. The two departments provide instruction under the basic and advanced Reserve Officers' Training Corps (ROTC) programs.

Scholarships

The Army and Air Force ROTC programs offer a wide variety of four, three, and two year merit based scholarship opportunities to qualified students interested in pursuing a commission in the Army or Air Force. ROTC scholarships provide payment for tuition, mandatory fees, books, and a monthly subsistence allowance for the duration of the scholarship period. An additional university based incentive scholarship of $1,000.00 per semester is allocated to 10 ROTC scholarship recipients annually. Four-year National ROTC scholarships are offered annually to high school seniors, who will be entering college in the fall semester. Scholarship applications may be obtained through local high schools, online or by contacting the University's ROTC department. In addition, the Army ROTC Program offers four and three year Guaranteed Reserve Force Duty Scholarships annually to students interested in pursuing a commission as an officer in the Army National Guard or United States Army Reserve.

Flexibility

ROTC at OSU offers a variety of programs, giving the student considerable flexibility in charting a path to commissioning in the Army or the Air Force. Programs are designed so those individuals in all OSU colleges, departments and majors can tailor their academic/ROTC curriculum in order to attain commissioned status. Opportunities also exist in both Army and Air Force ROTC for the student to "test the water" early in his or her academic program by participating in basic familiarization courses. Those interested in learning more about ROTC at OSU, or in enrolling, are urged to contact the professor of aerospace studies or professor of military science in Thatcher Hall on campus.

Aerospace Studies

Col Kevin C. Kriner, MBA, MSS - *Professor of Aerospace Studies and Head*

The basic four-year Air Force ROTC program consists of one classroom hour and one leadership laboratory period per week during the freshman and sophomore years. Additionally, at least two hours a week of physical conditioning is required. Basic courses give students a thorough background in United States Air Force (USAF) structure and history, as well as drill and ceremony, military customs and courtesies and wear of the uniform. Non-scholarship cadets enrolling in the freshman- and sophomore-level courses incur no military obligation. During the spring of the sophomore year, students compete for selection into the Professional Officer Course (POC); those selected will attend either a four-or five week field training encampment during the summer between the sophomore and junior years. For students getting a late start into the Air Force ROTC program, depending on academic major, there are two- and three-year programs that can lead to POC entrance and eventual commissioning.

Following completion of field training, students spend four semesters as POC cadets; academic courses consist of three classroom hours and one leadership laboratory per week, for three hours of credit per semester. Class work and laboratory involvement are designed to prepare the student for his or her future role as a leader in the USAF. In addition, students are given the opportunity to gain practical leadership experience by holding various positions of responsibility in the Cadet Wing. POC cadets not on two-, three- or four-year scholarships will receive $450.00-$500.00 per month subsistence allowance if they maintain retention standards.

All students have the opportunity to participate in various cadet wing-sponsored extracurricular activities during the year. These include visits to active Air Force installations to gain first-hand knowledge of the duties of junior Air Force officers; cadets are often taken on incentive flights in USAF aircraft. Cadets are also given the option to apply for numerous summer programs. These include expanded base visits, and even free-fall parachuting, and glider training programs in conjunction with the U.S. Air Force Academy.

Students who successfully complete the POC program are commissioned as second lieutenants in the United States Air Force, with a four-year obligation. Those who are selected for pilot or navigator training incur a ten-or six-year commitment, respectively.

Military Science

Lt Col William T. Beck - *Professor of Military Science and Head*

Students desiring to expand the scope of their education, while preparing for a dynamic and rewarding career as an officer in the United States Army, active duty, National Guard, or Army Reserve, choose the Army Reserve Officer Training Corps program (ROTC) as an adjunct to their chosen field of study. With courses dealing in a wide range of subjects from leadership to tactics, taught both indoors and out, the Army ROTC program produces over 5,000 second lieutenants each year across the nation.

The Army ROTC program consists of a basic course and an advanced course. Students desiring to see what the program is like may enroll

in up to 10 hours of military science with no commitment to the United States Army. During this basic course, emphasis is placed upon leadership, war gaming, individual skills, problem-solving, rappelling, and land navigation. All lower-division ROTC courses are open to the entire University community regardless of year in school.

Students committing themselves to a commission in the United States Army are permitted to enroll in the Army ROTC advanced course upon completion of the basic course or equivalent. The advanced course consists of 12 hours of academic work taken during the junior and senior year. In addition, participation in a five-week summer camp is mandatory. The advanced course emphasizes further development of leadership skills, offensive and defensive tactics, physical conditioning, ethics, military law, professional and basic military knowledge and skills. Additionally, advanced course students are responsible for use of required military skills as they act as assistant instructors during laboratory periods, plan leadership laboratories, plan and conduct field training exercises and are responsible for coordinating and supervising departmental extracurricular activities. In addition there are several students who join Army ROTC in the simultaneous Membership Program in which they are both students in the ROTC and members of the Army Reserve or Oklahoma National Guard. This provides tremendous experience and economic benefit.

All advanced course students must satisfy directed professional military education (PME) requirements prior to receiving a commission. The PME consists of two essential parts—a baccalaureate degree and completion of commissioning requirements to include an upper division military history course.

Students interested in the Department of Military Science are encouraged to visit with departmental faculty members at any time for further information concerning departmental course offerings and class sequence. A number of two-and three-year scholarships are available through the department. Prior enrollment in military science is not a prerequisite for departmental scholarship application.

Music

Brant Adams, PhD - *Professor and Head*

The music program at OSU serves students who plan careers in the field of music as well as those who desire to participate in any element of a comprehensive music program. Professional instruction prepares students for careers in performance, teaching, or the music industry. The OSU undergraduate degrees are also excellent preparation for graduate school and for church positions.

The student planning to major in music at the university level should consider his or her background carefully. It should include a strong interest in music during high school years and a talent for performance in vocal or instrumental music. Individual lessons, fundamental theory knowledge, and basic piano ability will also be helpful.

The music major may choose from the following degrees: (1) Bachelor of Music (BM) in performance, (2) BM in instrumental/vocal music education, (3) BM with elective studies in business, and (4) Bachelor of Arts (BA) in music. In addition, the Bachelor of University Studies allows the student to combine an interest in music with another outside field.

The student majoring in a discipline other than music may participate with music majors in all ensembles (choirs, opera, orchestra, wind ensemble, marching band, concert band, jazz bands, and chamber groups) and courses, as well as individual lessons for academic credit.

An active scholarship program provides assistance to music majors as well as non-majors. Students are invited to write, call (405) 744-6133, or check our Web site (http://music.okstate.edu) for audition information.

Faculty members, students and ensembles present over 100 concerts and recitals annually. The department also supports an active program of extension and outreach opportunities.

The Department of Music is accredited by the National Association of Schools of Music (NASM).

—Admission Requirements. Students wishing to major in music should contact the Department of Music to arrange for an entrance audition and interview.

Graduate Programs

Oklahoma State University offers a graduate degree which combines two elements that are important for many of today's musicians and music educators. The Master of Music in Pedagogy and Performance is available for the conductor, the school teacher, and the performer. We believe that a fine music pedagogue is an accomplished musician as well.

For the student pursuing the conducting track, we stress challenging studies in conducting skills, repertoire, and rehearsal techniques. The degree candidate will focus on his/her particular area of specialty and will have numerous opportunities to conduct appropriate choirs, wind bands, orchestras and string groups, and chamber ensembles.

As a part of specializing on his/her instrument, the student who chooses the applied music track will develop a refined knowledge of the literature composed for that instrument and will also learn the teaching and technical approaches that have been developed for that musical medium. Performing opportunities, both solo and collaborative, are an important component of the degree candidate's studies.

The school music educator will enroll in courses addressing the musical development of the students with whom he/she works. The practical application of advanced teaching techniques is a focus of studies, bolstered by the opportunity for additional study in applied music and conducting as appropriate.

The Master of Music in Pedagogy and Performance is a 32 hour degree. Each track includes courses in music research and bibliography, music theory, and music history. Elective credits that are built into each degree track permit the student to explore additional interests. Each degree candidate will complete a final project which contains both written and performing components. A final oral examination is also part of the degree requirements.

—Admission Requirements. To participate in the pedagogy and performance program, a student must first make application to the Graduate College. Prospective students must have earned a Bachelor of Music from an NASM accredited institution, or the equivalent. Students interested in the conducting track must audition on campus, or submit a video-tape of their conducting, and fill out the department of music application for admission. Students interested in the applied music track must audition on campus, or submit an audiotape of a recent performance (minimum of 20 minutes of music), and fill out the Department of Music application for admission.

—Financial Assistance. The Department of Music offers a variety of assistantships with areas of specialization including music appreciation, class piano, instrumental techniques, accompanying, and music technology. Additional scholarships may be awarded through the Department of Music.

Philosophy

Doren A. Recker, PhD - *Associate Professor and Head*

Philosophy is an intellectual activity to be practiced and a subject matter to be studied. As an activity, philosophy seeks to analyze, evaluate, and often reformulate the ideas, principles and arguments by which experience is understood and explained and by which action is directed and justified. Every area of experience or behavior—aesthetic, political, religious, scientific or moral—is considered by philosophy. The writings produced by great philosophers are worthy of study as models of thought and as artifacts of historical influence and cultural significance. In this latter role philosophy is related to the development of every academic discipline.

Courses offered in philosophy fall into three general groups: broad introductory courses that cover a variety of topics, historical courses that proceed chronologically through a sequence of thinkers, and special topic or field courses. Some offerings combine the latter two characteristics. Few undergraduate courses are intended primarily for majors. The BA program in philosophy has been approved for offering at OSU-Tulsa.

Students may pursue work in philosophy as part of their general education, as a support to their major area of concentration, as a minor, as a major leading to a BA degree, as a second major or in connection with a graduate program. The program in the major accommodates students of three sorts. The "general" track is designed for students who wish to explore philosophy as a general path to the refinement of their thinking, writing and speaking, and a deepening appreciation of the most fundamental and guiding ideas and values of civilization. It is a very flexible program, requiring two lower-division introductory courses, two upper-division historical survey courses and 19 hours of additional unspecified philosophy courses numbered 3000 or above. The "pre-professional" track is designed for students who wish to ground their professional interests (such as law, medicine, business, public service, the ministry), on a philosophic basis. Though requirements are technically the same for these students as ones on a general track, they are assigned a second advisor who helps to coordinate curricular and other activities for the best career preparation possible. The "graduate preparation" track is designed for students who are interested in pursuing graduate studies in philosophy. It requires an additional six hours of upper-division philosophy and mandates more specific courses than either of the other tracks. Students may shift from track to track at any time in their matriculation without prejudice.

A minor or a second major in philosophy will complement any other area of study. A philosophy minor requires 18 hours of unspecified philosophy courses, 12 of which must be numbered 3000 or above.

Graduate Programs

The Department of Philosophy offers a Master of Arts degree in philosophy. Consult "Master's Degree Programs" located in the "Graduate College" section of the *Catalog* for general regulations and requirements relating to admission.

The Master of Arts degree in philosophy offers a broad-based curriculum designed to serve the interests of two kinds of students:

1. *Professional Emphasis*: for the student who wishes to pursue his or her study of philosophy as a supplement to preparation in a wide variety of professions including business, law, government, the health professions, the ministry, or counseling.
2. *PhD Emphasis*: for the student who wishes to pursue his or her study of philosophy as a preparation for PhD studies in philosophy at another institution.

Students interested in the ***professional emphasis*** have the opportunity to choose from a wide variety of courses that support their career plans (biomedical ethics, business ethics, philosophy of law, philosophy of religion, and cognate courses in other disciplines).

Students interested in the ***PhD emphasis*** have the opportunity to enhance their understanding of the history of philosophy, logic, and metaphysics and epistemology.

Students in all of these programs are able to compete for teaching assistantships and may teach either Critical Thinking or Introductory Moral/Social Problems courses.

Prerequisites for admission to the program are 24 semester credit hours (at least 18 at the upper-division level) in philosophy including courses in the history of ancient, medieval, and modern philosophy (PHIL 3113 and 3213 or equivalents) and a course in logic (PHIL 3003 or equivalent). Students without these prerequisites, but otherwise admissible, may be granted "qualified" or "provisional" status until the prerequisites are satisfied.

The Master of Arts degree in Philosophy may be earned through any of three options: (1) Thesis option (twenty-four credit hours of course work plus six credit hours of research in which a thesis is written); (2) Report option (thirty credit hours of course work plus two credit hours of research in which a report is written); (3) Creative Component option (thirty-two credit hours of course work including a creative component).

Students will prepare a plan of study under the guidance of the graduate advisor. A student may choose one of two options. The first option is the General Track: this provides students with a well rounded background in the history of philosophy and the major areas of philosophy while leaving the student enough elective hours to pursue his or her special interests. The second option is the Applied Ethics Track: In addition to providing a rounded background in the history of philosophy, this track emphasizes courses in ethical theory and applied ethics.

All candidates for the Master of Arts in philosophy degree are required to pass two four-hour written examinations on selected major Western philosophical works. Each student is supervised by a three-person advisory committee appointed for, and in consultation with, the student.

A student may also, in accordance with the policies of the Graduate College, select a graduate minor in connection with the master's degree in philosophy, thus permitting a concentration of work in broad areas such as social thought, cognitive science, or religion.

Students pursuing a master's or doctor's degree in another field may elect philosophy as a graduate minor. Selected courses and seminars in philosophy can broaden and complement work in such areas as economics, education, engineering, English, history, psychology, and sociology.

Physics

James P. Wicksted, PhD - *Professor and Head*

Physics is the science of matter, energy and their interactions. Physics majors learn the fundamental laws governing the natural world, and in so doing develop critical skills of observation and quantitative analysis in both experimental and theoretical settings. Because those skills are increasingly valued in diverse fields in today's technological society, persons trained in physics are found not only in science, but also in fields where analytical skills are vital to success, such as finance, medicine, law and engineering.

The Department of Physics offers two bachelor's degrees. The BS in physics is for students who wish to concentrate on physics, and who may be interested in later obtaining master's and/or doctoral degrees and becoming professional physicists or astronomers. The BS in applied physics is for students who wish to combine physics with the study of other areas such as biology, geology, business, computer science, engineering, mathematics, or pre-medicine, perhaps in preparation for graduate degrees in those areas. Interdisciplinary study is also possible through double majors with physics, a major in physics with minor in

another subject, or minors in physics. The detailed requirements for all degrees can be obtained from the department and its Internet site.

Prospective physics majors should contact the departmental adviser as soon as possible to guarantee an enjoyable and profitable undergraduate career. A special freshman-level course, PHYS 1001, acquaints new physics majors with the department's professors and research, as well as with each other. During their first two years, physics majors learn the laws of mechanics (forces and motion) and electromagnetism which epitomize the work of Newton and Maxwell, among others. At the time, students develop their mathematical skills through courses in calculus and differential equations.

During their last two years, physics majors delve into advanced topics including the quantum and relativistic physics of Schroedinger, Einstein and their colleagues. Courses in laboratory and computational methods further develop experimental abilities. Students are also encouraged to work in the department's research labs or astronomical observatory. Students pursuing the BS in physics take additional physics courses and do a senior project. Students seeking the BS in applied physics replace the additional physics courses with upper-division courses in their chosen areas.

Graduate Programs

—Prerequisites. Thirty semester hours of physics beyond the elementary course work and mathematics courses through advanced calculus and differential equations are required.

—The Master of Science Degree. Students can choose between a thesis or non-thesis option. For both options, the required courses are PHYS 5113, 5313, 5413, 5453 and 5613. The thesis option requires the successful completion of 30 semester credit hours beyond the BS and the submission of an acceptable thesis (six credit hours of PHYS 5000) based on original and independent research, on a topic chosen in consultation with the student's adviser. The student must successfully defend the thesis in an oral examination. In addition, nine semester credit hours of electives must be completed in physics, mathematics or an allied field. The non-thesis option requires 32 semester credit hours beyond the BS degree, including two credit hours of library research (PHYS 5000) on a topic chosen in consultation with the student's adviser. The completed written report must be orally presented to the student's advisory committee. Fifteen hours of electives are allowed within this program, including up to nine credit hours of senior level courses, depending upon the student's background. The electives must be chosen in consultation with the student's advisory committee. For example, an advanced course in mathematics along with Solid State I and II may be reasonable choices for someone with a materials specialization. For others, more courses in electrical engineering may be preferable.

Also available is an MS program in photonics, with a specialization in physics, offered through the interdisciplinary MS in Natural and Applied Sciences major, in association with the School of Electrical and Computer Engineering. Students may pursue one of three options, all of which require 24 credit hours of course work with at least one course taken outside the student's specialization. Beyond this, the first option (30 credit hours) requires an additional six hours of research and a successful defense of a thesis. The second option (32 credit hours) requires an additional six hours of course work and a two-credit-hour report. The third option (36 credit hours) requires 12 additional credit hours of course work with a creative component. For the second and third options at least two courses must be outside the field of specialization and a successful oral presentation of the report or creative component is required.

—The Doctor of Philosophy Degree. Prior to the appointment of the advisory committee, as described in the "Graduate College" section of the *Catalog*, a comprehensive written examination administered over four sessions ("The Prelims") must be taken. This examination will cover the content of the course work required up to and including the MS degree and will be given once a year. It will be given in four parts of three hours each. The results of this examination will be included in a review by the Department of Physics to determine whether the student should be allowed to form a PhD advisory committee.

The following physics courses are required: PHYS 5113, 5213, 5313, 5413, 5453, 5613, 6313. Three additional PHYS prefix courses at the 5000 or 6000 level, including at least one course not in the student's specialization, must be completed. Additional courses reflecting the candidate's specialization may be required by the advisory committee. Ninety semester hours of credit beyond the bachelor's degree are required. A minimum of two-thirds of the graduate course credits must be in physics. No more than six credit hours of physics at the 4000 level can be counted toward graduate credit and no more than 12 total credit hours in all subjects at the 3000 or 4000 level can be counted toward graduate credit. Courses taken at another institution will be evaluated by a faculty committee to determine whether they satisfy any requirements.

A detailed Plan of Study reflecting these requirements, electives and transfer courses should be filed with the Graduate College by the student after consultation with the PhD advisory committee soon after passing the comprehensive exam. The advisory committee then administers the qualifying exam, the successful completion of which is a departmental requirement (in addition to any other requirements of admission to PhD candidacy imposed by the OSU Graduate College).

The most important single requirement for the PhD in physics is the presentation of an acceptable dissertation which represents original research work by the student and which demonstrates the student's ability to do independent study as well as to plan and carry out future research in his or her field.

A photonics PhD program involving electrical and computer engineering with physics as the home department is also available. Details of the multidisciplinary photonics PhD program are found in the "Graduate College" section of the *Catalog*.

Political Science

James M. Scott, PhD - *Professor and Head*

Political Science is, on the one hand, an ancient discipline with roots in Plato and Aristotle, and on the other, it is one of the most recent of the social sciences with roots in the early twentieth century. Political scientists study political institutions, the political behavior of individuals and groups, the formulation of public policy, the relations among states, and also enduring moral issues, such as what is justice and how leaders should be chosen. Political science, by its very nature, blends normative and empirical issues. Questions about democracy, participation, justice, and representation have both empirical and evaluative components. The discipline attempts to understand who participates in the political process and, when they do not, what it means for society. A major in Political Science offers the student a front row seat in the analysis of these questions. The principal fields of study in Political Science are political theory, public law, comparative politics, international relations, public administration, and American politics. Students may pursue the Bachelor of Arts (45 hours of political science and related course work in addition to General Education and college requirements), or the Bachelor of Science degree (45 hours of political science and related course work in addition to General Education and college requirements) in Political Science with a concentration in any of the fields of study. Either degree option requires a minimum of 24 hours of political science in courses numbered 3000 or above. Additional courses numbered 3000 or above from related areas of economics, English, foreign languages and literature, geography, history, philosophy, psychology, religion or sociology are necessary to reach the required hours of the degree option. The minimum GPA is 2.50 with a minimum grade of "C" in all upper-division political science and related upper-division course

work. Additional flexibility in the degree program is offered through internships, and opportunities to work with professors in developing independent study courses in areas where the department may not offer regular course work. Students may also pursue political science as a second degree, or as a minor to complement other areas of study. The minor in political science requires 15 hours of course work numbered 3000 or above, and must include three fields of political science. At least three of the hours must be taken in a field other than American politics, public law, and public administration. The required GPA for a minor is 2.50.

The political science major prepares students for a wide range of local, state, national and international careers, in and around government. It also provides preparation for admission to law school; teaching at the secondary level; urban and regional planning; political journalism; the conduct and analysis of foreign policy; and for graduate study in political science. At a more general level, political science has great career versatility for students. While the major does focus on the subject matter of government and politics, it also develops students' skills in critical analysis, written and oral communications, leadership and judgment. Such skills, prepare students for a wide range of options throughout their professional lives.

Graduate Programs

The Department of Political Science offers a Master of Arts degree in political science, a Master of Science degree in fire and emergency management administration, and a PhD in fire and emergency management and administration.

Candidates for the Master of Arts degree in political science complete a foundation of 18 hours of study and devote their remaining hours to specialization in two of the following areas: American politics, comparative politics, and international relations, with further specialization within these areas also possible. The plan is designed to prepare professional political scientists for careers in research and teaching, as well as administrative and policy positions in local, state or national government and international affairs.

Candidates who have significant professional experience in emergency services or have an undergraduate degree in an emergency service or related discipline may opt for the Master of Science in Fire and Emergency Management Administration. The MS in Fire and Emergency Management Administration is a specialized degree designed to provide an educational foundation for those who are currently serving or aspire to serve as managers or administrators in the fire service or emergency management. Candidates specialize in one of two areas: fire service administration or emergency management administration.

—Admission Requirements for Master's Degree Programs. Any student having a bachelor's degree with an overall 3.00 grade-point average (on a 4.00 scale) may be admitted as a student in full standing. Those with less than an overall 3.00 grade-point average are considered for admission on a probationary basis. All graduate students in the MA program would benefit from completion of an undergraduate statistics class. A GRE, LSAT, or MCAT exam score is required.

—Additional Admission Requirements for the MS in Fire and Emergency Management Administration degree. In addition to the general requirements outlined above, candidates for the Master of Science degree in fire and emergency management administration must meet one of the following requirements:

1. Have significant practical experience in a fire or emergency service organization.
2. Have a bachelor's degree in fire or emergency related discipline such as fire protection technology, fire management administration, fire science, emergency management administration; or
3. Not meeting the criteria specified in 1 or 2 above, complete a minimum of 12 hours of undergraduate study in fire protection and/or emergency management. Three of 12 hours must be an internship experience in fire or emergency management.

A complete application for admission to the master's program must include:

1. A completed Graduate College application submitted with a non-refundable application fee.
2. An official copy of undergraduate transcript(s).
3. Three letters of recommendation with at least one from an employer or faculty member familiar with the applicant's academic abilities.
4. TOEFL results for students for whom English is a second language. Students must have a score above 549 (paper exam) or 213 (computer exam) to be considered for admission.
5. A brief letter indicating interests and other information the applicant considers relevant.
6. GRE, LSAT, or MCAT score.

—Degree Requirements for the MA in Political Science. In addition to the general requirements of the Graduate College, requirements for the Master of Arts degree in political science are listed below.

1. A minimum of 33 credit hours in political science or closely related courses. These include: including nine required hours in research methods and foundations of Political Science (POLS 5103, POLS 5013, POLS 5023); three "proseminars" (American Politics, Comparative Politics, International Relations); at least nine hours of electives in two subfields (American Politics, Comparative Politics or International Relations); and a three hour "creative component" or six hour thesis. A minimum of 21 hours of political science graduate seminars (seminars numbered 5000 or above) is required. The student must successfully defend the thesis or creative component orally before the faculty committee.
2. Satisfactory completion of comprehensive exams in two of the following areas: American politics, comparative politics, international politics.
3. Minimum 3.00 grade-point average, with only one grade of "C" allowed.

—Degree Requirements for the MS in Fire and Emergency Management Administration. In addition to the general requirements of the Graduate College, requirements for the Master of Science degree in fire and emergency management administration are listed below.

1. A minimum of 39 credit hours in political science or closely related courses. Required courses include a nine hour scope of the field core requirement, a nine hour methods requirement, and twenty-one hours selected from either a fire administration or emergency administration specialization track. Students must complete a three-hour practicum research project or a thesis with a minimum of six hours, Pre-service students are required to take a three-credit hour internship.
2. Satisfactory completion of a final assessment project.
3. Minimum 3.00 grade-point average, with only one grade of "C" allowed.

—Admission Requirements for PhD in Fire and Emergency Management Administration. OSU Graduate College admission requirements include the following: An OSU Graduate College Application., payment of the OSU Graduate Application fee, and official transcripts of all previous college level course work including official transcripts that verify receipt of an undergraduate and graduate master's degree.

In addition, to the materials required by the Graduate College, applicants must meet the following departmental program admission requirements and provide the following documentation:

1. Undergraduate Degree: For the Fire Administration Track, an undergraduate degree in fire science, fire management, or a closely related degree. For the Emergency Management Track,

an undergraduate degree in emergency management or a closely related degree.

2. Master's Degree: For the Fire Administration Track, a Master of Fire and Emergency Management Administration, Master of Public Administration, or closely related degree. For the Emergency Management Track, a Master of Fire and Emergency Management Administration, Master of Emergency Management, Master of Public Administration, or similar degree.
3. GPA: Both Tracks require a minimum cumulative GPA of 3.0.
4. GRE: For both Tracks, scores from the Graduate Record Examination taken within the past two (2) years. A combined GRE score of 1100-1300 on the verbal and quantitative general exam is preferred but not required.
5. Professional Experience: For the Fire Track, professional experience in a mid-to senior-level management position in the fire service or related first responder services is preferred, but not required. For the Emergency Management Track, professional experience in emergency management or a related field is preferred but not required.
6. Research Skills: For both tracks, evidence of strong research skills as evidenced by research related course work and grades recorded on official transcripts and examples of authored research documents included in the Application Portfolio (see below).
7. English Language Proficiency: For international students, both Tracks require a minimum TOEFL score of 101 (Internet) and 607 (paper).
8. Application Portfolio that includes a current resume, three letters of recommendation, a career goals essay, and copies of published materials authored by the candidate.

—Degree Requirements for the PhD in Fire and Emergency Management Administration. Degree candidates must have completed a master's degree. In addition, they must complete 39 hours of required common course work that includes 15 hours in a common core, 9 hours of research tools, and 24 hours of dissertation research. An additional 21 hours of courses are required in either a fire service administration track or an emergency management administration track. Finally, candidates must take oral and written qualifying exams and must successfully defend their dissertation before their dissertation committee.

Psychology

Larry L. Mullins, PhD - *Professor and Head*

The student pursuing a BA or BS in psychology is provided with a background which can be of great value in dealing with the personal, social and vocational areas of his or her life. The course of study applies the scientific method to the study of the behavior of an individual and behavior between individuals. The understanding of such material can be directly related to a variety of vocational opportunities. In addition, students may take advantage of opportunities to work with faculty in research or in teaching to gain additional experience. Such experiences are especially helpful to those students wishing to pursue graduate education in psychology or related fields.

A bachelor's degree in psychology is useful in a wide number of occupations in business, education and industry. The range of positions obtained by graduates covers almost all occupations requiring direct personal contact with other people. Some examples are supervision, training, sales, public relations and interviewing. Also included are positions with city, state and federal agencies, and in applied research. Although there is no licensure or certification to teach psychology in the schools, it is possible to earn a teaching certificate or license in social studies education with endorsement in psychology while pursuing a major in psychology. Persons interested in such teaching should contact the Office of Professional Education. (See "Professional Education Programs" in the "College of Education" section of the *Catalog*.)

The department also offers courses in speech communication to enhance the student's ability to effectively communicate in the interpersonal, organizational and public contexts. Both conceptual knowledge and practical application are stressed to prepare students to begin careers in business and industry, or to enter graduate or professional schools.

Graduate Programs

Employment in the professional field of psychology requires a graduate degree. Psychologists with advanced degrees have exclusive claim to some professional positions.

The Department of Psychology offers two programs of study leading to the degree of Doctor of Philosophy, one in Clinical Psychology and one in Lifespan Developmental Psychology. Students applying for the doctoral degree should have the following prerequisites: introductory psychology, quantitative psychology, experimental psychology, history and systems. Abnormal psychology is recommended for students applying to the clinical program.

Students in the doctoral program first work toward a Master of Science degree. In addition to meeting the general requirements of the Graduate College, for completion of the Master of Science, students must also:

1. Complete two semesters of quantitative psychology along with other course credits totaling 30 credit hours.
2. Complete a thesis project supervised and reviewed by appropriate faculty members.

Following the completion of requirements, the student may be admitted to doctoral status in Clinical Psychology or Lifespan Developmental Psychology.

Religious Studies

Bruce Crauder, PhD - *Director*

Courses in religious studies are a vital part of a liberal arts education. The field involves the objective study of religious belief, literature and practice around the world. Opportunity is given for serious and objective study of these aspects in relation to major religions of past and present cultures. Special attention is given to the historical bases of world religions as well as to their effect upon present-day societies, in both the East and West. Courses are offered in several world religions, biblical studies, religious thought, and religion and culture.

Courses are open to all students without regard to personal views or affiliations. No attempt is made to promote a particular view. Emphasis is placed on the academic study of religion rather than the practice of a particular form of religion. Many of the undergraduate courses enable students to satisfy humanities requirements and also provide an excellent background for many types of graduate and professional programs.

Sociology

Duane Gill, PhD - *Professor and Head*

Sociology is the scientific study of human society and social behavior. Sociologists study a broad array of social phenomena ranging from the dynamics of social interaction to the composition and workings of entire societies.

The diversity of the faculty is reflected in the many different types of courses offered. Topics include criminology and corrections; environment and population; law and society; organizations, industry and work; social psychology; race, ethnicity and gender. Many undergraduate majors take advantage of the applied research option by selecting supervised work-related internships.

The Department of Sociology offers BA and BS degrees in general sociology and applied sociology. The general sociology degree provides students the opportunity to obtain a strong liberal arts degree with a maximum number of electives, and provides a good base for pursuing a professional or graduate degree in sociology and in several other fields of study. The applied options focus on law, crime and social justice; environmental and society; social services and provides practical experience for work in a variety of settings.

The option in anthropology provides students with a basic introduction into methods, theory and principles of cultural anthropology, archaeology, and physical anthropology. Regular course offerings introduce students to past and present cultures within and outside the United States.

Graduate Programs

The Department of Sociology offers the Master of Science degree with a thesis, or non-thesis (terminal degree) options, and the Doctor of Philosophy degree. Programs are designed to prepare students for appointments to the faculties of colleges and universities, to work in private industry and in social service agencies, and for research positions in business and in government. The department offers concentrations in environmental sociology, social inequality, complex organizations, deviance and criminology, and social psychology.

—Degree Requirements. The MS in sociology, thesis option, requires a minimum of 31 hours of course work. The MS in sociology, non-thesis option requires 32 hours of course work. For students pursuing the PhD, a minimum of 94 semester credit hours beyond the baccalaureate, or 64 hours beyond the master's degree, is required. Each student is required to take nine hours of sociological theory, six hours of research methods, and nine hours of statistics. Detailed information on each program is available by writing to the department and requesting a *Graduate Student Manual*.

Statistics

Ibrahim Ahmad, PhD - *Professor and Head*

Statistics is the science of learning from data. It is concerned with the development of theory and with the application of that theory to the collection, analysis and interpretation of quantitative information.

Because statistics is important in many scholarly disciplines, a degree in statistics provides the opportunity to enter not only the statistics profession but also many other fields which make extensive use of statistics. The areas of application include agriculture, the biological sciences, engineering, the physical sciences, the social sciences, education, business and home economics, among others. Statistics also promises to be important in emerging endeavors such as pollution and environmental research, energy utilization and health-care administration.

Those who pursue the study of statistics should be interested in scientific inquiry and should have a good mathematical background. In addition it is desirable that they have a genuine interest in some other subject which uses statistics.

Careers in government, industry and education, involving the disciplines previously mentioned, are open to the statistics graduate. In government and industry a statistician usually serves as a researcher or as a consultant to research scientists and decision-makers. In education, of course, the teaching function is added to those of research and consultation. In almost all careers, the statistician uses the computer.

The Statistical Laboratory operates within the department to provide statistical consulting to researchers—both faculty and student—across the campus.

The Department of Statistics offers the BS and MS degrees to those interested in applications of statistics, and the PhD degree to those who wish to make original contributions to the theory of statistics.

Graduate Programs

—Admission Requirements. It is necessary to have an undergraduate degree, not necessarily in statistics or mathematics, to begin a program of study toward the master's degree in statistics. In some instances, it may be advantageous to have an undergraduate degree in another field. However, the student should have acquired a good mathematical background as an undergraduate. This should be equivalent to the required mathematics courses in the bachelor's program (MATH 2144, 2153, 2163, 3013, 4013). Students admitted to the program with deficiencies will be required to remedy such deficiencies.

—The Master of Science Degree. The Master of Science degree in statistics may be completed by following one of the three plans listed in the "Graduate College" section of the *Catalog*. Normally, the all-course work plan will be initiated at the suggestion of the faculty. Each student will be required to attain an introductory knowledge of some field of application outside of statistics, mathematics and computer science. This requirement may be satisfied by having taken a three-hour graduate course in an approved field of statistical application. Each student is required to have completed CS 1113 or to have demonstrated competence in a procedure-oriented language such as C or FORTRAN.

—The Doctor of Philosophy Degree. The PhD requires the completion of 90 hours beyond the BS degree. A maximum of 30 of these credit hours may be earned by research for the dissertation. Each student will be required to attain an introductory knowledge of some field of application which may be satisfied by taking two three-hour graduate courses outside the fields of statistics, mathematics and computing. Each student is required to have completed CS 1113 or to have demonstrated competence in a procedure-oriented language such as FORTRAN.

Theatre

Kevin Doolen, MFA - *Professor and Head*

The Department of Theatre offers the BA and BFA degrees. Both degree options share a core of broad-based course work and practical experiences in all areas of the art form. The BA and BFA degrees emphasize professional training within the context of a rich liberal arts education.

The Bachelor of Arts degree is a generalist degree, designed to provide a broad background in practical and theoretical areas while allowing students to develop a limited emphasis area. Students interested in several areas of performance and production or students interested in pursuing a double major or minor elect this degree plan.

The Bachelor of Fine Arts degree is a pre-professional degree and is only open to students through audition or portfolio review at the end of their third semester. Each BFA class is kept small to ensure appropriate individual instruction. Options in acting, and design and technology are available.

An active production program in two well-equipped theatre spaces augments course work for both degrees. The regular production schedule consists of four major productions each year and two to four fully mounted studio productions that are directed, designed, and performed by students. Students also have the opportunity to study with a variety of guest artists and scholars during each academic year.

In addition to professional careers in acting and production, this major can lead to careers in arts management, teaching, law, counseling, or any career area where self-awareness, problem solving, group collaboration and effective personal communication are essential.

Graduate Programs

The department offers course work leading to the Master of Arts degree in Theatre. The Master of Arts degree in Theatre is an initial graduate degree designed to build on students' individual theatre skills and to deepen a student's theoretical and practical understanding of the

art form. Accepting only a limited number of students each year, the degree affords a great deal of individual contact with faculty members and considerable latitude in developing the plan of study.

Graduate candidates take a central general core of graduate level courses augmented by other courses available in the department and the university to develop and support their areas of special interest. Typically students seeking this degree plan to become teachers in secondary schools or two year colleges, or students who seek to enhance their background and skills in preparation for the pursuit of advanced degree work in a Master of Fine Arts or Doctoral Program.

The Master of Arts degree may be achieved in accordance with any of the three plans described under "Master's Degree Programs" in the "Graduate College" section of the *Catalog*.

A limited number of teaching assistantships are available to highly qualified students. Information and application forms may be obtained from the department head.

Undergraduate credentials should be referred to the department graduate program coordinator for evaluation to assist advisement and to determine any possible deficiencies that will affect the admission status.

Zoology

Loren Smith, PhD - *Professor and Head*

The Department of Zoology offers BS degree programs in biological science, physiology, and zoology.

The undergraduate degree in biological science is available for students wishing to obtain a broad program encompassing all of the life sciences. By including appropriate course work, students can obtain licensure to teach in the secondary schools. Requirements for admission to graduate and professional schools can be met through the biological science curriculum.

The undergraduate degree in physiology also serves as preparation for graduate school or a medically-related professional school. The bachelor's degree in physiology requires participation in an undergraduate seminar and intensive course work in general biology, genetics, comparative anatomy, mammalian physiology, biochemistry, mathematics, physics, and chemistry.

The curriculum in zoology is designed to provide a thorough background in the biology of animals. The BS degree requires courses in ecology, evolution, genetics, and vertebrate and invertebrate zoology. To become a zoologist the student must also have a good foundation in the related fields of chemistry, physics, and mathematics. Zoology provides a background for graduate school and for many applied and professional careers.

Graduate Programs

—Programs of Study. Programs of study leading to MS and PhD degrees are offered in zoology. The department emphasizes Ecology and Evolutionary Biology and Environmental Stress. Among faculty research interests are behavioral and evolutionary ecology, conservation biology, cytogenetics, ecotoxicology, ecosystem services, ecological immunology, behavioral endocrinology and neuroendocrinology, theoretical ecology, invertebrate ecology, ichthyology, herpetology, ornithology, mammalogy, parasitology, landscape ecology, molecular systematics, population ecology, aquatic and wetland ecology, and science education. The department includes the Ecotoxicology and Water Quality Research Laboratory and the Oklahoma State University Collection of Vertebrates.

—Prerequisites. Applicants must have completed a baccalaureate degree including 40 semester hours in biology and related areas and have completed the Graduate Record Examination.

—The Master of Science Degree. Students must prepare a research proposal and complete either a thesis or a report. For the thesis option, 30 credit hours are required; for the report option, 32 credit hours.

—The Doctor of Philosophy Degree. Students must prepare a research proposal, pass written and oral comprehensive examinations, and complete a dissertation based on original research worthy of publication. Most students enter the program already with a MS degree and their plan of study must include 60 credit hours. Exceptional students can enter the program directly following the BS; their plan of study must include 90 credit hours.

—Financial Aid. The department employs more than 35 graduate teaching assistants (TA). Faculty members also award research assistantships (RA) based on ongoing grants and contracts. Out-of-state students on RA or TA support are assessed in-state tuition only. However, in-state and out-of-state students on RA or TA support also receive full or partial waivers of in-state tuition.

Research Facilities

The Department of Zoology occupies a six-floor building with offices, classrooms, laboratories, and animal rooms. A broad range of instrumentation is available for both teaching and research. The department maintains laboratories in wildlife toxicology, genetic toxicology, conservation genetics, geographic information systems and remote sensing, and water quality. Specialized equipment within the department includes atomic absorption spectrophotometers, ultraviolet and visible spectrophotometers, ion chromatographs, high pressure liquid chromatograph, liquid scintillation counter, ultracentrifuges, gas chromatograph, ion specific electrodes, forage fiber analyzer, bright field and ipepifluorescent microscopes and photomicrography systems, cryostats, laminar flow hoods, tissue culture equipment, PCR thermocyclers, ultracold freezers, horizontal starch, agarose, and polyacrylamide gel apparatus, automated DNA sequencer, and computer labs. Available for use in field studies is the university-owned Lake Carl Blackwell area. The Department of Zoology also houses the OSU Collection of Vertebrates which includes over 25,000 lots of fish, 14,000 reptiles and amphibians, 3,000 birds, and 13,000 mammals.

College of Education

Pamela G. Fry, EdD - *Dean*
Steve Edwards, PhD - *Associate Dean for Graduate Studies and Research*
C. Robert Davis, PhD - *Associate Dean for Undergraduate Studies, Assessment and Director, Student Academic Services*

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The College of Education (COE) includes the schools of Applied Health and Educational Psychology, Teaching and Curriculum Leadership, and Educational Studies. The College offers a wide range of undergraduate and graduate programs to prepare individuals for careers in teaching, administration or research in the professional field of education either in the public schools or in institutions of higher education. There are a variety of degrees within the College at the bachelor's, master's, specialist and doctor's levels that prepare individuals for productive lives in the global community (see the "Degree Programs" section of the *Catalog*).

Accreditation

In the College of Education, the aviation programs are accredited by the Federal Aviation Administration. OSU was the first university in Oklahoma with a program receiving this designation. The counseling psychology program and the school psychology program are accredited by the American Psychological Association. The school psychology program also is accredited by the National Association of School Psychologists. The counseling program with options in Community Counseling and School Counseling are accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). The leisure studies program, with options in leisure service management and therapeutic recreation, is accredited by the National Recreation and Park Association in cooperation with the American Association for Leisure and Recreation. Athletic training is accredited by the Commission on Accreditation of Athletic Training Education (CAATE). All professional education programs are accredited by the National Council for Accreditation of Teacher Education (NCATE), Oklahoma Commission for Teacher Preparation, and the North Central Association of Colleges and Secondary Schools. Technical and industrial education professional education programs are also accredited by the Oklahoma State Department of Career and Technical Education.

—Statement on Diversity. The College of Education is committed to the promotion and affirmation of diversity in the broadest sense. We highly value the dignity and worth of individuals inclusive of their gender, race, ethnicity, nationality, sexual orientation, age, physical and mental abilities, religious beliefs, socioeconomic class, and other identities. Valuing diversity also extends to diversity of thought and perspective. We promote and create a dynamic community for personal transformation and social change with an atmosphere of respect and trust in which individuals explore, discuss, and express their beliefs with one another.

High School Preparation

Students are expected to satisfy the high school curriculum requirements as determined by the Oklahoma State Regents for Higher Education. It is recommended that students be involved in clubs and organizations as well as have had some experiences working with children and youth, or other experiences related to their chosen fields.

Admission Requirements

Freshman students are admitted to the College of Education consistent with criteria published for admission to the University.

Criteria for students wishing to transfer into the College of Education include a required minimum grade-point average based on the University graduation and retention grade-point average policy.

Total hours attempted	*Minimum GPA required*
fewer than 31	1.70
31 or more	2.00

Students pursuing degree options in career and technology education non-certification option, education non-certification option or leisure are required to maintain a 2.00 GPA. Students pursuing a degree in athletic training or Health Education and Promotion are required to maintain a 2.75 GPA. (Students wishing to declare athletic training as their major must apply and be accepted into the Athletic Training Education Program. Check the Web site for the most current information on application, fees, requirements, etc.) All other degree options require a 2.50 GPA.

For continuing enrollment in good standing, the Professional Education Unit and some other programs require a minimum of 2.50 GPA for admission to Professional Education, student teaching, and graduation. This requirement is consistent with state standards for students in the state of Oklahoma who complete professional education programs and seek licensure.

Requests from students seeking readmission after having been placed under probation/suspension should be submitted to the Watson Family Student Success Center in the College of Education and will be reviewed by the director of Student Academic Services prior to readmission. All student grades are reviewed at the end of each semester to determine whether appropriate academic progress is being made.

For graduation, with recommendation for Licensure/Certification in Professional Education, the following minimum GPAs are required: (1) a 2.50 overall GPA; (2) a 2.50 GPA in the Major Requirements; (3) a 2.50 GPA in Professional Core Requirements; and (4) where noted, a 2.50 GPA in the College/Departmental Requirements. The student must earn minimum grades of "C" or "P" in each course in the Major Requirements, the Professional Core Requirements, and where noted, the College/Departmental Requirements. The student must earn grades of "C" or "P" in all sections of observation (lab and clinical experience) courses and clinical practice for recommendation for licensure/Certification.

Scholarships

The College of Education offers scholarships for undergraduate and graduate students in the School of Applied Health and Educational Psychology, School of Teaching and Curriculum Leadership and the

School of Educational Studies. The College of Education will offer the following scholarships annually:

Abercrombie, Betty Memorial Scholarship
Blair, Mary Francis Endowed Scholarship in Aviation Fund
Bliss Family Aviation Management Scholarship
Branstetter, Paula G. Aviation Scholarship Fund
Brown, Ray E. Memorial Scholarship Fund
Broyles-Willard Family Scholarship Fund
Cashel, Christine Professional Scholarship
Celebration of Teaching Scholarship
Chauncey, Vera Jones Memorial Scholarship Fund
Christiansen Aviation Scholarship Fund
Close, Bryan, Transfer Scholarship
College of Education Alumni Association Undergraduate Scholarship
College of Education Alumni Association Freshman Scholarship
College of Education Alumni Association Minority Scholarship
College of Education Alumni Association Graduate Scholarship
College of Education Associates Scholarship
College of Education Dean's Academic Excellence Scholarship
Collins, W. Opal Eastep Endowed Scholarship
Colvin, Valerie Scholarship Award
Cooper, Dr. Donald Athletic Training Scholarship
Cornforth, Patricia Scholarship
Cumberledge, Gretchen Lynette Scholarship
Cunningham, Mary Marie Memorial Scholarship
Dickman, Marcia Endowed Scholarship
Dotson, Rachel Scholarship Fund
Dugger, Tom J. and H.
Earls, Lacrisha Diane Stephens Memorial Scholarship Fund
Eriksson, Alice R. Memorial Scholarship
Eskimo Joe's Endowed Future Teacher Scholarship
Esslinger, Charles "Adam" Outdoor Recreation Fellowship Fund
Frye, Drs. Mary & Moses Endowed Scholarship
Gilcrease Foundation Aviation Scholarship
Grace, James and Tammy Berlin Scholarship
Harrison, Aix B. Endowed Scholarship Fund
Hedrick, Frank E. & Harriet E. Aviation Scholarship Endowment Fund
Henderson, Ora A. Memorial Endowment Fund
Herd, Daniel & Mary Memorial Scholarship Fund
Holley, J. Andrew Memorial Scholarship Fund
Horner, Jo Griffith Endowed Scholarship Fund
Jameson Family Endowed Scholarship
Jeskey, Arlene Starwalt Scholarship Fund in Math Education
Jewell, Jan Endowed Scholarship
Jones, Helen M. Scholarship Fund
Jordan, Henry S. & Wanda Family Scholarship
Jungers, Richard & Edna Endowed Scholarship Fund
Kamm, Robert & Maxine Distinguished Graduate Fellowship Fund
King, Kenneth & Peggy Endowed Scholarship Fund
Kinkead Family Endowed Scholarship
Knaub Family Endowed Scholarship Fund
Kunze, Lawana Scholarship
Ledbetter, Myron C. Diversity Scholarship
Linehan, John C. & Caroline S. Endowed Scholarship Fund
Locke, Wright, Foster, and Cross Educational Scholarship Fund
Long, Hal & Jean Endowed Scholarship Fund in Elementary Education
Looper, Lura Schoenleber Memorial Endowed Scholarship Fund
Lotven Family Endowed Scholarship Fund
Luinstra, Brian Memorial Athletic Student Training Association Scholarship
Luinstra, Brian Memorial Scholarship Fund in Athletic Training
McMaster, James H. Memorial Scholarship
McMullen, Colleen & George Scholarship
Mills, Ted Endowed Scholarship In Environmental Science
Montemuro, Paul A. Scholarship in Music Education
Morgan, Clayton A. Excellence Scholarship
Morsani, Frank L. & Carol D. Endowed Scholarship - Undergraduate
Morsani, Frank L. & Carol D. Endowed Scholarship - Graduate
Mosier, Richard Harper Leadership in Higher Education Scholarship Fund
Munson, Leon L. Memorial Scholarship Fund
Nemecek, Col. Glen Aviation Scholarship
Oaks, Mable Marietta Macey Memorial Art Scholarship
Oaks, Percy W. Sr. Memorial Art Scholarship
Oklahoma State Teacher of the Year (OKTOY) Endowed Scholarship Fund
Parrack, Doyle Endowed Scholarship
Prince, James Leonard Memorial Scholarship Fund
Reitmeier, Georgan Walace Endowed Scholarship
Rezabek, Frankie Bohanan Scholarship
Rollins-Wade, Myr-Lou Endowed Scholarship
Sharpton, Wendell Family Scholarship Fund
Shriver, Madeline D. Endowed Scholarship Fund
Smith, Stephen and Rebecca Scholarship
Smith, Thomas J. Endowed Scholarship
Sorenson, Helmer & Frances Endowment in Educational Leadership
St. Clair, J. Kenneth Endowed Scholarship Fund
Stone, Lana B. Diversity Scholarship Fund
Stone, Toni and Bill Endowed Scholarship
Sumpter, Mildred H Endowed Scholarship
Sutton, Eddie Endowed Scholarship in COE
Trammel, Jane Memorial Scholarship Fund in Aviation
Ulrich, John Memorial Scholarship
Vandegrift, James R. Memorial Scholarship
Wagner, Amy Louise Scholarship
Waits, Gene Endowed Scholarship
Watson, Kim R. Endowed Scholarship Fund in Education
Watson, Kim R. President's Distinguished Scholarship
Wheeler, Mary Echo Scholarship
Wiggins, Lloyd L. Endowed Scholarship Fund
Wiggins, Kenneth & Margaret Aviation Endowed Scholarship Fund
Winter, Pauline Endowed Professional Scholarship
Xerox Corporation Scholarship Endowment Fund

An up-to-date listing for COE Scholarships can be found on the Internet at www.okstate.edu/education/scholarships/home.html.

Watson Family Student Success Center

Academic Advising

Academic advisement for undergraduate students is provided by the *Watson Family Student Success Center,* located in 106 Willard, in the College of Education. Students are assigned to a particular academic adviser in the *Watson Family Student Success Center* depending on the student's declared major. Academic advisers confer with their advisees on such matters as vocational counseling, course selection, academic problems, long-range professional goals, and semester by semester enrollment.

The requirements for the degree being sought are made known to the student when he or she first enrolls at Oklahoma State University. While the curriculum may change before a student graduates, a student who

makes normal progress toward graduation (no more than two years beyond the normal four-year bachelor's degree requirements) will be held responsible for the degree requirements at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or delay graduation.

—Collegiate Success Program. The goal of the Collegiate Success Program is to assist students with their success in the classroom. This program individualizes assistance for those students who have been placed on academic probation. The Collegiate Success Program has three objectives which include:

- Assisting students in identifying individual strengths and needs.
- Assisting students in establishing academic goals based on those strengths and needs.
- Providing students with the skills necessary to succeed at the collegiate level.

For more information logon to www.okstate.edu/education/studentacademicservices/index.htm.

—Graduation Check. The College of Education Office of Student Academic Services prepares a graduation check that indicates the undergraduate's status toward completion of degree requirements. For those students in Professional Education, teacher licensure requirements are included in the graduation check. Undergraduates may request, through their academic advisers, that the graduation check be completed.

—Career Services. The College of Education has a career consultant available. The career consultant provides seminars and one-on-one advisement in career-related topics such as job search strategies, resume development, interviewing skills, and career transitions. The services are available to undergraduate and graduate students and alumni. The career consultant also partners with many employers, including school districts, hospitals, non-profit organizations, and corporations, encouraging them to hire OSU graduates from the College of Education.

Special Academic Programs

—Bachelor of University Studies. The College of Education utilizes the Bachelor of University Studies degree program along with the other colleges in the University. Unique career objectives of students may be met by working with a faculty committee and academic advisers in selecting a specially-tailored program that ultimately leads to a degree.

—The Honors College. Outstanding students in the College of Education who meet the requirements of The Honors College may earn The Honors College degree while completing their undergraduate degree in this college. For more information, please refer to The Honors College information in this *Catalog*.

—Tutoring Program. The Reading and Math Learning Center within the School of Teaching and Curriculum Leadership offers elementary education undergraduate and graduate students a faculty-supervised opportunity to tutor school-age children interested in improving their reading and math skills.

—Professional Development Conferences. Professional education students and alumni are encouraged to attend the annual Celebration of Teaching Conference on the OSU campus held in April. Additional outreach conferences may include the Oklahoma Association of Elementary School Principals, the Oklahoma Association of Environmental Educators; the Oklahoma Education Association Annual Leadership Academy; the Oklahoma Technology Administrator's Conference and the Adult Basic Education Conference.

—Alumni Association. The College of Education Alumni Association distributes a quarterly newsletter to its over 3,000 active members. The organization provides professional support and an immediate network of professional contacts. The Alumni Association provides scholarships for students in the College of Education. Graduates attending convocation receive an invitation for a one-year complimentary membership to the Alumni Association. The organization also sponsors a Homecoming reception and other welcome events for students and faculty gatherings.

General Education Requirements

All undergraduate degrees in the College of Education require a minimum of 40 semester hours in general education that include the following: communication skills, mathematics, United States history and government, science, behavioral studies, arts and humanities, diversity, and electives. All degrees are consistent with the current University General Education requirements and the Oklahoma State Board of Education standards.

Departmental Clubs and Honor Societies

Athletic Training Student Association
College of Education Graduate Student Association
Education Student Council
Elementary Educators of Tomorrow
Flying Aggies
Health Promotion Club
Kappa Delta Pi (education honor society)
Leisure Club
Phi Epsilon Kappa (health, physical education, leisure honor society)
Physical Education Club
School Psychology Graduate Student Organization
Student Ambassadors
Student Education Association

Education Outreach and International Studies

Education Outreach and International Studies work together to facilitate the delivery of COE course work and academic programs. Consistent with the OSU mission and in conjunction with faculty and academic programs in the COE, Education Outreach and International Studies provide support, services and programs to meet the professional needs of educators advancing the state of Oklahoma and the nation while promoting and facilitating engagement of the college and university with state, national, and international communities.

The goals of Education Outreach and International Studies are to reflect the expertise and promote the accomplishments of the College of Education faculty and staff and to foster activities and learning that develop faculty and students for multiple futures. Specifically, these offices work to:

- facilitate campus-based degree credit which enables students to pursue their academic goals in ways that fit their schedule and personal situations;
- extend off-campus degree programs to individuals pursuing degrees and professional certifications through a variety of different methods;
- provide opportunities for international experiences linking campus faculty and students to a wide range of global locations through travel trips, student teaching, and cohort programs;
- assist workforce development initiatives through non-credit educational opportunities for employed adults in educational and governmental environments;
- coordinate professional conferences for the educational community, including school professionals and administrators, educational associations, and state organizations; and
- offer a wide array of community development and cultural enrichment opportunities.

School of Applied Health and Educational Psychology

John Romans, PhD - *Associate Professor and School Head*

The School of Applied Health and Educational Psychology encompasses undergraduate and graduate academic programs in athletic training, health promotion, physical education, leisure studies, community counseling, counseling psychology, educational psychology, school counseling, school psychology, and health and human performance. The School seeks to fulfill the traditional functions of teaching, research, outreach, and public service that are consistent with the mission of Oklahoma State University. The mission is to foster the development, integration, and application of empirical knowledge, theory, skills and experiences to promote social, physical, psychological, educational, and environmental health. Consistent with the goals of the University's Professional Education Council's Core Concepts and Goals Statement, faculty strive to demonstrate and perpetuate teaching based on theory and research-driven educational practices.

—Course Prefixes. Courses that support educational psychology and school psychology and gifted education are listed in the *Catalog* under the EPSY prefix. Courses that support counseling and counseling psychology are listed in the *Catalog* under the CPSY prefix. Undergraduate and graduate leisure courses use the LEIS prefix. Courses in health and human performance are listed in the *Catalog* under the HHP prefix. Undergraduate courses in physical education, health, and athletic training also carry the HHP prefix.

—Degree Opportunities. A student may earn a degree of Bachelor of Science (BS), Master of Science (MS), Specialist in Education (EdS), or Doctor of Philosophy (PhD) with emphasis in one of the following:

Programs/Areas of Emphasis	Degrees
Counseling/Counseling Psychology	
Community Counseling	MS
School Counseling	MS
Counseling Psychology	PhD
Educational Psychology	
Educational Psychology	MS, PhD
School Psychology	
School Psychology	EdS
School Psychology	PhD
Health and Human Performance	
Health Education and Promotion	BS, MS, PhD
Physical Education	BS
Applied Exercise Science	MS, PhD
Athletic Training	BS
Leisure Studies	
Leisure Service Management	BS
Therapeutic Recreation	BS
Leisure Studies	MS
Health, Leisure & Human Performance	PhD

Counseling and Counseling Psychology

Al Carlozzi, PhD - *Professor and Coordinator*

The counseling and counseling psychology program areas offer graduate programs in community counseling and school counseling leading to the MS degree in counseling as well as a PhD degree in educational psychology, with an option in counseling psychology.

Community Counseling

Camille DeBell, PhD - *Associate Professor and Program Director*

—MS Program. This program is intended for individuals who wish to serve as professional counselors in a variety of human service and community mental health agencies. Students may choose elective courses in selected areas of specification such as youth counseling, substance abuse counseling and mental health counseling. The program is designed to meet the academic requirement for licensure as a professional counselor in Oklahoma and the standards set by CACREP for national accreditation.

School Counseling

Barbara Carlozzi, PhD - *Associate Professor and Program Director*

—MS Program. This program prepares students to work as counselors in public schools, serving students, teachers and parents. The role of the school counselor is to coordinate the comprehensive school counseling program, focusing on the educational, career, personal and social development of students. Within this comprehensive school counseling program, school counselors provide counseling, consulting, coordinating, and appraisal services. The school counseling program is designed to meet the certification requirements for the State of Oklahoma as well as requirements of the Council for Accreditation of Counseling and Related Educational Programs (CACREP).

Counseling Psychology

Carrie Winterowd, PhD - *Associate Professor and Training Director*

—PhD Program. This program is accredited by the American Psychological Association and is based on the scientist-practitioner model of training. The program is designed to prepare students for counseling, consulting, teaching and research roles in various settings such as university counseling centers, academic departments, child guidance centers, youth and family centers, hospitals, business settings, and mental health clinics. Students are required to follow a specified sequence of study in which academic course work and practicum experiences are integrated. Students must also complete one year of full-time internship. Application materials for the counseling psychology program are due by January 15 for the following fall enrollment.

Educational Psychology

Diane Montgomery, PhD - *Professor and Coordinator*

—MS Program. A master's degree in educational psychology is available as an option within the MS in educational psychology. Educational psychology emphasizes the application of psychological theory and research in the field of education. Every educational psychology master's student takes basic courses in educational psychology and research. Each student also takes additional courses in an emphasis area of developmental/instructional psychology or gifted and talented education.

—PhD Program. The PhD in educational psychology includes areas of study in instructional psychology, human development, and education of the gifted. The programs prepare students for the role of teacher and researcher in educational and non-educational settings such as higher education, business, government, and communities.

The educational psychology PhD program is designed to provide students with maximum opportunity to individualize their programs according to their own interests, needs and professional goals. Applications for the PhD program in educational psychology are due by February 1 for the following fall enrollment.

School Psychology

Gary Duhon, PhD - *Coordinator and EdS Program Training Director*

—MS Program. A degree in educational psychology with an option in school psychometrics is awarded to students who are en route for either the EdS or PhD degree in school psychology. Students must be admitted to the EdS or PhD program to receive the MS. (Students are not admitted directly to the MS degree.)

—EdS Program. The NASP-approved (National Association of School Psychologists) specialist program is available through the School of Applied Health and Educational Psychology. The EdS is the appropriate level of training for those who are interested in applying psychology to a variety of child-related learning and adjustment problems, and for the improvement of children's mental health. Specialist-level school psychologists typically work in school systems and function in diverse roles including consultation, psychological and psycho-educational assessment, and intervention to facilitate success for all children. The EdS program at OSU is approximately 77 hours, consistent with the National Association of School Psychologists (NASP) standards for training, and meets the Oklahoma State Department of Education certification requirements. Successful completion of this program leads to eligibility for certification by the Oklahoma State Department of Education as a school psychologist and also the NASP National Certification in School Psychology (NCSP). Applications for the EdS program are due March 1 for consideration for admission the following semester.

Terry Stinnett, PhD - *PhD Program Training Director*

—PhD Program. The doctoral program in school psychology is accredited by the American Psychological Association, Office of Program Consultation and Accreditation, 750 First Street NE, Washington, D.C., 20002-4242; telephone: (202) 336-5979 and approved by the National Association of School Psychologists. The program has a scientist practitioner model that emphasizes the application of the scientific knowledge and methodological rigor in the delivery of school psychological services and in conducting research. Training in the scientist/practitioner model is for the purpose of developing a Science-Based Child/Learner Success orientation in students. Doctoral level school psychologists function in diverse and important roles including consultation, assessment, intervention therapy, supervision, program evaluation, and research to facilitate success for all learners. They add to the understanding of children and their families by contributing to the scientific knowledge base related to all aspects of child development. They are employed in many different settings including elementary and secondary schools, private practice, university, hospitals and mental health centers. School psychologists work with diverse populations and provide psychological services to children, youth, families, caregivers, school personnel, adult learners, and individuals with special needs, as well as to the systems in which these individuals need to be successful. Applications for the PhD program in educational psychology are due by February 1 for the following fall enrollment.

Health and Human Performance

Aric Warren, EdD, ATC, LAT, CSCS - *Associate Professor and Coordinator*

The programs in health and human performance prepare students at the undergraduate level for careers in athletic training, health promotion, and physical education.

Athletic Training

Aric Warren, EdD, ATC, LAT, CSCS - *Associate Professor and Program Director*

The *athletic training educational* program is a CAATE accredited program designed for professional preparation as a certified athletic trainer by the Board of Certification. In addition to core course requirements, ATEP majors are required to complete a variety of clinical experiences. The educational process in athletic training prepares students to work in a variety of allied health settings including secondary or post-secondary academic institutions, hospitals, rehabilitation or sports medicine centers, and professional sports teams. The program also utilizes a competitive admissions process. The program utilizes a competitive admissions process technical standards for admission and has strict transfer and retention policies. Interested students should contact the program director for additional information or view the programs Web site at http://frontpage.okstate.edu/coe/atep/. Requirements for admission can be found at either location.

Health Education and Promotion

Bridget Miller, PhD - *Assistant Professor and Program Coordinator*

The *health education and promotion* program prepares students to provide preventive and rehabilitative services in a variety of settings including worksites, health care facilities, community agencies, schools/universities, and governmental agencies. Students culminate their degree requirements with a semester-long internship during their final semester. This degree track prepares students for credentialing opportunities such as the Certified Health Education Specialists and certifications offered through the American College of Sports Medicine.

Physical Education

Patricia Hughes, PhD - *Associate Professor and Program Coordinator*

The undergraduate program includes a curriculum designed for professional preparation as a certified teacher of physical education, PK-12. Core courses for all physical education students include science-based courses, teaching methods, health and content-specific courses. Students engage in two formal field-based experiences: (1) a 45-hour practicum consisting of on-site observational experiences in one or more public school settings; and (2) a clinical experience (student teaching) in elementary and secondary schools during the final semester.

Graduate Program

Steve Edwards, PhD - *Professor and Graduate Coordinator*

—MS in Health and Human Performance. The health and human performance program provides preparation at the master's level with two option choices: health promotion and applied exercise science.

—PhD in Health, Leisure and Human Performance. The purpose and focus of this program is to prepare excellent entry level research scholars for formal and informal learning organizations. They may serve in such roles as faculty members at colleges and universities and scholar practitioners in the workplace. The options included in the degree program help students to develop experiences that will allow them to meet career needs and goals through (1) interactive, collaborative research, (2) teaching experience, (3) university and professional service, and (4) outreach and extension appropriate to a land-grant university. The options in (1) health and human performance and (2) leisure studies are designed to permit flexibility within the disciplines encompassed by the degree while assuring that all students in the program are provided the opportunity to develop research skills which facilitate functioning as future faculty members or scholar practitioners.

Leisure Studies

Jerry Jordan, EdD - *Associate Professor and Program Coordinator*

The program in leisure studies at Oklahoma State University prepares students at the undergraduate and graduate levels for careers in leisure services management and therapeutic recreation. Both undergraduate options are accredited by the Council on Accreditation, Sponsored by the National Recreation and Park Association (NRPA). Students completing the programs are eligible to sit for respective national certification examinations. Leisure services management prepares students for employment in a variety of settings such as municipal, commercial, and corporate recreation; state and national park services; YMCAs and YWCAs; and armed services recreation. Therapeutic recreation prepares students to work with persons with disabilities in a variety of settings including hospitals, rehabilitation centers, day programs, institutions and within the community.

Leisure services management is a growing field and is a multi-billion dollar industry. Students work in a variety of settings and can emphasize management, campus recreation, or outdoor pursuits. Therapeutic recreation is a valued part of the health care and human services. Individuals with illnesses, disabilities or limitations are helped to restore, enhance or maintain their health, independence and well-being through recreational activities. Non-majors may complete a 21 credit minor in Leisure Studies.

—Master of Science in Leisure Studies. Individuals wishing to pursue an advanced degree in recreation, parks, and leisure services may apply to the master's degree. Graduates of the master's degree are typically employed in management and administrative positions in a wide variety of recreation, parks, and leisure services settings. These include areas such as campus recreation, municipal parks and recreation, military recreation, directorships of therapeutic recreation units in clinical settings, YMCAs, state parks, and others. The master's degree is 36 credit hours beyond the bachelor's degree and many graduate assistantships are available for qualified students.

—PhD in Health, Leisure and Human Performance, with an option in Leisure Studies**.** Students seeking the terminal degree in Leisure Studies engage in the PhD in HLHP. Those completing this program are well prepared for entry-level positions as faculty members in a wide range of colleges and universities. To facilitate student readiness to work in academia, doctoral students work closely with faculty, engage in course work and examinations, and participate in opportunities for experiences in teaching, scholarship, and service. Core learning experiences include an understanding of curriculum, applied ethics, and administration as well as developing an understanding of the common tripartite mission of most universities - scholarship, teaching, and service. The PhD requires 60 hours of course work beyond the master's degree; many graduate assistantships are available for qualified students.

Graduate Program

Deb Jordan, ReD - *Professor and Coordinator*

—Master of Science in Leisure Studies. Beyond the baccalaureate level, the program in leisure studies provides preparation at the master's level across the discipline. Students develop a plan of study, under the advisement of a graduate committee and may focus on various emphasis areas in recreation, parks and leisure services. Graduates of the master's degree are typically employed in management and administrative positions in a wide variety of recreation, parks, and leisure service settings. These include areas such as campus recreation, municipal parks and recreation, military recreation, directorships of therapeutic recreation units in clinical settings, YMCAs, state parks, and others. The master's degree is 36 credit hours beyond the bachelor's degree and many graduate assistantships are available for qualified students.

—PhD in Health, Leisure and Human Performance, with an option in Leisure Studies**.** Students seeking the terminal degree in Leisure Studies engage in the PhD in HLHP. Those completing this program are well prepared for entry-level positions as faculty members in a wide range of colleges and universities. To facilitate student readiness to work in academia, doctoral students work closely with faculty, engage in course work and examinations, and participate in opportunities for experiences in teaching, scholarship, and service. Core learning experiences include an understanding of curriculum, applied ethics, and administration as well as developing an understanding of the common tripartite mission of most universities - scholarship, teaching, and service. The PhD requires 60 hours of course work beyond the master's degree; many graduate assistantships are available for qualified students.

School of Teaching and Curriculum Leadership

Christine Ormsbee, PhD - *Professor and School Head*

The School of Teaching and Curriculum Leadership prepares educational professionals to work with diverse populations in various settings. As a community of scholars, we generate knowledge, promote learning and understanding, and foster personal and professional growth through teaching, research, service, and outreach.

Undergraduate Programs

Caroline Beller, PhD - *Assistant Professor and Elementary Education Coordinator*

Pat Jordan, EdD - *Associate Professor and Secondary Education Coordinator*

Mary Jo Self, EdD - *Associate Professor and CTED Coordinator*

The School offers undergraduate degrees in elementary, secondary and K-12 education, and career and technical education.

Completion of the Bachelor of Science in Elementary Education degree qualifies the student for an Oklahoma elementary teaching license (1-8). The program is intended to provide students with (1) a breadth of knowledge that reflect the broad traditions of the liberal arts and sciences, (2) a depth of knowledge in the area of specialization, and (3) diverse field experiences that allow students to demonstrate their ability to work with young children.

The Bachelor of Science in Secondary Education degree is available in the following discipline areas: English, foreign language, mathematics, science and social studies. Completion of this program emphasizing English, math, science, or social studies qualifies the student for a secondary Oklahoma license. Students emphasizing foreign language also receive a degree in secondary education and qualify for an elementary/secondary Oklahoma license. The program is intended to provide students with (1) a breadth of knowledge that reflect the broad traditions of the liberal arts and sciences, (2) a depth of knowledge in the secondary subject area of specialization, and (3) diverse field experiences that allow students to demonstrate their ability to work with young children. Professional Education course work in art education for College of Arts and Sciences majors is also offered. Each of these secondary degree programs includes general education courses, extensive specialization course work in the discipline area, and professional education courses accompanied by substantial field-based practicum experiences.

The Bachelor of Science in Career and Technical Education (CTED) is designed with two distinct options: the non-certification option, for students interested in adult technical education, and the certification option for students interested in secondary career and technical education.

—CTED Non-certification Option. Students choosing the non-certification option are prepared to become instructional personnel for technical programs in community junior colleges, technical institutes and industry. Graduates with this option also accept technical employment of various types in business, industry and government.

The non-certification option is designed primarily for graduates of technical programs in technical institutes and community junior colleges. Qualified students from pre-professional programs can be accepted with advanced standing. In addition, students desiring to prepare for careers in technical education may enter the program directly from high school and complete their technical major requirements at OSU.

—CTED Certification Option. Candidates selecting this option are prepared to serve as teachers, or in other related professional roles for career and technical education programs. Plans of study leading to the bachelor's degree are offered for those wishing to qualify for teaching under the approved state plan for career and technical education. Candidates completing this option are qualified to teach

in career and technical departments of high schools and area career and technology centers.

The certification options include business information technology, marketing education, health occupations education, technology education, and technical and industrial education. The specializations in technical and industrial education are selected from but not limited to the trade and industrial fields of air conditioning heating and refrigeration, automotive technology, aviation technology, building and grounds maintenance, carpentry, commercial art, commercial photography, computer repair technology, cosmetology, diesel engine technology, drafting, electronics, laboratory technology, law enforcement training, machining, masonry, printing, plumbing, telecommunications, and welding technology. For the technical and industrial option, specific field is determined by the specialization proficiency and teaching aspirations of the student. Since specialization competency normally is required for admission, students are accepted into this option by consent of the program faculty. The required specialization competency may be acquired by completing a career and technology program in an approved high school, area vocational school, technical college, community junior college, by apprenticeship training, by actual experience in the field of specialization, or a combination of these. See the section "Professional Education Unit" for details regarding state certification requirements and procedures.

Graduate Programs

Kathryn Castle, EdD - *Professor and Graduate Coordinator*

The School offers graduate degree programs at the master's and doctoral levels. While specialization is required, maximum program flexibility enables students to meet individual goals. Programs are designed to prepare persons to enter public or private elementary and secondary schools as curriculum directors, department heads, reading specialists and instructional team leaders or enter other educational institutions and community agencies as educational leaders. Doctoral programs provide preparation for university teaching and research, as well as for K-12 roles, such as curriculum administrators.

Programs in the School offer the Master of Science (MS) in Teaching, Learning, and Leadership, and a Doctor of Philosophy (PhD) in Education.

—Teaching, Learning and Leadership

MS Options:

- Curriculum and Leadership Studies (curriculum leadership)
- Elementary Education, Middle School and Secondary Education (English/language arts, mathematics, science, social studies)
- K-12 Education (art, foreign language)
- Occupational Education Studies (Administration and Leadership,Technical Education, Trade and Industrial Education)
- Reading/Literacy (including reading specialist)
- Secondary Education for Teachers Non-Traditionally Certified
- Special Education (mild-moderate)

—Doctor of Philosophy in Education

PhD Options:

- Curriculum Studies
- Occupational Education Studies
- Professional Education Studies
- Social Foundations of Education
- Special Education

Teaching, Learning and Leadership

A student may earn the degree of Master of Science (MS) in Teaching, Learning and Leadership. Students specialize in such areas as curriculum leadership; elementary, middle school, secondary education and K-12; occupational education studies; reading and literacy; and special education. Students planning an emphasis in K-12 and secondary education may incorporate graduate course work from an academic discipline. The master's degree program is also frequently designed to qualify persons for certification in a specific area.

—Doctor of Philosophy in Education. *PhD Program.* A student may earn the degree of Doctor of Philosophy in Education with an emphasis in one of the following: Curriculum Studies, Professional Education Studies, Occupational Education Studies, or Social Foundations of Education.

The Curriculum Studies option focuses on a deep understanding and ability to create and use knowledge of curriculum studies in the field of education and in other scholarly communities interested in the advancement of education at the state, national, and international levels. Students will have opportunities to participate in the OSU Curriculum Studies Project working with internationally recognized scholars, collaborating in research, leadership events, and such school-based initiatives as curriculum development and evaluation, teacher research, analysis of teaching and learning, and media literacy. The program prepares students for a variety of professional goals: curriculum generalists and specialists, curriculum coordinators, K-12 curriculum leaders, professors of education and teacher educators, curriculum designers and evaluators, curriculum materials writers, educational administrators at various levels, as well as educational leaders in social and cultural organizations.

The Professional Education Studies option is intended to develop scholars in educational research and professional education who will advance knowledge fundamental to teaching and learning in the 21st century. The focus is to analyze teaching and learning contexts from various perspectives; integrate disciplinary knowledge with theories of teaching, learning, and curriculum; conduct inquiry using various research methodologies, reconceptualize the meaning and value of teaching, learning, and curriculum development and evaluation toward social transformation; and develop strategies for implementing such transformations.

The Occupational Education Studies option is intended to strengthen research activities for improving practice in occupational education, provide graduate programs that reflect transformative roles in occupational education and the workplace, strengthen leadership and outreach services to the discipline, expand activities in international workforce development, and strengthen the cultural diversity in the field of occupational education studies. The focus is to prepare persons for leadership positions in higher education; international occupational education and workforce development organizations; national, state, and community agencies; as well as public and private educational institutions.

The Social Foundations of Education option is intended to prepare future scholars and educators to employ a number of different disciplinary perspectives to critically analyze and evaluate policies and practices within and outside education and to better understand how such policies and practices shape educational institutions. This approach is intended to heighten students' abilities to examine, understand, and explain educational arrangements, processes and practices to develop a disciplined sense of policy-oriented educational responsibility. Scholars in social foundations are expected to contribute to advancing the educational enterprise at national and international levels.

General Program Requirements, Application Procedures and Financial Aid

—Master's Programs. The master's program requires a minimum of 36 hours. Students elect one of three plans for completion of the master's degree: Plan I (minimum of 36 hours including a required thesis), Plan II (minimum of 36 hours including a required formal report), or Plan III (minimum of 36 hours including a required creative component). Application to the Graduate College precedes program admission decisions. For unqualified admission an undergraduate degree in Education or a related field, a vita/resume and a goals statement are required.

—Doctoral Program. The Doctor of Philosophy (PhD) degree requires a minimum of 69 semester hours beyond the master's degree. Application to the Graduate College precedes program admission decisions. For program admission, candidates prepare a folder to be evaluated by faculty. This folder is to include a score from the Graduate Record Exam or the Miller Analogies Test, a Statement of Goals and Objectives, references, and examples of written expression. An interview may be required.

—Financial Aid. Support is available each year for research assistantships and for qualified graduate students to assume teaching responsibilities in the undergraduate curriculum. Selections are usually made in the spring semester for the following academic year. Interested persons are encouraged to apply at any time. Applications can be obtained from the School of Teaching and Curriculum Leadership. A limited number of graduate fee waivers and College of Education scholarships are available to eligible graduate students.

School of Educational Studies

Bert H. Jacobson, EdD - *Professor and School Head*

Katye Perry, PhD - *Associate School Head*

The School of Educational Studies offers degrees or options in the following areas: aviation and space education, school administration, higher education, college student development, research and evaluation, curriculum social foundations and educational technology. These areas of emphasis conduct scholarly inquiry and educate professionals in areas foundational to thought and practice in a wide variety of occupational roles associated with business, educational and industrial settings. Consistent with the goals of OSU's Professional Education Council's Core Concepts and Goals Statement, faculty strives to demonstrate and perpetuate teaching that is based on theory and research-driven educational practices.

We provide specialized training at the undergraduate and graduate levels yet permit flexibility to enable students to meet individualized goals. General information about undergraduate degrees may be found under the "University Academic Regulations" section of the *Catalog*. Additional general information about graduate degrees may be found in the "Master's Degree," "Doctor of Education," or "Doctor of Philosophy" areas of the "Graduate College" section of the *Catalog*.

Financial support is available for research assistantships and for qualified graduate students to assume teaching responsibilities under faculty supervision. Selections for assistantships are usually made in the spring semester for the following academic year. However, interested individuals are encouraged to apply at any time. Applications can be obtained from the School. A limited number of graduate fee waivers and College of Education scholarships are available to eligible students. This information can be obtained from the School.

Aviation and Space Education

Steven Marks, EdD - *Professor and Coordinator*

—Aviation and Space Program. The Aviation and Space Program prepares students for careers in the aerospace industry. The BS in Aerospace Administration and Operations degree program offers five options: Aerospace Logistics; Aviation Management; Professional Pilot; Aerospace Security; and Technical Services Management.

The *Aerospace Logistics* option prepares students to work in the aerospace logistics sector. Employment opportunities include positions with military and civilian maintenance, repair and overhaul (MRO) facilities worldwide as well as any aerospace organization involved in supply-chain management activities.

The *Aviation Management* option prepares students for management positions in the aerospace industry. Employment opportunities include positions with fixed-base operators, air carriers, corporate flight departments, commuter and air taxi operations and a variety of career areas associated with airport operations, manufacturing, maintenance and government aviation and aerospace organizations.

Students in the *Professional Pilot* option complete all flight requirements for private pilot, commercial pilot with instrument, multi-engine, and certified flight instructor ratings. Students are prepared for careers as general aviation, corporate, commuter, and commercial airline pilots. Both flight and ground school courses are conducted under Federal Air Regulation Part 141.

The *Aerospace Security* option prepares students for careers in aerospace security fields. Employment opportunities include governmental agencies and private industry that deal with aerospace security operations.

The *Technical Services Management* option builds on an individual's technical experience in aircraft maintenance or avionics to prepare the students for management positions in all segments of the industry. Twenty-five hours of technical training may be credited toward this option if received from an accredited institution.

Aviation and Space Program has an extensive industry-based management internship program established with aerospace industries, major and regional air carriers and a variety of other companies within the aerospace industry.

—OSU NASA Education Projects. The faculty in the Aviation and Space Program are the principal investigators for the NASA Teaching From Space Project (TFSP), NASA Interdisciplinary National Science project incorporating Research and Education Experience (INSPIRE) and the NASA Explorer Schools Project (NES). The TFSP includes Educator Astronaut Support and Education Flight Projects. These components include supporting astronauts with educational resources and consultations for K-16 education related personal appearances, and support education payloads for space shuttle missions and/or the International Space Station.

The NASA Interdisciplinary National Science Project incorporating Research and Education Experience or INSPIRE, is a multi-tiered student pipeline project for students and their parents. Participating students must be in grades 9-12 or in their freshman year of college. INSPIRE is designed to provide grade appropriate NASA-related resources and experiences to encourage and reinforce students' aspirations to pursue science, technology, engineering and mathematics, or STEM, education and careers.

NASA Explorer Schools (NES) is supported by providing NES coordinations and digital learning network coordinations at each of the NASA field centers. These components engage and educate the K-16 education community in NASA mission directorates.

—Graduate Degree Requirements. MS Degree Program. The Master's in Natural and Applied Sciences emphasizes management, regulation, logistics, security, finance, current issues, and content regarding the aerospace industry and related government programs and missions. To be considered for admission to the master's program, students must be admitted to both the OSU graduate college and the AVED program. Applicants are required to provide a statement of personal goals and objectives, two letters of recommendation addressing the applicant's abilities, interest, motivation, etc., and a copy of a recent resume. All MS students must complete course work from research, core requirements, program emphasis, and elective courses to total 33 hours. At least 21 hours must be completed at the graduate level (5000 or above) and no pass/fail courses may be used. Master's students must also complete a Creative Component or a Thesis or a Report for committee approval.

—EdD Degree Program. The EdD in Applied Educational Studies with the Aviation and Space Science Specialization emphasizes administration of aerospace programs, aviation law, aerospace logistics, aerospace security programs, international aviation issues, and aircraft accident investigations. The Space portion emphasizes the development of air and space flight; the earth's air, land and water systems; and the solar system. The Aviation and Space program provides advanced courses in the specific field of aviation and space for successful practice in the aerospace industry. Applicants should have at least three full years of work experience in the aerospace industry, government, and/or higher education area(s). Either the MAT or GRE test must be taken within five years prior to application to the program. All applicants are required to submit a statement of personal goals and objectives, two letters of recommendation addressing the applicant's experiences, abilities, interest, motivation, etc., and a current resumé/vita. Course work must be completed from the professional core, program emphasis, field experiences, and research in addition to 10 hours of Doctoral Dissertation, for a total of 60 hours of course work beyond the Master's degree. The EdD degree requires a dissertation that is research-based in the field of specialization of the practitioner-student. Basic principles are used to emphasize the practical application of research.

Educational Leadership

Kenneth Stern, EdD - *Associate Professor and Coordinator*

Educational leadership emphasizes three areas: higher education, school administration, and college student development. Doctorates in education (EdD) are offered in higher education and school administration. Also offered is the PhD in Educational Leadership and Policy Studies with options in Higher Education and School Administration. The Master of Science degree is offered with options in higher education (a 36-hour program that prepares individuals for leadership positions in all levels in post-secondary institutions), school administration (a 36-hour program designed for those who aspire to the principalship, departmental chairs, and central office positions in school districts), and college student development (a 42-hour program that prepares individuals for positions in service delivery areas of student affairs). Admissions to the graduate programs in Educational Leadership are competitive and based upon multiple factors.

To be considered for admission to masters programs, applicants are expected to have an earned baccalaureate degree with at least a 3.00 GPA (on a 4.00 scale), and have career goals that match the program. Applicants must provide appropriate recommendations (3), a recent Miller Analogies Test (MAT) or Graduate Record Exam (GRE) score, a critical issue essay and a career objective essay. Students currently enrolled in the program have an average MAT score of 57/410 or GRE scores of Verbal 437 and Quantitative 541. Additionally, applicants to the school administration degree are expected to have at least two years of teaching experience. Admissions to all master's options are on a rolling basis (applications are reviewed when all materials have been received).

To be considered for admission to an EdD program, applicants must have an earned master's degree with a minimum 3.00 GPA (on a 4.00 scale), and have career goals that match the program. Applicants must submit a description of relevant work experience, a recent MAT or GRE score, samples of scholarly work, a current vita or resumé, a critical issues essay, a career objectives statement, and three letters of recommendation. Students admitted into the EdD programs in 2008 have an average MAT score of 414 or GRE scores of Verbal 483 and Quantitative 541. Applicants for the PhD program must provide the same information and documents as for the EdD. However, the GRE is required for the PhD, and the minimum scores expected are: Verbal 500, Quantitative 610, and Writing 4.5. For the PhD only, a one year residency of at least nine hours for two semesters is required during the degree process. The deadline for submission of all application materials is March 15. Review of these materials will begin soon after this deadline with notification to follow soon thereafter.

Educational Technology

Susan L. Stansberry, EdD - *Associate Professor and Coordinator*

The goal of the Educational Technology program is to facilitate educators in becoming highly qualified educational technologists and school library media specialists. Our focus on instructional design, information management, and multimedia design and development along with core technology integration enables candidates to serve in a variety of settings in education, business, and industry. The program Web site, http://edtech.okstate.edu, offers greater detail.

The MS in Educational Technology is for students interested in furthering their knowledge, skills, and opportunities in the area of educational technology and library media. This degree will enhance their marketability and, in the case of the School Library Media option, provide credentials necessary for recommendation for this particular area of teacher certification. In addition to the core focus on educational technology, candidates pursuing School Library Media certification will also be immersed in the areas of information literacy, curriculum leadership, and program administration, meeting NCATE accreditation standards. To be considered for admission to the master's program, applicants should have an earned baccalaureate degree with at least a 3.00 GPA (on a 4.00 scale), a recent score on either the Miller Analogies Test or Graduate Record Exam, and three letters of recommendation providing information related to past academic ability, potential for graduate study, and writing ability. Applications will be reviewed upon receipt of all materials.

For those seeking a doctoral level degree emphasizing educational technology, we offer the PhD in Education with an option in Professional Education Studies (Literacy and Technology specialization). The focus of the program is on the core areas of the field: design, development, utilization, production, and evaluation of instructional systems and technology applications to support learning. The doctoral program emphasizes research using educational technology in applied settings. The PhD degree in Educational Technology prepares students for a variety of professional positions. Graduates are typically employed as university faculty, educational technologists in universities, community colleges, and schools or as training managers or instructional designer/developers in corporate settings. The PhD in Education degree requires a minimum of 69 credit hours beyond the master's degree. Applicants must apply to the OSU Graduate College and include a recent score from the Graduate Record Exam or the Miller Analogies Test, a Statement of Goals and Objectives, references, and examples of scholarly writing. An interview may be requested.

The Educational Technology faculty is committed to involving students in a variety of experiences that will enhance their professional careers. Faculty work with students to present papers at national conferences and to submit manuscripts to professional journals. Students participate in Educational Technology courses, grant projects, and service and outreach to educational groups. Graduate assistantships in teaching and research are often available. Each student has the opportunity to engage in rich internship and practicum experiences designed with the individual learner's goals in mind.

Educational Research and Evaluation

Laura Barnes, PhD - *Associate Professor and Coordinator*

The educational research and evaluation program offers the MS and PhD degrees. The MS program prepares students to function as staff members in research and evaluation units in school districts, governmental agencies, and private corporations and foundations. Graduates of the doctoral program are prepared to serve as college or university professors, directors of research and evaluation for public schools and universities, researchers for funded projects, state department of education consultants, and professional employees for test publishers and local, state and federal government agencies.

—Degree Requirements. The MS degree requires a minimum of 36 credit hours. There are three options: either 36 hours of course work plus a creative component; 32 hours of course work plus a report (four thesis hours); or 30 hours of course work plus a thesis (six thesis hours). The student's advisory committee may recommend additional course work or thesis hours. Required courses include six hours in educational psychology and 24 hours in research and evaluation including a practicum. Students taking a non-thesis option must take additional courses from an approved list of electives. Masters students must take two qualifying examinations that cover the program core and the area of professional specialization.

The PhD degree requires a university determined minimum of 60 hours beyond the master's degree or a minimum of 90 semester hours beyond the bachelor's degree. The typical doctoral student completes nine hours of common core course work in educational psychology and 15 hours of common core course work in integrated and extended inquiry; 18 hours of professional course hours (e.g., psychometric theory, applied multivariate research), a minimum of nine hours in a cognate area defined by the student and committee chair (e.g., mathematical statistics, institutional research, student development), and at least 15 dissertation hours. Students also select two applied experiences from a list of suggested experiences with the assistance and approval of the committee chair. PhD students must take two qualifying examinations that cover the program and core and the area of professional specialization.

—Admission Requirements. For both the masters and PhD programs, admissions decisions are competitive and based on a combination of multiple criteria. Criteria for admission to the master's program include an undergraduate GPA of at least 2.75; Miller Analogy Test (MAT) or Graduate Record Exam (GRE); 3 positive letters of reference (preferably from previous instructors or employers); and evidence of potential for professional development (e.g., proof of written work). For the doctoral program, admissions criteria include telephone or personal interview, GRE scores, undergraduate and master's GPA, four positive letters of reference on SES forms, relevant experience, statement of career goals, and evidence of potential for professional development (e.g., proof of written work). Students considering admission to the doctoral program must have a master's degree from an accredited institution. Doctoral applicants should have an undergraduate GPA of at least 2.50 and a graduate GPA of at least 3.50.

—Application Procedures. Applicants must submit a completed portfolio consisting of a Graduate Application for Admission form, the required number of positive letters of recommendation (three for master's, four for doctoral), a signed Confidentiality of Reference form, official score report for required tests (GRE or MAT for master's, GRE for doctoral), two official transcripts from each institution attended, Statement of Purpose, and the Graduate College application fee. International applicants must include TOEFL scores and a signed Confirmation of Resources form. The yearly admissions deadline is February 15.

Social Foundations

Edward Harris, PhD - *Associate Professor and Interim Coordinator*

Social foundations of education are the interdisciplinary study of schooling and other forms of schooling and of education. Ever since it began during the 1930s at Teachers College of Columbia University, social foundations has brought together scholars who situate education in historical, philosophical, economic, and social contexts. Using the tools of the humanities and the social sciences, social foundations scholars ask perennial questions, such as: *What is the purpose of schooling in a democracy? What knowledge and values should be taught and to whose benefit? How are issues of race, ethnicity, social class, gender and ability manifested in schools?*

Drawing from history, philosophy, sociology, anthropology, international studies, and other disciplines to teach their courses, faculty in the social foundations program area ask that educators reflect critically on the social and cultural dynamics in educational settings and how policy and practices might be improved. Students from other human service professions and other disciplines are invited to make similar use of the content of these courses for their professional practice.

—Doctoral Program. The mission of the PhD in education with the curriculum and social foundations option is to educate scholars who have the abilities to discover, integrate, and apply knowledge about the culture in which the institutions called *school* reside, as well as the culture the institution creates. In the broadest sense, the curriculum and social foundations option is intended to educate scholars so they can disseminate new knowledge to the education, government, economic social and other scholarly communities interested in the advancement of the educational enterprise at the national and international levels.

The vitality of the degree option in curriculum and social foundations arises from its orientation toward the exploration of critical problems and questions facing 21st Century educational institutions. The focus on vital educational issues is found in the course work, degree requirements, and the qualifications of the faculty. As such, the curriculum and social foundations degree option allows students to cross traditional boundaries in education and in disciplines outside of education and use multiple resources to study educational issues and to create solutions to educational problems.

The problem-centered, interdisciplinary nature of the course work contributes to this process. It begins with the program core in education, builds in the integrated inquiry core, and continues with the students' additional specialized program and research courses. Through collaboration and mentoring with program faculty, students are expected to conduct, write and present original research at professional meetings, so that they may connect early to professional and scholarly communities.

—Program of Study. Students in the program participate in the scholarly community of the University, the College of Education, the School of Educational Studies, and the program area. They are encouraged to study within the college and in other colleges in which they may take their cognate course work. Students are encouraged to engage in a diverse range of experiences that prepare them for positions in higher education and for leadership positions in schools. During the program, they have

opportunities to work collaboratively with professors, attend colloquia, teach university courses, work with faculty on research projects, write grant applications, serve on university, school, and program committees, participate in service learning projects in the broad community, present at professional conferences with emphasis on research presentations, and write manuscripts to submit for publication.

—Degree Requirements. All students admitted into the PhD degree option in curriculum and social foundations are expected to meet all University requirements and the requirements for admission to the PhD in education. For students with little or no background in curriculum studies and social foundations, additional leveling work may be required. The student and the respective advisory committee determine such prerequisite considerations as they design the plan of study. Specific graduate courses that may be required include: CIED 5053 Curriculum Issues, REMS 5013 Research Design and Methodology, REMS 5953 Elementary Statistical Methods in Education, and SCFD 5883 Educational Sociology.

Course work in the degree includes a minimum of 69 credit hours. It consists of a common program core (12 credit hours), integrated inquiry (six credit hours), extended inquiry (nine credit hours), and independent research (15 credit hours of dissertation). In addition to the requirements listed, students must have presented at a professional conference and submitted an article for publication. Faculty support and mentor candidates through these processes.

Professional Education Unit

Officers of the Professional Education Council

Christine Ormsbee - *Interim Associate Director of Professional Education*

The College of Education coordinates all professional education programs offered at Oklahoma State University. All programs are operated in collaboration with the colleges of Agricultural Sciences and Natural Resources, Arts and Sciences, Human Environmental Sciences and the Graduate College. The dean of the College of Education serves as the director of the Professional Education Unit (PEU). The Professional Education Council has been established as the governance and oversight structure for the Professional Education Unit. The Unit has a mission statement and goals that guide the operation of its programs.

—Professional Education Unit Core Values. The underlying structure of the unit is articulated through its conceptual framework that guides the direction of programs, teaching practices, candidate performance, faculty scholarship, and service. The core values of the conceptual framework emphasize leadership, ethics and professionalism, academics and professional roles, diversity, and service orientation/community outreach. (L.E.A.D.S.)

Leadership. PEU prepares candidates who are committed to the belief that professional educators who provide quality education are the foundation of a prosperous and democratic society.

Ethics and Professionalism. PEU prepares candidates who demonstrate ethical and professional behavior in their interactions with students, families, colleagues and communities and practice social justice.

Academic and Professional Roles. PEU provides opportunities to prepare knowledgeable candidates who reflect upon the connections between academics and their professional roles.

Diversity. PEU prepares candidates who believe everyone deserves the opportunity to learn and can learn; they possess knowledge, skills, and dispositions to serve as effective professionals who understand and meet the needs of a diverse society.

Service Orientation/Community Outreach. PEU prepares candidates who value and engage in service and meaningful involvement of the learner/client and their families, as well as their school and their community.

All Professional Education programs are administered by the dean of the College of Education and are coordinated through the Office of Professional Education. Upon completion of an approved program or degree, passing the appropriate Certification Examinations for Oklahoma Educators, and upon the recommendation of the University, the candidate will be eligible for licensure/certification to serve in the schools of Oklahoma. All candidates completing an approved program or applying for a teaching license are subject to all rules and regulations specified by the OSU Professional Education unit, the Oklahoma State Board of Education, and the Oklahoma Commission for Teacher Preparation. State-mandated changes in teacher certification may result in additional course requirements for licensure/certification.

Certification programs are offered at various levels, but all require the earning of at least a bachelor's degree for recommendation for a standard certificate. Graduate programs leading to the master's degree, the education specialist degree, and both the Doctor of Education and the Doctor of Philosophy degrees are offered in several areas. In addition, there are programs at the graduate level that lead to certification which may or may not lead to graduate degrees. Professional Education programs at Oklahoma State University are accredited by the National Council for Accreditation of Teacher Education (NCATE) and the Oklahoma Commission for Teacher Preparation.

Undergraduate Professional Education programs are offered in the College of Education as well as in the Colleges of Agricultural Sciences and Natural Resources, Arts and Sciences, and Human Environmental Sciences. The candidate must meet the requirements of the OSU Professional Education Unit as well as the degree requirements of the particular college. Each student who desires to enter a Professional Education program must make formal application to do so and must meet the admission standards specified.

Students classified by the Graduate College as "special" or "provisionally admitted" who are pursuing teacher certification must be admitted to the Professional Education Unit. Information regarding admission requirements may be obtained from the Office of Professional Education.

Inquiries concerning any aspect of Professional Education programs at Oklahoma State University should be addressed to the head of the School or Department offering the program or the Office of Professional Education, 325 Willard.

There are increasing opportunities in business, industry, and state and federal agencies for persons with unique preparation in several education specialties. The Unit also provides academic preparation for a wide range of certification and teaching areas:

Undergraduate Certification Teaching Programs

Early Childhood Education (PK-3)
Elementary Education (1-8)

Elementary/Secondary Level (PK-12) Programs

Art Education
Foreign Language (French, German, Spanish)
Music-Instrumental
Music-Vocal
Physical Education/Health/Safety

Secondary Level Programs

Agriculture Education
Secondary English
Secondary Mathematics
Secondary Science
Secondary Social Studies
Career and Technical Education

Graduate Certification Programs
- Elementary School Principal
- Secondary School Principal
- Library/Media Specialist
- Reading Specialist
- School Counselor
- School Psychologist
- School Speech/Language Pathologist
- Special Education

Graduate Programs

Master's degrees are available in conjunction with all of the above programs and doctorates are available in many. Options and areas of emphasis in several of these fields may be included as part of master's and doctoral degree programs if approved by the head of the school or department offering the program and the dean of the Graduate College.

Admission to Professional Education

The criteria for admission to Professional Education programs are based on University-wide policies recommended by the Director of Professional Education through the Professional Education Council. Requirements are applicable to all Professional Education administrative units of the colleges preparing teachers. Students should submit an *Application for Admission to Professional Education* Form to the Professional Education Unit as early as possible in their programs. The candidate is not considered a fully eligible participant in a Professional Education program until formally admitted to the Professional Education Unit.

Full admission is required to enroll in the restricted courses in teaching methods and the clinical practice internship. Certain vocational programs may vary from this requirement due to state guidelines.

Criteria for Admission to Undergraduate Professional Education Programs

For admission to the Professional Education Unit, the student must complete the *Application for Admission to Professional Education*. To be admitted to Professional Education programs within the College of Education, students must meet the required minimum grade-point average. (See "College of Education Admission Requirements.") If the student is enrolled in the Professional Education program in the College of Agricultural Sciences and Natural Resources, Arts and Sciences, or Human Environmental Sciences, the student should check with the office of the department head for further information.

The student must meet all of the following criteria to be fully admitted to Professional Education:

1. Orientation to Professional Education Course and Field Experiences. An appropriate orientation to Professional Education course must be completed with a grade of "C" or better. One semester credit hour of early field experiences must be completed with a grade of "C" or better or grade of "P."
2. Basic Skills Competency. Basic skills competency must be demonstrated by successful completion of the Oklahoma General Education Test (OGET).
3. Interview for Admission to Professional Education. All candidates for full admission to undergraduate or initial programs in Professional Education must satisfactorily complete a formal interview with designated OSU Professional Education **faculty.**
4. Minimum cumulative overall GPA of 2.50. A minimum cumulative overall GPA of 2.50 must be earned based on no fewer than 40 credit hours of courses to include lower-division general education requirements as specified in the student's program.

Criteria for Admission to Graduate (post-baccalaureate) Professional Education Programs

Graduate (post-baccalaureate) students must complete the application form. Post-baccalaureate candidates must meet one of the following criteria for full admission to Professional Education:

1. The student must have completed an approved Professional Education program and hold a valid Oklahoma license or Provisional, Standard, or Professional Certificate; or a valid license from a state with which the Oklahoma State Department of Education has an interstate contract. The license or Provisional, Standard, or Professional Certificate must have included successful completion of (a) an interview for Professional Education; (b) one semester credit hour of early field experiences with a grade of "C" or better or a grade of "P" and (c) an orientation to professional education course with a grade of "C" or better or a grade of "P." If the graduate student does not hold a valid credential and did not successfully complete the criteria listed above, he or she must meet 2 or 3.
2. Students in a master's program must (a) satisfy the departmental requirements for unqualified admission to the master's degree program; (b) have a minimum cumulative overall GPA of at least 2.50; (c) complete the interview for Professional Education; (d) complete one semester credit hour of early field experiences with a grade of "C" or better or a grade of "P," and (e) complete an orientation to Professional Education course with a grade of "C" or better or a grade of "P" and receive a passing score on the OGET.
3. Students classified by the Graduate College as "special" or "provisionally admitted" must (a) have a minimum cumulative overall GPA of at least 2.50; (b) complete the interview for Professional Education; and (c) complete one semester credit hour of early field experiences and an orientation to Professional Education course with a grade of "C" or better or a grade of "P" and receive a passing score on the OGET.

Professional Portfolio

The Oklahoma Commission for Teacher Preparation requires candidates for certification and licensure in Oklahoma to present professional portfolios as a portion of their professional documentation. Candidates in Professional Education are required to submit a professional portfolio for review and approval at designated checkpoints prior to certification.

Transfer Students

Transfer students must work toward meeting the criteria for full admission to Professional Education established by Oklahoma State University as soon as possible during the first semester at OSU. It may be possible to transfer admission from another Oklahoma institution. For information see the OSU site www.okstate.edu/peu or contact the Office of Professional Education.

Calculating Grade-Point Average Professional Education

The 2.50 GPA for all Professional Education purposes is calculated based on the University graduation and retention GPA policy.

Retention in Professional Education

For participation in all courses requiring full admission to and for continued acceptability in the Professional Education unit, an undergraduate candidate must maintain a grade-point average required for graduation of at least 2.50. If this GPA falls below 2.50, the candidate is placed on probation. When the required graduation GPA is raised above 2.50, the candidate is removed from probation. If the candidate fails to meet the graduation GPA requirement in that probationary semester or fails to have at least a 2.50 GPA for that semester, the candidate

will be suspended from the Professional Education Unit. A candidate not satisfying the probation requirements at the end of the semester following the initial probationary semester will be administratively withdrawn from the Professional Education Unit and all courses having full admission as a prerequisite. Readmission to the Professional Education Unit will require a new application. Advisers are available to assist the candidate in regularly reviewing continuing retention or reinstatement in Professional Education programs. A retention review prior to enrollment and again prior to the beginning of classes each semester is encouraged when continuing retention is in question.

Graduate students, including those classified as graduate special students, admitted to the Professional Education unit must meet and maintain the requirements of the Graduate College to remain in good academic standing with the Professional Education Unit. This will require that graduate candidates earn and maintain a 3.00 GPA at Oklahoma State University following admission to Professional Education.

Additional Professional Education Requirements

Candidates in Professional Education programs may be required to document competency in a foreign language at the novice high level and to complete a professional portfolio.

These requirements are dependent upon college matriculation, graduation dates, continuous enrollment, and admission to the Professional Education program. Students must contact their advisers for details.

—Program Completers. In Oklahoma, a program completer is defined as a person who has met all the requirements of a state-approved teacher preparation program. Program completers include all those who are documented as having met such requirements. OSU requirements include a degree, program credentials as documented on a transcript and written proof of having met the program's requirements which include successful completion of all certification examinations and a professional portfolio.

Diverse Placement in Field Experiences

NCATE Statement

"America's classrooms are becoming increasingly diverse; more than one-third of the students in P-12 classrooms are from minority groups. The families of an increasing number of students are immigrants, many with native languages other than English and from diverse religious backgrounds. Growing numbers of students are classified as having disabilities. At the same time, minority teachers are less than 15 percent of the teaching force. As a result, most students do not have the opportunity to benefit from a diverse teaching force. Teacher candidates need to develop proficiencies for working with students from diverse backgrounds and with exceptionalities to ensure that all students have the opportunity to learn. Regardless of whether they live in areas with great diversity, candidates must develop knowledge of diversity in the United States and the world, dispositions that respect and value differences, and skills for working in diverse settings."

The professional education unit at Oklahoma State University shares the NCATE vision of providing field experiences that prepare our students for careers as educators in an increasingly diverse world. Our intent is to provide opportunities to experience diversity in the communities we serve in Oklahoma; whether that is diversity in ethnicity, socio-economic level, and geography or in grade level, department level, course offerings, or school day schedule. We recognize that opportunities to experience diversity vary within each program and inherent difficulties may exist in meeting all of these needs in some programs. We also recognize that diversity exists in many different forms and aspects and each program is committed to providing as much diversity as possible in its field experience placements.

The Professional Education Council of Oklahoma State University strives to ensure that teacher education students complete field experiences in schools meeting some or all of the following criteria:

1. Are urban, suburban, and rural;
2. Exceed the minority percentage for the state of Oklahoma;
3. Exceed the average low income status for Oklahoma school children;
4. Are diverse in scheduling, grade level, departments, course offerings, and teachers.

Clinical Practice Requirements

In order to participate in clinical practice, all teacher candidates must complete the Teacher Candidate Profile Application form during the prior semester. Clinical practice information is distributed at the "Intent" meeting each semester. Candidates are notified of this meeting through consultation with advisers, signs on bulletin boards across campus, advertisements in the *Daily O'Collegian* and by announcements made in Professional Education classes. Candidates must submit their applications to the Office of Professional Education prior to specified dates in September and February. These dates will be announced to candidates in the same manner as mentioned above. Candidates will be notified in writing of their placements as soon as the coordinator of field experiences has received confirmation from the cooperating schools. Some school districts require OSBI background checks prior to placement of a teacher candidate.

Criteria for clinical practice placement for all Professional Education candidates are:

1. Continued full admission to a program in the Professional Education unit (see "Retention in Professional Education" on the previous page);
2. A current overall grade-point average of at least 2.50;
3. A grade-point average of at least 2.50 in courses listed on the current approved program for licensure/certification in the areas of professional core, major, and college/departmental requirements. No grade lower than a "C" or a "P" in either of these areas;
4. Completion of all professional education course work that includes at least one course in sociological foundations, all early field experiences (45 clock hours minimum), exceptional learners, and human growth and development, with no grade lower than "C" or "P" in any of these courses. It is recommended that all professional sequence course work be completed.
5. Successful completion of submission II requirements for the professional Education Program portfolio. The exact submission date for portfolio is set by the program certification area. Portfolios should contain the materials listed in the Portfolio Handbook (www.okstate.edu/peu/portfolio.htm) for the pre-internship submission and any additional items required by a specific program. The portfolio is completed in conjunction with the internship and should not be separate.

—Required Grades in Clinical Practice. A candidate must receive grades of "P" in all sections of clinical practice in order to be recommended for a teaching license. A candidate assigned a grade of "F" in any section of clinical practice will *not* qualify for a recommendation for a license or any level of certification.

Out-of-Area/Out-of-State Placements

A candidate requesting an out-of-area/out-of-state placement due to extenuating circumstances must submit a written request and receive the approval of the degree program area coordinator, the Coordinator of Field Experiences, and the PEU Field Experiences Committee. Securing

placements and supervision are the responsibility of the Office of Clinical Practice and program area supervisor. Candidates granted an out-of-area/out-of-state placement must meet all clinical practice deadlines and requirements, including attendance of on-campus meetings and are required to pay the following fees:

1. All necessary and appropriate fees required in securing and finalizing the placement (e.g., such as reimbursement for cooperating teacher, supervisor, etc.). These fees are payable to the Office of Professional Education or designated office and/or out-of-state university at the beginning of the semester in which the placement is sought.
2. If a recommendation for licensure/certification is to be made by Oklahoma State University, the candidate is responsible for reimbursing visits performed by the cooperating institution. All other criteria pertaining to in-state clinical practice placements apply as previously stated.

Exceptions to this policy are permitted for students who are enrolled in programs that have a specific out-of-state placement policy and for students who participate in special placements abroad.

Appeals

By enrolling in Professional Education programs at Oklahoma State University, students accept the responsibility for complying with all applicable Professional Education Council policies and procedures that allow them to maintain good academic standing. If the student believes that the established policies of the Professional Education Council have not been fairly or consistently followed, he/she has the right to pursue an appeal to the Student Affairs Committee. For more detailed information pertaining to the appeals process, students are encouraged to contact the Office of Professional Education.

Certification Examinations for Oklahoma Educators

All candidates who graduate or are seeking recommendation for certification from a Professional Education program are required to complete the Certification Examinations for Oklahoma Educators before a license or area of certification can be issued. The examinations, which include a General Education Test, Subject Area Tests, and a Professional Teaching Exam (OGET, OSAT, and OPTE), are administered by the National Evaluation Systems for the Oklahoma Commission for Teacher Preparation five times each year. Registration booklets are available in the Office of Professional Education and online at www.ceoe.nesinc.com.

Copies of the *Objectives and Study Guides for the Oklahoma Teacher Certification Testing Program* have been placed on reserve in the Curriculum Materials Library and are listed as "Objectives for Oklahoma Certification Testing Program," and are available on the National Evaluation Systems Web site at www.ceoe.nesinc.com.

Teacher candidates must successfully complete the OGET prior to admission to Professional Education, and the OPTE and OSAT at or near completion of their program.

Registration deadlines are indicated on the registration booklet and are generally about four weeks prior to the testing date.

Recommendations for License, Certificate, or Additional Certification Areas

Applications for an Oklahoma license or certificate can be obtained in the Office of Professional Education, 325 Willard. Candidates seeking advisement concerning teacher licenses or certificates can be assisted by the teacher certification specialist in the Office of Professional Education. Oklahoma State University does not make a recommendation for a license, certificate or additional certification area until all criteria have been met for the Professional Education program and a passing score has been achieved on the Certification Examinations for Oklahoma Educators (CEOE). Applicants recommended by Oklahoma State University for a license, certificate or additional area of certification must have achieved grades of "P" in all sections of clinical practice. A successful recommendation for certification by the Residency Committee at the end of the first year of employment as a teacher will result in a recommendation for the standard certificate.

A candidate assigned the grade of "F" in any section of clinical practice will *not* qualify for a recommendation for a license or any level of certification. Requirements for certification and degrees are not necessarily the same thing. Candidates must meet all other certification requirements, including portfolio and foreign language proficiency if appropriate.

Requirements for exit from administrator preparation programs include:

1. successful completion of an administrator assessment that evaluates administrator candidates' knowledge and skills regarding legal, organizational, and financial concepts related to schools, reading comprehension, mastery of writing and verbal skills and child and adolescent growth and development.
2. a culminating portfolio which includes the future administrator's knowledge of diversity, and demonstrates his or her ability to transfer theory and research to practice.

Residency Program

A teacher with an Oklahoma license will serve at least one and in some cases two years as a resident teacher under the guidance of a Residency Committee. The committee consists of a mentor teacher and an administrator within the local district where the beginning teacher is employed, and a higher education representative. Upon completion of the residency experience (120-180 days) the candidate may be recommended either for certification by the Residency Committee or for an additional year of teaching under the guidance of either the same or a new Residency Committee.

The Oklahoma State Regents for Higher Education and the teacher education institutions in Oklahoma have taken another step in improving teacher education by offering a warranty that all teacher education graduates recommended for licensure will meet the employing school's expectations in 15 competency areas. Students entering college in or after fall 2000 and completing an approved teacher education program in Oklahoma would be the beneficiary of this warranty. The state university that awards the degree and submits the recommendation for teacher licensure will stand by the quality of its graduates and maintain its obligation to nurture the continuing development of teachers.

If the teacher does not satisfactorily complete the second year as a resident teacher, the Residency Committee will recommend non-certification for the candidate. Anyone recommended for non-certification upon the completion of the second year of residency will not receive a recommendation from OSU for any in or out-of-state teacher certification.

College of Engineering, Architecture and Technology

Karl N. Reid, ScD - *Dean*
David R. Thompson, PhD - *Associate Dean for Instruction and Outreach*
D. Alan Tree, PhD - *Associate Dean for Research*
Kevin Moore, MBA - *Director of Student Academic Services*

101 Engineering North • (405) 744-5276 • Web site: www.ceat.okstate.edu

The mission of the College of Engineering, Architecture and Technology is to advance the quality of human life through strategically selected programs of instruction, research and public service, incorporating social, economic and environmental dimensions and emphasizing advanced level programs in engineering that are internationally recognized for excellence.

Engineers, engineering technologists and architects, working side by side, constitute one of the most powerful agents for change in our society. New ways are found to control the environment, to utilize the resources and forces of nature and to increase productivity of needed goods and services, in short, to improve the quality of life for all.

Most of the work of engineers, technologists and architects is concerned with the conception, design, fabrication, and maintenance and testing of devices, processes, installations, and systems that serve human needs. This work provides ample opportunity to express creativity. It requires an ability to make decisions.

The professionals and semi-professionals who will be largely responsible for the shape of the world in the next few decades include those now in higher education. The power they will exercise makes an exciting prospect and presents a sobering responsibility. The easy problems are usually solved first and are now a part of history. Many difficult problems remain. The need for talented and highly trained people is obvious; one will be embarking on a lifetime of challenge if he or she decides to prepare for a career in engineering, engineering technology or architecture at Oklahoma State University.

The College of Engineering, Architecture and Technology (CEAT) offers a complete spectrum of educational opportunities designed to give graduates the capability and the flexibility to meet the ever-changing requirements of society—a society heavily committed to technological innovation. To be prepared to make continuing contributions, engineers, architects and technologists must have at their command not only the modern tools and processes of industry, but a firm and rigorous education in mathematics, the physical sciences, analysis and design. In order that those contributions be sensitive to genuine human needs, the engineer, architect or technologist must also be schooled in the social sciences and humanities that provide the understanding of non-technical factors that must shape technological innovation and implementation. The study of social sciences and humanities also helps prepare the graduate to be an effective contributor within human organizations. With this firm foundation and a commitment to lifelong learning, graduates make contributions to society throughout their professional careers.

The curricula in each of the programs seek to provide the optimum combination of breadth in the enduring fundamentals that undergird technologically based society and specialization in a discipline. Each curriculum also sensitizes the student to ethical, social, cultural and global issues in order to equip the student to contribute to solutions at the cutting edge of technology. Curricula are continuously evolving to include current applications of the principles. With the combination of theory, practice and sensitivity to the educational experience should support one's following diverse interests and opportunities throughout the productive years of his or her life span.

Academic Programs

Academic programs offered in the College of Engineering, Architecture and Technology culminate in the following degrees:

Schools of Engineering:
Bachelor of Science in Aerospace Engineering, Biosystems Engineering with options in biomechanical, bioprocessing and biotechnology, environment and natural resources, and food processing; Chemical Engineering with options in environmental, biomedical/biochemical and premedical; Civil Engineering with an option in environmental; Computer Engineering; Electrical Engineering; Industrial Engineering and Management; and Mechanical and Aerospace Engineering with an option in premedical.

Master of Science in Biosystems Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Engineering and Technology Management, Environmental Engineering, Industrial Engineering and Management, and Mechanical and Aerospace Engineering.

Doctor of Philosophy in Biosystems Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering and Management, and Mechanical and Aerospace Engineering.

School of Architecture:
Bachelor of Architecture, Bachelor of Architectural Engineering.

Division of Engineering Technology:
Bachelor of Science in Engineering Technology with programs in construction management technology with options in building and heavy, electrical engineering technology with options in computer and telecommunications, fire protection and safety technology, and mechanical engineering technology.

Accreditation

Undergraduate engineering programs are separately accredited by the Engineering Accreditation Commission (EAC) of the ABET. EAC of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; phone: (410) 347-7700; e-mail: accreditation@abet.org. Specifics of accreditation are found in the sections devoted to each program on the following pages.

The Bachelor of Architecture program is accredited by the National Architectural Accrediting Board, Inc., 1735 New York Ave. NW, Washington D.C. 20006; phone (202) 783-2007.

The undergraduate engineering technology programs are separately accredited by the Technology Accreditation Commission (TAC) of ABET. TAC of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; phone: (410) 347-7700; e-mail: accreditation@abet.org. Specifics of accreditation are found in the program descriptions in the section "Division of Engineering Technology."

Special College Programs

—Cooperative Education. The Cooperative Education program provides students work opportunities in a supervised environment that assures professional development. Work periods alternate with academic

studies. Students enter the program at the end of their sophomore year and complete at least one calendar year of supervised work experience in two or more work periods prior to graduation.

—CEAT Scholars Program. This program provides educational experiences for a select group of gifted students that will develop their technical competence, world view, professional and public responsibility, and leadership skills. Approximately 25 freshmen are selected each year by application and interview to enter this four year program, based on demonstrated academic and leadership potential. Students participate in special lectures, tours, residence hall programs, seminars, personal development activities, faculty mentoring, and summer tours in the U.S. and abroad.

—CEAT Freshman Research Scholars Program. This program provides opportunities for accelerated intellectual development of a select group of students. Approximately 12 new freshmen students are identified from applications and interviews annually to participate in this program. Each student is assigned to a research faculty mentor and participates in a research program.

—ConocoPhillips Spirit Scholars Program. The ConocoPhillips Company sponsors this program to increase the number of outstanding graduates in engineering from Oklahoma State University. Freshman students are identified for this program from applications and interviews with both Oklahoma State University faculty and ConocoPhillips employees. The program includes a number of experiences to help students develop professionally, build leadership and teamwork skills, assess personal capabilities, achieve academic excellence, enhance interpersonal relationships, and increase the student's awareness of career opportunities. Special features include the assignment of a ConocoPhillips engineer to mentor each student, focused national and international trips and financial support.

—Women in Engineering, Architecture, and Technology (WEAT). Programs and resources are in place to develop and support female enrollment in the CEAT. Peer mentoring program, an active Society of Women Engineers, summer programs in engineering for high school students, a conference for high school and OSU students, and a vigorous recruiting effort are all directed at recruitment and retention of women in engineering, architecture and technology. Female faculty members and a coordinator of WEAT programs provide support to this program.

—Multicultural Engineering Program. These programs focus on increasing the number of minority graduates from the CEAT, and increasing the understanding of diverse cultures on the part of all students. Included are programs for recruitment and retention of qualified minority students. Industrial support provides scholarships, summer employment, and supplemental funds for recruitment and retention of minority students. Cultural awareness programming is designed to increase understanding of and sensitivity to the diverse cultures with which students will have to interact in today's world.

—Employment Service. The CEAT Career Services Office supports the University Career Services and assists students with on-campus interviews and job referrals for summer coop and permanent employment. Job vacancy listings, reference files, and resource materials on resume preparation, interviewing, and job search techniques, are available for student reference. Orientation meetings and various workshops are provided to prepare students for the process of seeking employment.

—CEAT Living Unit Programs. CEAT floors have been established in the Kerr-Drummond residence hall for both men and women CEAT students. Living/Learning Communities are also available for female (Maude's Quad) and multicultural (HOMES) freshmen. CEAT student staff live on the floors to provide programming and monitoring. Special activities are planned for the floors, including events with faculty and other resource persons. This arrangement provides a community where students can study together, have access to tutoring, and serve as role models for other students. The atmosphere on these floors is conducive to study.

Departmental Clubs and Honor Societies

Alpha Epsilon (biosystems and agricultural engineering honor society)
Alpha Pi Mu (industrial engineering and management honor society)
Alpha Rho Chi (architecture honor society)
Amateur Radio Club
American Indian Science and Engineering Society
American Institute of Architecture Students
American Institute of Aeronautics & Astronautics
American Institute of Chemical Engineers
American Society for Quality
American Society of Agricultural and Biological Engineers
American Society of Civil Engineers
American Society of Heating, Refrigeration and Air Conditioning Engineers
American Society of Mechanical Engineers
American Society of Safety Engineers
Architecture Engineering Institute
CEAT Student Council
Chi Epsilon (civil and architectural engineering honor society)
Construction Management Society
Construction Specifications Institute
Cowboy Motorsports Quarter Scale Tractor Team
Engineers Without Borders
Eta Kappa Nu (electrical and computer engineering honor society)
Fire Protection Society
Institute for Operations Research and the Management Sciences
Institute of Electrical & Electronics Engineers (two student branches)
Institute of Industrial Engineers
Institute of Transportation Engineers
Omega Chi Epsilon (chemical engineering honor society)
Pi Tau Sigma (honorary mechanical engineering society)
Sigma Gamma Tau (honorary aerospace engineering society)
Sigma Lamda Chi (Construction Management Technology honor society)
Society of Automotive Engineers
Society of Automotive Engineers Formula Racing Team
Society of Automotive Engineers Mini-Baja Team
Society of Black Engineers, Technologists & Architects
Society of Fire Protection Engineers
Society of Hispanic Professional Engineers
Society of Manufacturing Engineers
Society of Women Engineers
Student Association of Fire Investigators
Tau Alpha Pi (technology student's honor society)
Tau Beta Pi (engineering student's honor society)

CEAT Honors Program

The Honors College provides opportunities for challenges for undergraduate students of unusually high ability, motivation and initiative. Honors classes, seminars and independent study courses are structured to put interested students and teachers together in ways which encourage discussion and a mature approach to learning.

Each honors course completed with an "A" or "B" grade is identified on the student's transcript as such. A special bachelor's degree honors diploma is conferred upon graduation for successful completion of all Honors College requirements.

Qualified high school scholars are eligible for The Honors College beginning with their first enrollment at OSU as freshmen. Eligibility is based on a minimum composite ACT score of 27 and a high school grade-point average of 3.75 or higher. Students other than new freshmen may enter the Honors Program if they have an OSU and a cumulative grade-point average that satisfies the requirements specified by the Honors College. Students should contact The Honors College, 510 Edmon Low Library, for eligibility forms.

—Honors Recognition. The General Honors Award is earned by completing a minimum of 21 honors credit hours with grades of "A" or "B." At least three honors credit hours must be completed in each of four of the following areas: (1) English, speech communication and foreign languages (2000 level or higher), (2) humanities, (3) mathematics, statistics and computer science, (4) natural science, (5) social science, and (6) other courses with honors credit. Three of the 21 credit hours must be in a special honors seminar or an interdisciplinary honors course. A 3.50 or higher cumulative grade-point average is required at the time of the award. Completion of the General Honors Award is noted on the student's official transcript.

The College Honors Award is earned by completing a minimum of 12 honors credit hours in upper-division courses with grades of "A" or "B." The 12 credit hours must include a senior honors thesis or senior honors project with a public presentation of the results. A 3.50 or higher cumulative grade-point average is required at the time of the award. Completion of the College Honors Award is noted on the student's official transcript.

Students who earn a minimum of 39 honors credit hours with at least a 3.50 OSU and cumulative GPA and have received both the General Honors Award and the College Honors Award will be granted the bachelor's degree with honors. This recognition is reflected on the student's official transcript and on a special honors diploma.

Scholarships

Several scholarships are funded through private donations, alumni gifts, and industries, and vary in amounts from $400 to over $5,000 per year.

These scholarships are available for freshman through senior students, and are awarded primarily on the basis of academic achievement and leadership potential. However, during the selection process consideration may be given to financial need. Freshman students should normally have an ACT composite score of 29 or higher and be in the top 10 percent of their high school graduating class to be competitive for CEAT scholarships.

Each school or department within the College normally has scholarship funds available. These are administered through that school or department rather than through the College's scholarship committee. However, a separate application form is not required.

Scholarship application forms for transfer students may be obtained by contacting the Office of Student Academic Services, CEAT, 101 Engineering North, OSU, Stillwater, OK 74078.

Freshman scholarship applications should be completed and on file by February 1 preceding the academic year for which the student expects to receive the scholarship in order to assure full consideration. The OSU Freshman Fee Waiver and Scholarship form should be submitted to the Office of University Scholarships. Since copies of these applications are forwarded to CEAT, a separate application is not required.

Continuing students should submit scholarship applications to the Dean's office of student services and the head of the school in which they are majoring prior to April 1. In this manner they will also be considered for any departmental scholarships for which they may be eligible as well as for any CEAT scholarship. Students who have not selected a major should submit their applications to the Dean's Office of Student Services.

Concurrent Enrollment

If a student expects to apply credits toward a degree at OSU that are to be earned at another institution or through correspondence study or extension, while enrolled in one of the programs of the College of Engineering, Architecture and Technology, permission must be obtained in advance. It is the belief of the faculty of the College that such enrollment detracts from the educational process at this institution, and can be justified only in the most unusual circumstances. Normally, if the material for which such permission is sought is available at OSU, permission will not be granted, nor will retroactive permission be granted in any circumstances.

High School Preparation

Beginning engineering students who have completed two units of algebra and one each in plane geometry and trigonometry/analysis in high school should be prepared to enter at the expected level in mathematics. In addition, students who can should obtain high school credit in one unit of general chemistry, one unit of general physics, and a course in calculus, if available.

Oklahoma State University offers course work in algebra, trigonometry and preparatory chemistry for students who were unable to obtain this work during high school. However, such credit does not count toward the minimum number of semester hours specified for the BS degree in engineering.

General chemistry, college algebra and trigonometry credits may count toward BS degrees in engineering technology, and general chemistry may be used as an elective in architecture.

General Education Requirements

For students in Engineering, Architecture and Technology, courses in the humanities and social sciences provide both a broadening of the education and essential background for addressing the critical issues in society. Students in Engineering, Architecture and Technology must take General Education courses consistent with those specified in the degree requirement sheets. Each student should visit with his or her adviser to ascertain that appropriate courses are being selected. Engineering students must complete at least six credit hours of courses designated as (H) and six credit hours of course work designated (S). The student must also satisfy the international dimension and diversity course requirement. The international dimension can be satisfied by either taking a course designated (I) or by approved international experience. The diversity course requirement must be satisfied by taking a course designated (D). If this course work is taken at Oklahoma State University, the course must have been designated as (H), (S), (D) and/or (I) respectively at the time it was taken. If one or more of the courses were taken at another institution the course must transfer as equivalent to an Oklahoma State University course that was designated (H), (S), (D) and/or (I) respectively at the time that the transfer course was taken. Engineering students should verify their course selections in these categories with advisers in the CEAT Office of Student Academic Services before enrollment.

Schools of Engineering

Each of the schools of engineering offer bachelor's, Master of Science, and doctor of philosophy degree programs. The common curricular objectives for the engineering programs are to develop each student's: (1) capability to delineate and solve in a practical way the engineering problems of society, (2) sensitivity to the socially-related technical problems which confront the profession, (3) understanding of the ethical characteristics of the engineering profession and practice, (4) understanding of the engineering responsibility to protect both occupational and public health and safety, and (5) ability to maintain professional competence through life-long learning.

The Professional School Concept

In accord with the professional nature of a career in engineering, a student entering OSU is admitted into the pre-engineering program, consisting of the course work normally taken the first two years of an engineering curriculum. Near the completion of the pre-engineering course work, the student is considered for admission to one of the professional schools of the College to continue in the upper-division program. Upon meeting admission standards the student then pursues a curriculum leading to the BS degree or graduate education in his or her discipline.

—Pre-professional School. The content of the pre-engineering program is similar for most engineering specialties and includes course work devoted to mathematics through calculus and differential equations, communication skills, general chemistry, general physics, engineering sciences, social sciences, and humanities.

—Professional School**.** Upon formal admission to the professional school of his or her choice, the student proceeds through the junior and senior years of the degree program, fulfilling "Major Requirements" as listed on the degree requirements sheets in the publication *Undergraduate Programs and Requirements* that is considered a companion document to this *Catalog*. Upon completion of all degree requirements, the student is awarded the Bachelor of Science degree.

—Master of Science and Doctor of Philosophy. These degree programs are available in each engineering school to prepare engineers for careers in advanced engineering, research and development. The programs are described under each school's headings and in the "Graduate College" section of the *Catalog*.

The College of Engineering, Architecture and Technology also participates in interdisciplinary Master of Science programs in control systems engineering, engineering and technology management, health care administration, and telecommunications systems management. The Master of Manufacturing Systems Engineering is also offered in the College. All of these programs are available using distance learning technologies and most may be taken by resident students on campus. See the "Graduate College" section of the *Catalog* for further information.

Admission Requirements

All new engineering students at Oklahoma State University are first admitted to the pre-professional school program. Regardless of previous background all new engineering students must enroll in ENGR 1111, BAE 1012 (if the student plans to study biosystems engineering), or ARCH 1112 (if the student plans to study architectural engineering). New students who do not have a strong preparation in mathematics and science will be required to complete additional course work before enrolling in required courses in these subjects. Students transferring to pre-professional school from another major at OSU or University Academic Services must meet the same requirements for admission as a student transferring from another college or university.

Transfer students will be admitted directly to pre-professional school if they satisfy all OSU resident transfer student requirements and have a GPA of at least 2.00 not to include activity, performance or remedial courses in the most recent semester completed.

Students not directly admissible to pre-professional school, but those who meet OSU requirements for admission, may be admitted to University Academic Services for one or two semesters in order to fully evaluate their qualifications for admission to pre-engineering. After grades are received each semester, such students may be evaluated and, if qualified, will be admitted to pre-engineering.

International student applications must be received by June 15, November 1 and April 1 for the fall, spring and summer terms, respectively, to be considered for admission to pre-engineering.

—Admission to the Professional Schools. In each school of engineering the lower-division course work is devoted to preparing the student for professional school.

To be admitted to one of the professional schools of engineering, the student must have:

1. Completed a minimum of 60 credit hours in an accredited institution of higher learning.
2. Demonstrated an acceptable level of competence in subject material comparable to that covered in Pre-engineering, i.e., General Education and Common Pre-engineering. Such demonstration may be by completion of course work or by examination with not more than half the requirements satisfied by examination.
3. Demonstrated an acceptable level of professional potential, including academic integrity and ethical behavior, as determined by the professional school head.
4. Been formally accepted by a professional school. This acceptance may include any evaluation of the student's professional potential.

An acceptable level of competence for admission to a professional school may be demonstrated by:

a. Completion of the pre-professional school requirements as designated on the flow chart corresponding to the student's matriculation date and major, with an overall grade-point average of 2.30 or higher in these courses. Students may be deficient in no more than nine of these hours, and must have completed the required sequences in calculus, general physics, general chemistry, English composition, and at least two engineering science courses.

b. Final grades of "C" or better in all courses submitted to meet the University's English composition requirement.

c. Completion at OSU of at least 12 credit hours of courses required for the degree, with a grade-point average of 2.30 or higher in these courses. This must include at least nine hours of technical subjects with a GPA of 2.50 or higher.

d. Achievement of an overall grade-point average of 2.50 or higher in the required mathematics, physics, chemistry, engineering science and engineering courses completed prior to admission to a professional school and final grades of "C" or better in each of these courses.

For these purposes, all GPAs are calculated using only the last grade in repeated courses. Individual schools may impose higher standards for admission. Currently, the School of Electrical and Computer Engineering requires a 2.60 and 2.70 respectively where 2.30 and 2.50 are indicated in a., c., and d. above.

The School of Mechanical and Aerospace Engineering currently requires a 2.70 technical GPA (basic science and engineering courses including physics, biology, geology, engineering, engineering science and MAE courses on degree plan); a 2.70 math GPA (includes all required math and statistics courses on degree plan); and a 2.60 overall GPA.

The School of Chemical Engineering currently requires a 2.70 GPA or better in math, science and engineering courses required in the Chemical Engineering degree plan.

In addition, if the number of qualified professional school applicants to a given professional school exceeds the number that can be provided a quality program with the resources available, the number admitted each year to that professional school will be limited. In that event, priority for admission will be given to pre-engineering students on a best qualified basis as determined by the grade-point average in relevant courses taken and completed at OSU and professional potential, including academic integrity and ethical behavior. This practice will preserve the

high standards demanded of a quality educational experience sought by students and is necessary so that OSU graduates will continue to be highly regarded.

Students may enroll in no more than nine hours of upper-division major requirements prior to admission to professional school unless they secure permission from the head of the school. However, enrollment preference in such courses will be given to students admitted to the professional school.

Class Placement

The selection of the initial chemistry and mathematics courses for an entering student in the College of Engineering, Architecture and Technology is determined by: (1) the credit hours of and grades in mathematics and chemistry courses previously complete, (2) placement test scores, and (3) ACT test scores. When appropriate, students with a strong background can obtain academic credit by advanced standing examination or by College Level Examination Program (CLEP) tests.

Academic Advising

The College's Office of Student Academic Services provides advisement for all pre-engineering students. When a student has gained admission to a professional school of engineering, he or she will be assigned a faculty adviser in the school.

Each student is personally advised in the planning and scheduling of his or her course work and is counseled and advised individually on matters of career choice, his or her activities at OSU, and on other academic matters. An academic file is created for each student at the time of initial enrollment.

Each student and his or her adviser must carefully select elective courses to meet the curriculum objectives and accreditation criteria. Specific criteria include appropriate computer-based experiences, knowledge of probability and statistics, competence in written and oral communications, an understanding of ethical, social, economic and safety considerations, and engineering design experiences that are integrated throughout the curriculum. The engineering design experiences begin with ENGR 1322, 1332, 1342 or 1352 (depending on the student's major) and culminate with a major engineering design experience specified on the degree requirement sheet. The adviser assists the student in this effort and tries to assure accuracy and compliance; however, the ultimate responsibility for meeting degree requirements rests with the student.

General Education Requirements

Opportunities to satisfy General Education requirements with required courses in the schools of engineering include:

ENGLISH. Students in some programs are required to complete a course in technical report writing. Thus, students making an "A" or "B" in the first English composition course (ENGL 1113), need not take ENGL 1213, and may take ENGL 3323, to meet both the General Education requirement for English and specific program requirements.

—Humanities and Social Science. Engineering students must complete a minimum of 18 credit hours to satisfy this requirement. By taking American history and political science, six additional hours designated as social and behavioral sciences, and six hours designated as humanities, the 18 hours will meet the University's requirements in these areas. Humanities and Social Science courses must be selected with the assistance of a CEAT adviser in order to assure compliance with accreditation requirements and the University's requirement for an International Dimension.

Biosystems and Agricultural Engineering

Ronald L. Elliott, PhD, PE - *Professor and Head*

The School of Biosystems and Agricultural Engineering is administered jointly by the College of Agricultural Sciences and Natural Resources and the College of Engineering, Architecture and Technology.

Biosystems engineers are professionals who create and adapt engineering knowledge and technologies for the efficient and effective production, processing, storage, handling and distribution of food, feed, fiber and other biological products, while at the same time providing for a quality environment and preserving and protecting natural resources. Biosystems engineers directly address problems and opportunities related to food, water, energy, and the environment – all of which are critical to the quality of life in our society. Subject-matter specialization is provided through the following four undergraduate option areas: food processing, environment and natural resources, biomechanical, and bioprocessing and biotechnology.

Biosystems engineering courses integrate engineering sciences, physical sciences, and biological sciences, and teach students to address real-world challenges. With the guidance of experienced faculty, students work both as individuals and in teams to design creative solutions to complex problems.

The overall objective of the undergraduate biosystems engineering degree program is to provide the comprehensive education necessary to prepare students for successful, productive and rewarding careers in engineering for agricultural, food and biological systems. Graduates of the program will be:

- able to apply the mathematical, physical, engineering, and biological principles needed to understand, analyze, and solve problems in food, agricultural, environmental and/or biological systems.
- effective in oral, written and visual communications.
- effective in accomplishing tasks, both as an individual, and as a contributor to multi-disciplinary teams.
- able to understand the social, environmental, safety and economic impacts of their work in local and global contexts, and to perform in a professional and ethical manner.
- committed to enhancing knowledge and skills through continuing education.

The undergraduate educational program is divided into two components—pre-professional and professional. In the pre-professional portion of the biosystems engineering program (usually equivalent to two years of study) the focus is on the underlying biological, physical, chemical and mathematical principles of engineering, supplemented by appropriate general education courses in English, social sciences and humanities. Students who demonstrate proficiency in this portion of the program are eligible for admission to the professional school in biosystems engineering.

The professional school of biosystems engineering curriculum (typically two years) builds systematically upon the scientific knowledge acquired in the pre-professional curriculum. In professional school, students have the opportunity to focus on the option areas given above. The degree is accredited by the Engineering Accreditation Commission of the ABET under criteria for agricultural engineering and similarly named programs.

Each professional school course builds upon preceding engineering courses to develop in the student the ability to identify and solve meaningful engineering problems. The course work is specifically sequenced and interrelated to provide design experience at each level, leading to progressively more complex, open-ended problems. The course work incorporates the social and economic aspects of technical problems, and stresses the responsibilities as engineering professionals to behave ethically and promote occupational and public

safety. The program culminates in senior year design courses in which students integrate the analysis, synthesis and other abilities they have developed throughout the earlier portions of their study into a capstone experience. At this point, they are able to design components, systems and processes that meet specific requirements, including such pertinent societal considerations as ethics, safety, environmental impact and aesthetics. The students have also developed and displayed the ability to conduct experiments essential to specific studies and to analyze the experimental results and draw meaningful conclusions.

An integral part of this education continuum from basic science through comprehensive engineering design are learning experiences that facilitate the students' abilities to function effectively in both individual and team environments. Moreover, the program provides every graduate with adequate learning experiences to develop effective written and oral communication skills. State-of-the-art computational tools are introduced and used as a part of their problem-solving experiences. Finally, the students' experience in solving ever-more-challenging problems enables them to continue to learn independently throughout their professional careers.

A wide variety of employment opportunities are available for biosystems engineers in industry, public service and education. Some of these opportunities include positions in governmental agencies, consulting engineering firms, and agricultural and food equipment industries. Biosystems engineers are employed throughout the U.S. as well as internationally.

Students interested in a degree in biosystems engineering may initially enroll in the College of Engineering, Architecture and Technology or the College of Agricultural Sciences and Natural Resources. Students who enroll in the College of Agricultural Sciences and Natural Resources should request a biosystems engineering adviser and transfer to the College of Engineering, Architecture and Technology by the end of their first semester.

Graduate Programs

The School of Biosystems and Agricultural Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees in biosystems engineering. These degrees emphasize research and development.

Excellent laboratory and computer facilities are available for students to explore research and design in such areas as bioprocessing, food engineering, sensor and control technology, waste management and utilization, hydrology, water quality, porous media flow, and intelligent systems for agricultural machine design and production.

Research projects are supported by the Agricultural Experiment Station and by state, federal and private grants and contracts. A well-trained faculty, many of whom are registered professional engineers with research, consulting and design experience, guide the graduate students' activities and plan programs to meet students' needs. Graduate students design experiments and special equipment to conduct their work. They are expected to demonstrate, by supporting research or by designs, the ability to identify a problem, define alternatives, propose a solution, organize a design or an experimental investigation, carry it to completion and report the results.

—Admission Requirements. Admission to either the Master of Science or Doctor of Philosophy degree program requires graduation from an engineering curriculum accredited by the ABET. Students without accredited degrees may be admitted provisionally and may be required to take additional courses.

A student must be accepted by an adviser in the department prior to official admission to the graduate program.

—Degree Requirements. A candidate for either of the graduate degrees listed above follows an approved plan of study which must satisfy at least the minimum University requirements for that particular degree.

Chemical Engineering

Khaled A.M. Gasem, PhD - *Bartlett Chair, Professor and Head*

Chemical engineers use the language of mathematics to describe the chemical and physical behavior of molecules (solid, liquid, gas, or plasma). This ability is used to design and operate processes that produce useful products. Chemical engineers work in a wide range of industries that make pharmaceuticals, fuels, biochemicals, semiconductor materials, foods, plastics, paper, petroleum products and chemicals. Key to providing a benefit to society, chemical engineers are responsible for resource conservation, minimizing pollution, minimizing costs, and maximizing quality and safety of processes that make the products.

The emphasis on the chemical nature of everything people use is what makes chemical engineers different from other engineers. The emphasis on the processes that make the products is what makes chemical engineers different from chemists.

Chemical engineers often find themselves defining a problem or product, developing a process to do what is needed, and then designing the plant to carry out the process. After the plant is started, chemical engineers commonly manage operations, oversee equipment maintenance, and supervise control of product quality. They trouble-shoot the problems which hinder smooth operations, and they plan for future expansions or improvements. Their training and knowledge make them well qualified to market the products from a plant, the processing equipment for plants, or even the complete plant itself. The varied background and experience of chemical engineers make them ideally suited for advancement into top-level managerial and executive positions.

—Educational Objectives. Within the first few years after graduation OSU graduates will possess:

- Competencies - skill in tools and techniques that are fundamental to the job, many of which need to be learned after graduation.
- Professionalism - partnership in the mission and within the human context of the enterprise; ethics, effectiveness and awareness of the broad context of detailed work
- Balance - a wise self-direction to life, community, health, and self view that finds the right balance between personal choices, that energizes self and others and enables effectiveness in relationships with others.

The goal of the BS degree program is to produce graduates who possess broad-based knowledge, skills and judgment that prepares them to succeed in the profession of engineering or in further studies at the graduate level, including medical school. To achieve this goal, the program is designed to progressively develop both technical and human skills.

In the pre-professional portion of the chemical engineering program (usually equivalent to two years of study), the focus is on the underlying scientific and mathematical principles of engineering, supplemented by appropriate general education courses in English, social sciences and humanities. Students who demonstrate proficiency in this portion of the program are eligible for admission to the professional school.

The curriculum in the professional school (typically the second two years) builds systematically upon the scientific knowledge acquired in the pre-professional curriculum. In professional school, students have the opportunity to focus in one of four emphasis areas: (1) the regular course prepares a graduate for a wide range of employment opportunities; (2) the pre-medical option is for those who wish preparation for medical school; (3) the biomedical/biochemical option is for those who seek employment in bio-related professions; and (4) the environmental option is for those who wish to emphasize environmentally-related studies. Each emphasis area is accredited under the basic level EAC-ABET criteria for chemical engineering programs and each prepares a student for success in both employment and graduate study at OSU or other universities. A more complete description of exact degree

requirements for the bachelor's-level curricula is given in the publication *Undergraduate Programs and Requirements* at OSU.

—Admission Requirements for the Chemical Engineering Professional School. To be admitted into the CHE Professional School (and to be eligible to take the upper-level CHE courses) the student must:

- Complete at least 60 college-level credit hours (of which 12 must be from OSU)
- Complete MATH 2144, 2153, 2163, and 2233 (or 3263); PHYS 2014 and 2144; CHEM 1515 and 3053; CHEM 3153 and 3112 (or BIOC 3653 and 3723); ENSC 2213 and 3233; CHE 2033; ENGL 1113 or 1313. A final grade of "C" or better must be achieved in these courses. If a "C" is obtained in ENGL 1113 or 1313, ENGL 1213 or 1413 is also required.
- Earn a grade of "C" or better in additional math, science and engineering courses taken prior to professional school admittance which are part of the degree requirements.
- Maintain a GPA of 2.75 or better in the math, science and engineering courses on the Chemical Engineering degree requirements.

Each professional school course builds upon the preceding chemical engineering courses to develop the ability to identify and solve meaningful engineering problems. The course work is specifically sequenced and interrelated to provide design experience at each level, leading to progressively more complex, open-ended problems. The course work includes sensitizing students to socially-related technical problems and their responsibilities as engineering professionals to behave ethically and protect occupational and public safety. The program culminates in the senior-year design courses in which the students integrate the analysis, synthesis and other abilities they have developed throughout the earlier portions of their study into a capstone experience. At this point, they will be able to design components, systems and processes that meet specific requirements, including such pertinent societal considerations as ethics, safety, environmental impact and aesthetics. The students will have developed and displayed the ability to design and conduct experiments essential to specific studies, and to analyze the experimental results and draw meaningful conclusions within an enterprise context.

An integral part of this educational continuum from basic science through comprehensive engineering design are learning experiences that facilitate the students' abilities to function effectively in both individual and team environments. Moreover, the program provides every graduate with adequate learning experiences to develop effective written and oral communication skills. State-of-the-art computational tools are introduced and used as a part of their problem-solving experiences. Finally, the students' experience in solving ever-more-challenging problems gives them the ability to continue to learn independently throughout their professional careers.

Graduate Programs

The School of Chemical Engineering offers programs leading to the Master of Science and Doctor of Philosophy. A program of independent study and research on a project under the direction of a member of the Graduate Faculty will be satisfactorily completed by all graduate students. For the Master of Science candidate, the project may result in a thesis. For the Doctor of Philosophy candidate, the project will result in his or her dissertation.

—Admission Requirements. Admission to either the Master of Science or Doctor of Philosophy degree program requires graduation from a chemical engineering curriculum approved by the ABET (ABET) or a recognized equivalent from any international program.

Students with related undergraduate degrees, such as chemistry, automation engineering, etc. can be admitted conditionally, subject to completing prescribed undergraduate Chemical Engineering program courses. Admission is competitive based on undergraduate GPA, GRE and TOEFL (for international students), statement of interests, experience and recommendations.

—The Master of Science Degree. General requirements for the Master of Science degree in chemical engineering are 30 credit hours of work beyond the BS degree and an acceptable thesis. At least 18 hours must be in class work and a minimum of six hours of credit is required for thesis research. The courses taken must include CHE 5123, 5213, 5743 and 5843.

—The Doctor of Philosophy Degree. The general credit requirement is a minimum of 90 credit hours beyond the BS degree, including at least 36 hours of credit for research and at least 30 hours of class work. The courses must include CHE 5123, 5213, 5743, 5843, and 6703. Each student is responsible for consultation with his or her advisory committee in preparing the study plan.

Civil and Environmental Engineering

John N. Veenstra, PhD, PE - *Professor and Head*

Civil engineers build the future. The exceptional diversity of professional practice in civil and environmental engineering presents many career opportunities for students.

The concern of civil engineers is a person's environment—its design, construction, control, alteration and utilization. Civil engineers plan, design and construct, highways, waterway and railway systems, harbors and shipping facilities, systems for the treatment and distribution of water and for the collection and treatment of municipal and industrial waste, dams and hydroelectric works, airports and terminals, structures of every kind including buildings, bridges, towers, industrial plants, tunnels and subway systems, processes for the control of water and air pollution, and many other works of general benefit to society.

The professional curriculum in civil engineering is based on the pre-engineering courses in mathematics, physical sciences and engineering sciences. On this foundation, required courses train the student in the basic skills needed for the professional practice of civil engineering and provide the tools for more advanced study. Engineering theory and principles are developed in a way that will encourage their application to the solution of practical problems.

—Educational Objectives. The educational objectives of the BS degree program are:

- To design, coordinate and execute an undergraduate program in Civil and Environmental Engineering that produces graduates who have the following attributes:

  a. The understanding and technical skills necessary to develop engineering solutions that are technically feasible, economically acceptable, and environmentally sustainable;

  b. A background in the six major areas of civil engineering (construction management, environmental, geotechnical, water resources, structural, and transportation), at a level consistent with other full- term ABET-accredited programs in the nation;

  c. The communication and interpersonal skills necessary to learn and work both independently and in teams including both engineers and non-engineers; and

  d. The technical and personal attributes needed to meet the needs of external constituencies, and to contribute to society's infrastructure and the environment;
- To provide enrichment opportunities for students, including opportunities to interact with practicing professionals, opportunities to develop leadership skills and encouragement and motivation for life-long learning;
- To recruit and retain a faculty that is qualified by education,

experience and interpersonal skills to effectively provide the desired educational experiences and guidance to students; and

- To provide instructional facilities, equipment and other resources to students and faculty to enable them to achieve the program's objectives.

The curriculum is designed to achieve the educational objectives in conjunction with the program outcomes. These outcomes state that graduates of the program will have: (a) an ability to apply knowledge of mathematics, science, and engineering, (b) an ability to design and conduct experiments, as well as to analyze and interpret data, (c) an ability to design systems, components, or processes to meet desired needs within realistic constraints (such as economic, environmental, social, political, ethical, health, safety, and sustainability) (d) an ability to function on multi-disciplinary teams, (e) an ability to identify, formulate, and solve engineering problems, (f) an understanding of professional and ethical responsibility, (g) an ability to communicate effectively, (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context, (i) a recognition of the need for, and an ability to engage in life-long learning, including an understanding of the importance of professional licensure, (j) a knowledge of contemporary issues, (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice, (l) an ability to apply knowledge in six technical areas in civil engineering, and (m) an ability to explain basic concepts in management, business, public policy, and leadership.

The School provides a curriculum that is effective and balanced among the major areas of civil engineering practice. Design capabilities are developed throughout the curriculum, culminating in a comprehensive senior design experience, incorporating much of the previous course work. Some degree of specialization is provided through the choice of elective courses in structures, engineering mechanics, transportation engineering, soil mechanics and foundations, construction engineering and management, environmental engineering and water resources. There is a designated option for those students wishing to concentrate more heavily in the environmental area of practice. Program curricula requirements are outlined in the publication *Undergraduate Program and Requirements* that is considered a companion document to the *Catalog*. The general civil option and the environmental options are accredited together by the Engineering Accreditation Commission of the ABET under the criteria for civil and similarly named engineering programs.

—Oklahoma Transportation Center. Oklahoma State University, University of Oklahoma, and Langston University established the Oklahoma Transportation Center (OTC) as a cooperative venture with the Oklahoma Department of Transportation (ODOT), and other transportation agencies, operators and suppliers. This center has been designated as a University Transportation Center (UTC). The mission of the Center is to develop and transmit knowledge through research, training, technical assistance, and technology transfer to enhance the transportation systems that touch the lives of the people of Oklahoma and the nation. This mission is straightforward; it is to solve problems in all areas of transportation.

Graduate Programs

The School of Civil and Environmental Engineering offers three programs leading to post-baccalaureate degrees— the Master of Science degree in civil engineering, the Master of Science degree in environmental engineering, and the Doctor of Philosophy degree. The Master of Science degree is characterized by a technical specialization in a particular area of study. The Doctor of Philosophy degree is designed to prepare a student for research and for the teaching profession in engineering.

Major areas of study in the School are applied mechanics, structural analysis and design, transportation, construction engineering and management, geotechnical engineering, water resources, and environmental engineering. Research in all major fields is continuously pursued. Master of Civil Engineering candidates may choose either to specialize or to engage in a broadly based program of study, in accordance with an approved and purposeful plan of study.

—Admission Requirements. Candidates for the Master of Science or Doctor of Philosophy degree must have graduated from a civil engineering curriculum accredited by the ABET. Graduates from other curricula and schools should submit transcripts to the head of the School of Civil and Environmental Engineering for evaluation. Admission to the Master of Science in environmental engineering degree program is permitted for students who meet the minimum prerequisites as established by the School of Civil and Environmental Engineering.

—Degree Requirements. All degree programs follow an approved plan of study that must be submitted at a designated time. All programs are characterized by the flexibility available in a study plan that is designed to satisfy the particular needs of the student, while conforming to the general requirements implied by the title of the degree and specified by the University.

The Master of Science degree in either civil or environmental engineering requires the completion of at least 30 credit hours beyond the bachelor's degree, including a research thesis for which no more than six credit hours may be granted. The non-thesis option (32 credit hours) described in the "Graduate College" section may be permitted at the discretion of the student's advisory committee.

The Doctor of Philosophy degree requires the completion of at least 90 credit hours of course work beyond the bachelor's degree, including not more than 30 credit hours for the research thesis. In addition, the candidate must meet the equivalency of the language requirement (six hours) in selected areas at the discretion of his or her committee to facilitate his or her research. Generally, official admission as a candidate for the Doctor of Philosophy degree in any program offered by the School will not be granted until a member of the Graduate Faculty in the School agrees to serve as major (or thesis) adviser for the prospective candidate.

Electrical and Computer Engineering

Keith A. Teague, PhD, PE - *Associate Professor and Head*

Electrical Engineering and Computer Engineering are two related professional engineering disciplines that are responsible for many of the phenomenal technological advances that we often take for granted. For example, consider the global electronic media, instantaneous communications, the meteoric rise of the Internet, advances in medical technology, miniaturized electronic circuits, the availability of abundant cheap power, personal computing, and the cellular telephone. Both disciplines have made remarkable contributions to build the society we enjoy today and offer exciting opportunities in the future.

Electrical Engineering has its origins in the 1700s, with Benjamin Franklin, Alessandro Volta, Luigi Galvani and other early scientists who sought to understand what we now call electricity, but they wouldn't recognize the field today! Electrical Engineering deals with the study and application of the theory of electricity, electronics and electromagnetics. Electrical engineers perform research, design, develop, test, and oversee the manufacture of electrical and electronic systems and devices of all types. Examples include electronics and integrated circuits, communication systems, radio and television, radar, automatic control systems, robotics and computer vision, computers and digital electronics, power generation and distribution, waveguides and antennas, navigation systems, and optoelectronics. The field is very broad and growing.

Computer engineering is a relatively new engineering discipline that combines a strong foundation in electrical engineering with elements of computer science to deal with the many “digital” or computer-based systems and devices we encounter every day. As a result, computer engineers and electrical engineers have many things in common.

Computer engineers analyze, design, and develop computer-based systems and digital electronics, focusing on all aspects of computing, both hardware and software. Computer engineers understand digital logic design, computer architecture, digital data communications, computer and sensor interfacing, microprocessors, VLSI circuits, operating systems and software, computer arithmetic, and their application to solve important problems in diverse areas.

Electrical engineers and computer engineers have played a fundamental role in the development of many modern technologies and devices, including cellular telephones and wireless communications systems, global positioning systems, DVD and MP3 players, radio and television, micro-circuits, computers, automotive and aircraft electronic systems, home entertainment products, computer games, medical electronics and imaging systems, radar, electrical power generation and distribution systems, space electronics and remote sensing, solar cells, lasers, telecommunication networks, robotics and computer vision, artificial intelligence, parallel computer systems, and the Internet.

The technologies that electrical and computer engineers discover and develop have improved lives immeasurably, and future technologies will improve and change them even more. An undergraduate degree in electrical engineering or computer engineering provides the opportunity to be one of those who work in these exciting areas.

Beyond technical knowledge, engineers of tomorrow must be aware of the social, economic, ethical and environmental impact of these technologies. They must also be able to communicate their thoughts and ideas, possess excellent teamwork skills, and understand and be able to carry out the process of engineering design. The undergraduate programs in electrical engineering and computer engineering at Oklahoma State University addresses all of these aspects of engineering.

—Educational Objectives. Students gain skills that will benefit them their entire lives. These skills and attitudes define the educational objectives of the program.

The graduates of electrical and computer engineering at Oklahoma State University will:

- be widely employed across a range of disciplines and sub-disciplines in electrical engineering and computer engineering and will report the program provided the preparation needed to succeed in an engineering career.
- be able to succeed in obtaining a professional or graduate degree should they choose to. At least one-third of our graduates will earn or be pursuing an additional degree within five years following graduation.
- report that in their careers they can function on multidisciplinary teams, communicate effectively, and understand the engineering design process.
- follow ethical standards in their careers and engage in public and professional service activities.
- if they choose to pursue careers that require understanding the impact of social, economic, or environmental factors on engineering be successful in these careers.

The School of Electrical and Computer Engineering offers a full range of undergraduate and graduate program choices. A degree in electrical engineering or computer engineering is also an excellent foundation for graduate work in other professional fields such as medicine and law. Many graduates also pursue advanced programs in business and management after earning a degree in engineering.

The undergraduate electrical engineering and computer engineering programs at Oklahoma State University prepares each graduate for a life-long professional career. During the first two years, students complete a carefully designed pre-engineering program consisting of mathematics, physical sciences, engineering sciences, introductory electrical and computer engineering courses, and selected courses in the humanities and social sciences. During the final years of the program, each student concentrates his or her study on specific electrical engineering and/or computer engineering course work. In addition, students majoring in electrical engineering can elect from the following areas of specialization:

- energy and power systems;
- electronics and solid state devices;
- controls, communications, and systems;
- electromagnetics and photonics;
- computers and digital.

These areas of specialization tailor course choices to give electrical engineering students both a breadth of knowledge and a depth of understanding in their chosen area, while computer engineering students focus on their own challenging curriculum which also is designed to provide breadth and depth. By tailoring the program to align student interests with faculty strengths, faculty-student interaction is enhanced and students receive better academic and career guidance. All electrical engineering areas of specialization, as well as computer engineering, offer multiple engineering design experiences distributed throughout professional school. In addition to the laboratories devoted to research, separate instructional laboratories give students the opportunity for hands-on experience in areas such as microcomputers, digital logic design, electronics, electrical machinery, networks, instrumentation and electromagnetics. Laboratories include those that emphasize concepts learned in the classroom as well as those that emphasize engineering design. Engineering design labs have students solve open-ended problems that demonstrate the students' ability to apply fundamental concepts to solve realistic problems of practical importance. These problems have several possible solutions, and students must choose an acceptable approach and demonstrate that the desired outcomes have been met.

The capstone design experience consists of a two-course sequence typically taken during the student's last two semesters in the program. These courses integrate analysis, design, and other skills the students have developed over their entire course of study. Teamwork, communication skills, and the complete engineering design process, from problem definition to prototype, presentation and documentation, are emphasized. Student teams receive individual project mentoring from an appropriate faculty member who provides project management and supervision. The capstone experience concludes with a formal public design demonstration, oral presentation, and written documentation.

The BS degree in electrical engineering is accredited by the Engineering Accreditation Commission of the ABET under the criteria for electrical, computer, and similarly named engineering programs. The BS degree in computer engineering is a new program which first became available in 2008. Accreditation of this degree by the ABET, under the criteria for electrical, computer, and similarly named programs, is being sought at the earliest possible date (2009).

Graduate Programs

The School of Electrical and Computer Engineering offers two graduate degrees, both in electrical engineering: Master of Science and Doctor of Philosophy. New specialized MS degree options in 1) control systems and 2) optics and photonics are expected to be available beginning in 2009.

The Master of Science degree is designed for students interested in careers in industry and government service that emphasize advanced design, development, and research methods for high technology. This degree incorporates additional advanced course work and on-campus creative activities.

The Doctor of Philosophy degree is designed to prepare the student for high-level research and development positions in industry and

government and for the teaching profession in engineering and is distinguished by the emphasis on research and by the incorporation of a doctoral thesis.

Students may select course work and participate in research and design projects in the following areas:

- communication systems and networks;
- control systems;
- computer architecture and arithmetic;
- electromagnetics;
- microsystems and nanoengineering;
- photonics and electro-optics;
- signal, image and video processing;
- very large scale integration (VLSI);
- energy and power;
- bioengineering.

In addition, students may elect a multidisciplinary program that crosses departmental lines and emphasizes the application of electrical engineering and systems theory to complex problems involving the interaction of engineering systems and technology with social, economic and environmental processes. Multidisciplinary opportunities exist in control systems, biomedical engineering, photonics and nanotechnology and materials.

—Admission Requirements. Admission to the Graduate College, as described under "General Regulations" in the "Graduate College" section of the *Catalog* is the first step for those students proceeding toward advanced degrees. Graduation with high scholastic performance from an electrical engineering or computer engineering curriculum accredited by the ABET qualifies the student for admission to the School of Electrical and Computer Engineering as a candidate for the advanced degrees offered. Additionally a cumulative score of 1200 or greater on the GRE is required.

Graduates from non-engineering fields such as mathematics, physics and computer science are also admitted to the School of Electrical and Computer Engineering MS and PhD graduate programs if an evaluation of their transcripts indicates they are prepared to take graduate-level course work in electrical engineering, or can be expected to do so after a reasonable amount of remedial course work. This condition also applies to graduates of unaccredited engineering programs and engineering technology programs.

—Degree Requirements. The Master of Science degree is awarded to those students who successfully complete an approved plan of study under one of two possible options. If a thesis is written, 30 credit hours are required, including six hours credit for the thesis. If no thesis is written, 33 credit hours are required, including at least two hours that include an approved creative activity. To be approved, a plan of study will include, as a minimum, 18 hours of 5000-level courses in electrical and computer engineering. Most plans of study include additional 5000-level courses, depending upon the background and particular educational goals of the student, and the minimum stated above is allowed only when a specific interdisciplinary plan of study is approved by the faculty. Each student is encouraged to include courses in supporting disciplines such as mathematics, computer science, statistics, business or other engineering fields. As mentioned above, some remedial work in undergraduate electrical and computer engineering may be required in addition to the 30-33 hours specified above.

The Doctor of Philosophy degree is granted in recognition of high achievement in scholarship in course work selected from the broad field of electrical and computer engineering and an independent investigation of a research problem in a chosen field of specialization that leads to a contribution to knowledge, as presented in a dissertation. For this degree the Graduate College requires a minimum of 90 credit hours for acceptable academic work beyond the bachelor's degree, including credit for the dissertation.

The School of Electrical and Computer Engineering also participates in several interdisciplinary degree programs. (See "Graduate Programs" under "Industrial Engineering and Management," and "Telecommunications Management" in the "Graduate College" section of the *Catalog*.)

General Engineering

David R. Thompson, PhD - *Professor, Associate Dean and Head*

The School of General Engineering administers common engineering courses and interdisciplinary graduate programs.

Master of Science in Engineering and Technology Management

Terry Collins, PhD - *Director*

Brenda L. Johnson, MS - *Assistant Director*

The Master of Science in engineering and technology management (MSETM) degree is designed for today's fast-track engineer or scientist. Effective planning, selection, implementation and management of technology are essential to the success of any business in today's time-critical global market. Career paths and responsibilities of engineers and scientists often include project management, selection and supervision of people, and executive and strategic leadership. This program will help managers who must integrate rapidly changing technology and cost effective product and process design. Applying proven evaluation concepts and implementation strategies to fast-moving, technical management decisions can make the difference in both career and business success. Tomorrow's technical professionals need more than on-the-job training. OSU's MSETM curriculum is flexible; permitting the student to build a strong degree that directly addresses the student's needs and prepares the student for the future. The degree consists of 32 credit hours. The MSETM program is provided by the OSU colleges of Engineering, Architecture and Technology, Arts and Sciences and the William S. Spears School of Business.

—Admission Requirements. The guidelines for admission to the MSETM program are a bachelor's or higher degree, in engineering or the physical/mathematical sciences, with a 3.00 GPA, and at least three years employment in a technical field since graduation with a bachelor's degree. Applicants not meeting these standards may be granted provisional admission based upon their overall academic and professional practice history and accomplishments. Since many course assignments are integrated into current issues in the work environment, students must be managing or employed in a technical organization in order to be successful in the program. For this reason the program is not appropriate for full-time on-campus students. The MSETM student body is made up entirely of full-time employed, technical professionals who receive the courses through distance education technologies. Because technology and time constraints exist in some overseas delivery, distance may not be feasible in all countries. Contact the MSETM office prior to application if special circumstances exist. An applicant must submit the following documents to the MSETM office: (1) an official OSU Application for Graduate Admission, (2) an MSETM program application, (3) an official transcript of all academic work and degrees received, (4) an application fee of $40.00, (5) official results of the TOEFL with a minimum score of 600 (international students only). Application materials can be found online at http://etm.okstate.edu.

Master of Science in Control Systems Engineering

R. Russell Rhinehart, PhD - *Interim Director*

Today's technological demands impose challenging and varying control problems in many fields. The objectives of the Master of Science in the control systems engineering (MSCSE) program are to improve the participant's ability to implement modern control techniques; understand the latest control and data acquisition strategies; develop

systems for noisy, nonlinear and non-stationary processes; develop new production and quality control procedures; work with real-time, distributed software; develop advanced control procedures; and continue to learn concepts, tools and skills. Four different schools with the College of Engineering, Architecture and Technology are participating in the program: Chemical Engineering, Electrical and Computer Engineering, Industrial Engineering and Management, and Mechanical and Aerospace Engineering. Additional information regarding the MSCSE degree can be found at www.okstate.edu/ceat/mscse.

—Admission Requirements. The requirement for admission to the program is a bachelor's or higher degree in engineering or the physical/mathematical sciences from an ABET-accredited institution, with a 3.25 or higher GPA. There are two options for the MSCSE degree: research and creative component. On-campus students can pursue either option. Distance education (off-campus) students must follow the creative component option. The creative component project may be a control application for the student's employer that benefits the employer as well as demonstrating the student's ability to integrate a wide range of control relevant topics. Either option consists of 33 credit hours of core control courses and electives in five areas of control-relevant specialization. (Off-campus distance education offerings are selected from a limited subset of these courses). The five areas are signal processing, modeling, analytical/numerical methods and simulation, equipment/software/operating systems, and systems and control. An applicant must submit the following documents to the MSCSE office: (1) an official OSU Graduate Application for Admission, (2) an MSCSE program application, (3) two official transcripts of all academic work and degrees received, (4) a one-page written statement of qualifications, goals and objectives, (5) an application fee of $40.00 and (6) official results of the TOEFL with a minimum score of 600 (international students only).

Industrial Engineering and Management

William J. Kolarik, PhD, PE - *Professor and Head*

Industrial engineering and management focuses on production systems that provide products (goods and services) for customers throughout the world. Industrial engineers define, design, build, operate, and improve production processes that convert resources to products effectively (e.g., high quality), efficiently (e.g., high productivity), and safely.

People are the fundamental component of production systems–people provide the creativity and leadership essential to make things happen. Hence, industrial engineering is the most people-oriented discipline within the engineering family. Industrial engineers are trained to think in both broad and specific terms. Practicing industrial engineers understand business parameters as well as physical and social parameters within production systems. This breadth allows industrial engineers to function effectively in a wide spectrum of activities ranging from strategic business planning to detailed task design. The wide-angle vision of industrial engineering provides career flexibility, leading to high-level leadership or specialized technical responsibilities.

Industrial engineers are found in manufacturing organizations (e.g., automotive, electronics, medical, and food manufacturers), service enterprises (e.g., hospitals, banks, airlines, and consulting groups), and governmental organizations (e.g., public service and regulatory organizations).

The School of Industrial Engineering and Management's vision is to be internationally recognized by industry and academia for excellence in education, research, outreach and service. Its mission is to discover, verify, integrate and transfer knowledge and methodologies relating to enterprise design and management, information technology, and modeling and optimization for the benefit of students, research sponsors and the technical community. The faculty, students and staff work together to build and maintain learning and mentoring environments where:

- innovative practices are developed, tested and validated.
- knowledge and practices are shared.
- each individual develops to his or her full potential.
- professional ethics are practiced at all times.

—Educational Objectives and Outcomes. The educational objectives emphasize the application of technologies and tools in the short term, and the ability to discover, acquire, and adapt new knowledge and skills in the long term. Graduates are prepared to:

- define, analyze and solve complex problems within and between enterprises.
- discover, understand and incorporate appropriate new technologies in the design and operation of enterprises.
- lead and manage design, development and improvement efforts that benefit customers, employees and stakeholders.
- function in culturally diverse teams, communicate in a professional manner, and uphold the ethical standards of the engineering profession.

Graduating baccalaureate students possess an understanding of fundamental industrial engineering and management concepts, methodologies and technologies as demonstrated by:

- an ability to apply knowledge of mathematics, probability and statistics, science, engineering, engineering management and engineering economy.
- an ability to design and conduct experiments involving risk and uncertainty, as well as to analyze and interpret data.
- an ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environment, social, political, ethical, health and safety, manufacturability and sustainability.
- an ability to function on multi-disciplinary teams.
- an ability to identify, formulate and solve engineering problems involving physical, human and economic parameters.
- an understanding of professional and ethical responsibility.
- an ability to communicate effectively.
- the broad education necessary to understand the impact of engineering solutions in a global economic, environmental and societal context.
- a recognition of the need for, and an ability to engage in life-long learning.
- a knowledge of contemporary issues and the role of the human in enterprise activities.
- an ability to use the techniques, skills and modern engineering tools necessary for industrial engineering and management practice.

The curriculum consists of three primary parts: (1) general studies, (2) core engineering, and (3) professional school topics. General studies consist of courses such as math, statistics, chemistry, physics, English, behavioral science, history, humanities, and arts. Core engineering courses consist of engineering sciences such as materials, statics, electrical circuits, fluid mechanics, and thermodynamics. Professional school courses consist of topics such as systems thinking and analysis in engineering, economic analysis, manufacturing processes, computer-aided modeling, work analysis, operations research, quality control, experimental design, facility location and layout, management and leadership, production control, system simulation modeling, information systems, ergonomics and human factors, and energy and water management. A capstone design experience, working with a real-world organization, brings all of the classroom and lab work together in the senior year. Details regarding degree requirements are available in the *Undergraduate Programs and Requirements* publication.

The program is accredited by the Engineering Accreditation Commission of the ABET under the criteria for both industrial engineering and engineering management.

Each IE&M student, along with the faculty adviser, works out an individual plan of study which guides them through the curriculum. The course work is sequenced and interrelated to provide theoretical and applied knowledge, along with hands-on laboratory and project experience. Students work as individuals and as teams to integrate and apply mathematical, scientific, and engineering knowledge and concepts in order to address both traditional academic questions as well as open-ended design and analysis challenges. Instruction in experimental methods is integrated in the curriculum through the design, execution, analysis, and interpretation of experiments. Project work is used to develop both technical and communications skills. Technical skills are used to identify, formulate, and address engineering problems, both simple and complex. Communications skills are addressed and practiced in written, oral and team interaction formats.

The means to define and design detailed solutions to address customer needs from a system-wide perspective is introduced in the sophomore year, and reinforced through the capstone senior design project. Additionally, global perspectives of production systems are introduced and emphasized in the sophomore year so that students understand the nature of global customer bases as well as global competition early in their studies. The curriculum is continually updated to assure that contemporary issues, thinking, and tools are integrated in course content as well as instructional delivery. Professional responsibility and ethical behavior are introduced and reinforced throughout the curriculum. Additionally, the need for life-long learning after graduation is stressed.

Students are offered opportunities to enhance their classroom and laboratory experiences through student organizations such as the student chapter of the Institute of Industrial Engineers, the Institute for Operation Research and the Management Sciences, and the American Society for Quality. Outstanding scholars are recognized by Alpha Pi Mu, the national honor society for industrial engineering students. Additionally, opportunities for internship and co-op experiences are offered to IE&M students so that they can gain professional experience during their collegiate program. Please visit our Internet site http://iem.okstate.edu for more information.

—Graduation.

1. Grades of "C" or better in all technical courses in the pre-engineering curriculum.
2. Grades of "C" or better in all courses that are prerequisites for IEM courses.
3. 2.00 major (right hand side of requirement sheet) GPA.

Graduate Programs

The School of Industrial Engineering and Management offers graduate programs leading to the Master of Science Industrial Engineering and Management degree and the Doctor of Philosophy degree.

The Master of Science degree is characterized by a higher degree of technical specialization in a particular field of study. This degree program is designed to prepare students for professional practice that may include research or consulting components. The Master of Science degree is especially attractive to industrial engineering graduates, engineering graduates from other disciplines, and many science majors. It includes a strong technical component and an orientation to business and engineering management that is complementary to a technical background.

The Doctor of Philosophy degree is designed to carry the student to the leading edge of knowledge in the profession of industrial engineering and engineering management. It is intended to prepare students for highly specialized positions, such as research and consulting in industry, government and service organizations, and for teaching or research positions in colleges and universities.

The basic consideration in graduate education in industrial engineering and management is effective and efficient utilization of human, physical, and economic resources. Instruction in management embraces both qualitative and quantitative concepts, including analytical methodologies and social considerations pertinent to organizations.

Advanced degree programs are designed with major emphasis in fields of interest such as engineering management, manufacturing systems, operations research, quality and reliability, facilities, energy, environmental management, and enterprise modeling and supply chains. Students may complement industrial engineering and management courses with work in other branches of engineering, as well as economics, business administration, computer science, statistics, mathematics, psychology, and sociology.

ADMISSION REQUIREMENTS. Admission to the Graduate College is required of all students pursuing the MS or PhD degree. Graduation from an industrial engineering curriculum with scholastic performance distinctly above average qualifies the student for admission to the School of Industrial Engineering and Management as a candidate for the master's and doctorate degrees. Graduates from disciplines other than industrial engineering may be admitted if an evaluation of their transcripts and other supporting materials by the School of Industrial Engineering and Management indicates that they are prepared to take graduate-level course work in industrial engineering, or can be expected to do so after a reasonable amount of prerequisite work.

All international applicants must submit GRE scores. In addition, the Graduate College may require certain international applicants to submit TOEFL scores.

—Degree Requirements. The Master of Science degree in industrial engineering and management requires the completion of at least 30 credit hours beyond the bachelor's degree, including a research thesis of six credit hours. A 33 semester-credit-hour option is also permitted and must include a three credit-hour creative component. The creative component requirement can be met by completing a three credit-hour independent study project or a three credit-hour course approved by the student's committee.

The Doctor of Philosophy degree requires the completion of at least 90 credit hours of course work beyond the bachelor's degree or 60 credit hours of course work beyond the master's degree, normally including an 18 credit hour research thesis. In addition, the candidate must complete six credit hours of course work in an area such as mathematics, statistics, experimental techniques, or research methodology (as specified by the advisory committee).

The School of Industrial Engineering and Management also participates in the Master of Science in Engineering and Technology Management program. Current IE&M program information can be found on the School Web site http://iem.okstate.edu.

Mechanical and Aerospace Engineering

Lawrence L. Hoberock, PhD, PE - *Professor and Head*

No professions unleash the spirit of innovation like Mechanical Engineering and Aerospace Engineering. From research to real-world applications, mechanical and aerospace engineers constantly discover how to improve our lives by creating bold new solutions that connect science to life in unexpected, forward thinking ways. Few have such a direct and positive effect on people's everyday lives. We are counting on mechanical and aerospace engineers and their imaginations to help us meet the needs of the 21st century.

Mechanical and aerospace engineers know that life takes engineering, and that their disciplines provide freedom to explore, shape the future,

encompass an enterprising spirit, and call for limitless imagination. Engineering makes a world of difference and is essential to our health, hap[pines, and safety. Creative problem solving, turning dreams into reality, is the core of Mechanical and Aerospace Engineering. These are professional disciplines that involve the invention, design, and manufacture of devices, machines and systems that serve the ever-changing needs of modern society.

Mechanical engineering is an exceedingly diverse field that covers an exceptionally wide range of systems, devices and vehicles. Mechanical engineers are vitally concerned with all forms of energy production, utilization and conservation. They are the key professionals in bringing about the green revolution, finding ways to reduce or eliminate pollution, minimize waste, reduce energy usage, and re-use waste, scrap, and recycled goods. They deal with everything mechanical and energy-consuming, whether it is small or large, simple or complex—from fuel cells to nuclear power plants, gas turbine engines to interplanetary space vehicles, artificial limbs to life support systems, robotic manipulators to complex automatic packaging machines, precision instruments to construction machinery, household appliances to mass transit systems, heating and air-conditioning systems to off-shore drilling platforms, and powered home and garden appliances to vehicles of all types. In virtually every organization where engineers are employed, mechanical engineers will be found.

The BS degree program in mechanical engineering, together with the premedical option in mechanical engineering, is accredited by the Engineering Accreditation Commission of the ABET under the criteria for mechanical and similarly named engineering programs.

Aerospace engineering is concerned with the science and technology of flight, and the design of air, land and sea vehicles for transportation and exploration. This exciting field has already led people to the moon and continues to lead in the expansion of frontiers deeper into space and into the ocean's depths. Because of their unique backgrounds in aerodynamics and lightweight structures, aerospace engineers are becoming increasingly involved in solving some of society's most pressing and complex problems, such as high-speed ground transportation and pollution of the environment.

The BS degree program in aerospace engineering is accredited by the Engineering Accreditation Commission of the ABET under the criteria for aerospace and similarly named engineering programs.

The mission of the School of Mechanical and Aerospace Engineering is to support the mission of Oklahoma State University by:

- Providing the best possible education to students, grounded in engineering fundamentals, so that they are competitive in employment and advanced studies and are prepared for a lifetime of continuing development;
- Engaging in basic and applied research, making significant, innovative contributions to the engineering and science base on which industrial competitiveness is built, to solve problems of both immediate and long-range concern to society, and to support our instructional programs;
- Providing extension and public service activities where constituents' needs and School resources are compatible; and
- Emphasizing the practice of engineering and the needs of the State of Oklahoma in each of the above activities.

—Educational Objectives. The educational objectives of the mechanical and aerospace BS degree programs are:

- To educate engineers who can identify, formulate and provide effective solutions to real-life, complex problems;
- To prepare engineers for successful careers by providing them with an appropriate background in mathematics, humanities, the sciences and engineering, and to instill in them a recognition of the need for lifelong learning and of the need to remain current in their chosen disciplines;
- To educate engineers who can realize successful designs through proper use of classical and modern engineering tools while incorporating engineering standards and realistic constraints for a global world;
- To prepare engineers to contribute successfully within teams and to communicate their ideas and solutions effectively, especially with respect to written and oral communications.

The outcome for students graduating from the mechanical and aerospace engineering BS programs are: (a) an ability to apply knowledge of mathematics, science, and engineering to the mechanical and aerospace engineering disciplines; (b) an ability to design and conduct experiments and analyze and interpret data; (c) an ability to design a system, component or process to meet desired needs; (d) an ability to function on teams, some of which require consideration of multiple disciplines; (e) an ability to identify, formulate and solve engineering problems; (f) an understanding of professional and ethical responsibility; (g) an ability to communicate effectively; (h) an ability to understand the impact of engineering solutions in a societal context; (i) a recognition of the need for, and an ability to engage in, life-long learning; (j) a knowledge of contemporary issues; (k) an ability to use the techniques, skills and modern engineering tools necessary for engineering practice. For the BSME Program, there are 4 additional outcomes: MEP01 – a knowledge of chemistry and calculus-based physics with depth in at least one of the two; MEP02 – the ability to apply advanced mathematics through multivariate calculus and differential equations; MEP03 – a familiarity with statistics and linear algebra; and MEP04 – the ability to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations) to model, analyze, design, and realize physical systems, components, or processes to work professionally in both the thermal and mechanical systems areas. For the BSAE Program, there are 3 additional outcomes: AEP01 – knowledge of the following aeronautical topics: aerodynamics, aerospace materials, structures, propulsion, flight mechanics, and stability and control; AEP02 – knowledge of some of the following astronautical topics: orbital mechanics, space environment, attitude determination and control, telecommunications, space structures, and rocket propulsion; and AEP03 – graduates must have design competence which includes integration of aeronautical or astronautical topics.

Because mechanical engineering is perhaps the broadest of all engineering disciplines, the program provides not only excellent grounding in all engineering fundamentals, but also allows some flexibility in selecting controlled technical electives to suit the student's interests. However no one area may be unduly emphasized at the expense of another. For the aerospace engineering and premedical programs, prescribed course work has been selected to provide students with more focused development. Graduates of these programs are fully competent as mechanical or aerospace engineers, including their abilities in design, but also competent in their areas of concentration.

As a fundamental component of all BS programs, engineering design is strongly emphasized in the junior and senior years but is integrated throughout the curriculum. Most MAE courses at the 3000 and 4000 levels include some design content, ranging from a minimum of one-half to a maximum of four credit hours of design content. Each professional school course builds upon the preceding mechanical and aerospace engineering courses to develop in the student the ability to identify and solve meaningful engineering problems. The course work is specifically sequenced and interrelated to provide design experience at each level, leading to progressively more complex, open-ended problems. The course work includes sensitizing students to socially-related technical problems and their responsibilities as engineering professionals to behave ethically and protect occupational and public safety. The program culminates in a senior-year design course in which students integrate analysis, synthesis, and other abilities they have developed throughout the earlier portions of their study into a capstone experience. The design

experiences include the fundamental elements and features of design with realistic constraints such as economics, safety, reliability, social and environmental impact, and other factors. At this point, students are able to design components, systems and processes that meet specific requirements, including such pertinent societal considerations as ethics, safety, environmental impact and aesthetics. Students develop and display the ability to design and conduct experiments essential to specific studies and to analyze the experimental results and draw meaningful conclusions.

An integral part of this educational continuum from basic science through comprehensive engineering design are learning experiences that facilitate the students' abilities to function effectively in both individual and team environments. Moreover, the program provides every graduate with adequate learning experiences to develop effective written and oral communication skills. State-of-the-art computational tools are introduced and used as a part of their problem-solving experiences. Finally, the students' experience in solving ever-more-challenging problems gives them the ability to continue to learn independently throughout their professional careers.

The broad background and problem-solving ability of mechanical and aerospace engineers make them suited to engage in one or more of the following activities: research, development, design, production, operation, management, technical sales and private consulting. *Versatility* is their trademark. A bachelor's degree in mechanical or aerospace engineering is also an excellent background for entering other professional schools such as medicine, dentistry, law or business (MBA). The premedical option in mechanical engineering is available for students wishing to enroll in medical school.

In the professional school, (essentially the junior and senior years of the program) mechanical and aerospace engineering students extend their study of the engineering sciences and consider applications of fundamental principles and analysis tools to the solution of real technological problems of society. Some design courses involve students in the solution of authentic, current and significant engineering problems provided by industrial firms. Students may also help smaller firms that need assistance with the development of new products.

The student designs, with the guidance of an adviser, an individualized program of study consistent with his or her interests and career plans. Some students terminate their studies with a bachelor's degree, while others receive one of several graduate degrees.

Graduate Programs

The School of Mechanical and Aerospace Engineering offers programs leading to the degree of Master of Science in Mechanical and Aerospace Engineering, and the degree of Doctor of Philosophy in Mechanical and Aerospace Engineering. These degrees prepare the graduate for research and development positions in industry and government, or for the teaching profession in engineering. They are distinguished by the incorporation of a research component.

Students may select course work and participate in research or design projects in the following areas: aerodynamics, aeroservoelasticity, biomedical engineering, design, computational mechanics, heat transfer dynamic systems and controls, fluid mechanics, materials, manufacturing processes, refrigeration, solid mechanics thermal and HVAC systems, unmanned aerial systems, and web handling systems. Students are encouraged to take courses in mathematics and science and in other fields of engineering which fit into their programs.

—Admission Requirements. Admission to the Graduate College is required of all students pursuing the MS or PhD degree. Graduation from a mechanical or aerospace engineering curriculum accredited by the ABET, with scholastic performance distinctly above average, qualifies the student for admission to the School of Mechanical and Aerospace Engineering as a candidate for the MS and PhD degrees. Graduates from disciplines other than mechanical or aerospace engineering may be admitted if an evaluation of their transcripts by the School of Mechanical and Aerospace Engineering indicates they are prepared to take graduate-level course work in mechanical or aerospace engineering, or can be expected to do so after a reasonable amount of prerequisite work.

—Degree Requirements. All degree programs follow an approved plan of study designed to satisfy the individual goals of the student, while conforming to the general requirements of the School of Mechanical and Aerospace Engineering and the Graduate College.

The *Master of Science* degree program with the thesis option requires 24 credit hours of approved graduate-level course work, and a suitable research thesis of six credit hours. The non-thesis option requires 35 credit hours of which two must be for an acceptable, directed research activity that results in a written and oral report to the faculty.

The *Doctor of Philosophy* degree requires a minimum of 60 credit hours beyond the master's degree, including a dissertation for which no more than 30 credit hours may be awarded.

School of Architecture

Randy Seitsinger, M.Arch, AIA - *Professor and Head*

The School of Architecture, founded in 1909, offers professional degree programs in both architecture and architectural engineering. The integration of these programs through shared faculty, facilities and course work is a major strength of the School. It is one of the few such integrated programs in the United States, and as such produces graduates who are particularly prepared for the integrated team processes used in professional practice. The School of Architecture is a primary unit in the College of Engineering, Architecture and Technology, and therefore benefits from excellent state-of-the-art resources which significantly enhance the School's professional programs.

The School of Architecture is dedicated to providing a high quality and focused professional education to students whose career goals are to enter the practice of architecture or architectural engineering. Professional and liberal study electives provide opportunities for educational breadth or depth and a possible double degree in both architecture and architectural engineering.

The employment demand for OSU graduates consistently exceeds the supply potential of the School. Oklahoma State University graduates are recruited by the leading architectural and architectural engineering firms both in Oklahoma and nationally. The Oklahoma State University School of Architecture is particularly proud of having among its alumni many of the leaders of the best firms in the country, an AIA Gold Medalist (the highest award given to an architect), and presidents of the American Institute of Architects (AIA) and the National Architectural Accreditation Board (NAAB).

—Mission and Goals. Architecture is the difficult and complex art and science of designing and building a setting for human life. It is unique among today's professions in that its successful practice requires a blend, in roughly equal shares, of traits normally considered less than compatible: human empathy, artistic creativity, technological competence, and organizational and economic acumen. In contrast to other fine arts, architecture is rarely self-generated; it is rather a creative response to a stated or perceived human need. It must, therefore, be more user-oriented than fine art alone and more humane than pure science. Its design solutions must avoid the total subjectivity and detachment of other arts while striving to be functionally, technically and economically objective and sound. Yet, in a seemingly insoluble contradiction, the keenest technological and economic functionality will fall far short of becoming architecture unless it also strongly appeals to human spiritual and emotional values. When one thinks of the environment, one cannot help but see or recall architectural images: pyramids in Egypt, Greek and Roman temples, gothic cathedrals,

medieval castles, industrial cities, modern skyscrapers and dwellings or entire cities which significantly express the culture and values of the people who live or lived there.

The mission of the School of Architecture is to prepare future architects and architectural engineers to make vital contributions to humanity through the creation of architecture. The vision of the school is to be nationally recognized for outstanding professionally focused programs in architecture and architectural engineering with strengths in design and the collaboration between architecture and architectural engineering.

The School of Architecture endeavors to instill in each individual a sensitivity to human needs, a genuine concern for quality, integrity and high ideals, a positive attitude for life-long learning, and an appreciation for one's own self-esteem.

The School's primary goal is to provide excellence in professional education for students preparing to enter the private practice of architecture or architectural engineering. This professional focus is to educate not just qualified candidates for the degree, but graduates who, during their careers, will be licensed professionals and will assume positions of leadership within the profession and society.

—Accreditation. The School of Architecture offers two separately accredited professional degree programs. The Bachelor of Architecture degree, BArch, is accredited by the NAAB. The Bachelor of Architectural Engineering degree, BArchE, is accredited by the Accreditation Board for Engineering and Technology (ABET) as an engineering program. Both programs require a minimum of five years of study to complete.

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture. A program may be granted a six-year, three-year, or two-year term of accreditation, depending on the extent of its conformance with established educational standards.

Master's degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.

The OSU School of Architecture offers an accredited, five-year, Bachelor of Architecture degree.

Architecture

Architecture is the complex synthesis of creatively solving problems involving both art and science through the disciplined orchestration of image making, activity organization, technological applications, legal constraints, and budgetary parameters which together express culture, enhance quality of life and contribute to the environment.

Education in architecture consists of campus-oriented classroom and studio courses, as well as off-campus studies. It is conducted in an intellectual climate which stimulates inquiry, introduces principles and values, and teaches the disciplines necessary to work in collaboration with others. The goal of the program is the education of future leaders within the architecture profession.

The design studio is the center of the School's educational program. It is the setting where students and faculty work most closely together, and where all specialized study and knowledge comes together and is synthesized in design. The record of OSU students' achievements in the design studios is evidenced by the success in national and international architectural design competitions. In addition to a student's design studio education, he or she is required to complete sequential courses in architectural history/theory, technology, and management that work in correlation with the design studio sequence.

The program has long been known as one of the strongest professional programs in the United States. OSU graduates are consistently offered employment opportunities in many of the best architectural offices in Oklahoma and throughout the United States. The program is fully accredited by the National Architectural Accreditation Board.

Architectural Engineering

Architectural engineering is a profession that combines the art and science known as architecture with a detailed background in fundamental and applied engineering principles. In its broadest sense, it involves the creative application of science and technology to the design of structures meant for human occupancy. Architectural engineering differs from architecture in its focus upon the design of elements, systems and procedures for buildings, rather than the design of buildings themselves. Architectural engineers practice in a wide variety of professional engineering settings such as consulting firms, architectural firms, industrial or commercial organizations and governmental agencies.

The objective of the Bachelor of Architectural Engineering program is to provide basic and professional education to engineering students in building-related structural engineering. OSU graduates will possess broad-based knowledge, skills, and judgment that prepare them to succeed in the profession of architectural engineering or in further studies at the graduate level. The program is designed to prepare students to contribute to society as professional engineers dealing with analysis, design and related activities within the construction industry. The program utilizes the broad resources of the University to exploit a close relationship with the architectural program and to provide in-depth understanding of the professional field and sensitivity to other less technical concerns related to the building environment faced by architectural engineers.

The primary focus of the architectural engineering program at OSU is the safe and economical design of structural systems used in buildings. These structural systems must withstand the various forces of nature such as gravity, winds and earthquakes, as well as the forces of man. These systems require a working knowledge of the mechanics of those materials commonly used for building structures such as steel, timber and reinforced concrete.

The study of architectural engineering is an integrated mix of liberal studies, design and technical education. Architectural engineers need to be able to conceptualize aesthetic issues and design complex technical systems.

In the pre-professional portion of the architectural engineering program (approximately two years of study), the focus is on the underlying scientific and mathematical principles of engineering and the basic design principles of architecture supplemented by appropriate general education courses in English, social sciences and humanities. These courses allow students to assimilate a beginning knowledge base in architecture and engineering along with a broader liberal based component to their education. Students who demonstrate proficiency in this portion of the program by meeting a specific set of admission criteria are eligible for admission to the professional program in architectural engineering.

The professional program in architectural engineering (typically three years) builds systematically upon the scientific and architectural knowledge acquired in the pre-professional curriculum. Students acquire detailed structural and architectural knowledge and problem-solving abilities through a series of progressively more detailed and comprehensive courses and studios.

Each architectural engineering course builds upon the preceding architectural engineering courses to develop in the student the ability to identify and solve meaningful architectural engineering problems. The course work is specifically sequenced and interrelated to provide design experience at each level, leading to progressively

more complex, open-ended problems. This course work includes sensitizing students to socially-related technical problems and their responsibilities as engineering professionals to behave ethically and protect public safety. The program culminates in a fifth year course in which the students integrate analysis, synthesis and other abilities they have developed throughout the earlier portions of their study into a capstone experience.

An integral part of this educational continuum from basic knowledge through comprehensive architectural engineering design are learning experiences that facilitate the students' abilities to function effectively in both individual and team environments. Students are exposed to a wide variety of problems dealing with contemporary issues in an international context. Moreover, the program provides every graduate with adequate learning experiences to develop effective written and oral communication skills. State-of-the-art computational and CAD tools are introduced and used as a part of the students' problem-solving experiences. Finally, the students' experience in solving ever-more-challenging problems gives them the ability to continue to learn independently throughout their professional careers.

—Educational Objectives. The educational objectives of the Bachelor of Architectural Engineering program to be successful as practicing structural engineers. The educational objectives expected of graduates from the program a few years after graduation are as follows. Graduates will:

- possess a basic education in building-related structural engineering.
- possess a professional education in building-related structural engineering.
- possess broad-based knowledge, skills, and judgment in the profession of architectural engineering.
- contribute to society as professional engineers dealing with analysis, design, and related activities within the construction industry.
- have utilized the broad resources of the University.
- have exploited the close relationship with the architecture program.
- have an in-depth understanding of the professional field.
- have sensitivity to other less technical concerns related to the building environment faced by architectural engineers.
- have a professional education that will prepare them to engage in the private practice of architectural engineering as a licensed engineer.
- have sensitivity to human needs.
- have a genuine concern for quality, integrity and high ideals, a positive attitude for life-long learning, and an appreciation for their own self-esteem.

The architectural engineering program has adopted the following program outcomes:

a) An ability to apply knowledge of mathematics, science and engineering.

b) An ability to design and conduct experiments, as well as to analyze and interpret data.

c) An ability to design a system, component, or process to meet desired needs.

d) An ability to function on multi-disciplinary teams.

e) An ability to identify, formulate, and solve engineering problems.

f) An understanding of professional and ethical responsibility.

g) An ability to communicate effectively.

h) The broad education necessary to understand the impact of engineering solutions in a global and societal context.

i) A recognition of the need for, and an ability to engage in life-long learning.

j) A knowledge of contemporary issues.

k) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

The program outcomes were adopted with the concept that they would provide students with the educational experience necessary to successfully achieve the longer term program educational objectives.

Undergraduate Curriculum

The programs in architecture and architectural engineering are five years long and offer the professional degrees of Bachelor of Architecture and Bachelor of Architectural Engineering.

—Undergraduate Admission. Students who satisfy the University admission requirements are eligible to enroll for the first two years of the program (pre-architecture). Upon completion of these two years, the best qualified students are selected, upon application, by the School for admission to the upper division. Admission is based upon academic achievement and professional potential. Admission criteria are subject to annual review by the School and may be obtained directly from the School.

Transfer students are required to furnish transcripts and course descriptions for previous classroom courses, as well as examples of previous studio work. Evaluation and enrollment by the School is on a course-by-course basis for all transfer students.

—General Education. At least 12 semester hours of basic science and mathematics can be counted toward General Education requirements, and some required upper-division course work in History and Theory of Architecture can be used for General Education credit.

—Electives. Electives should be selected to comply with the appropriate undergraduate degree requirements for the program. (See 3.2 "Changes in Degree Requirements" in the "University Academic Regulations" section of the *Catalog*.) These requirements assure compliance with institutional and accreditation criteria.

—Foreign Study. The School of Architecture is committed to preparing its graduates for the professional opportunities presented by the expanding global economy. As part of this preparation, the School offers a nine-week Summer Foreign Study Program based in Versailles, France. This program has been designed to supplement the required curriculum. Students study, in an organized and disciplined fashion, major examples of modern and historic European architecture, including urban issues. Both analytic and artistic sketching skills are the main tools developed in this course of study.

Experience has shown that the Summer Foreign Program significantly increases a student's level of maturity, independent thinking, and cultural and social awareness of others. Knowing the values and accomplishments of other cultures not only deepens and broadens knowledge and abilities; it also makes a student a better and more responsible citizen of his or her own country.

Five weeks of the nine-week program are spent in France under the direct supervision and instruction of faculty from OSU. The remainder of the nine weeks is spent in independent travel study in other countries in western and central Europe. Housing while in Versailles is provided in French family homes, enriching the cultural experience of each student.

—Faculty and Facilities. In keeping with the professional orientation of the School, the faculty has extensive experience as successful practicing architects and architectural engineers, as well as outstanding scholastic records.

The School has recently received a $16.5M gift from the Donald W. Reynolds Foundation to renovate and expand the existing facilities. The new Donald W. Reynolds School of Architecture Building will be complete in 2009 and will include state of the art design studios, a greatly expanded architectural library, day lighting lab, computer lab, classroom facilities and many other amenities.

—Student Work. Projects submitted for regular class assignments may be retained by the School. All projects not retained will be available to the student.

—Student Body. With the curriculum based upon extensive and personalized student-faculty interaction, the student-faculty ratio in studio courses is set at approximately 15 to one. Annual student enrollment is approximately 325 students of whom approximately 22 percent are women, and approximately 18 percent are international students, thus providing a rich and diverse educational environment. A variety of student organizations and activities are available.

Academic Advising

The College's Office of Student Academic Services provides advisement for all pre-architecture students. When a student has gained admission to the upper-division of architecture, he or she will be assigned a faculty adviser.

Each student is personally advised in the planning and scheduling of his or her course work and is counseled and advised individually on matters of career choice, his or her activities at OSU, and on other academic matters. An academic file is created for each student at the time of initial enrollment.

Division of Engineering Technology

James E. Bose, PhD, PE - *Professor and Director*

Engineering technology education is concerned with the practical application of engineering achievement with emphasis upon the end product rather than the conceptual process. Whereas the development of new methods is the mark of the engineer, effective use of established methods is the mark of the technologist. Often the technologist will be expected to achieve what the engineer conceives.

Curricula

Engineering technology curricula at OSU are four-year programs which lead to the Bachelor of Science in Engineering Technology. Graduates of the program are known as "technologists" and are trained either to assist engineers or to provide independent support for engineering activities. The technologist receives an intensive education in his or her technical specialty and great depth in mathematics and technical sciences. The program provides breadth in related technical, communication and socio-humanistic studies. A "master of detail," he or she is capable of independent action in performance of technical activities and is frequently involved as a coordinator, expediter or supervisor of other technical personnel. His or her capability in technical sales and other public-contact positions is enhanced by his or her background in selected liberal studies.

Bachelor of Science in Engineering Technology Degree Programs

Construction Management Technology

Electrical Engineering Technology

Fire Protection and Safety Technology

Mechanical Engineering Technology

The Bachelor of Science in Engineering Technology degree requires either 124, 128 or 129 credit hours.

Engineering technology programs prepare graduates who:

1. Demonstrate an appropriate mastery of the knowledge, techniques, skills and modern tools of their disciplines.
2. Apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology.
3. Conduct, analyze and interpret experiments and apply experimental results to improve processes.
4. Apply creativity in the design of systems, components or processes appropriate to program objectives.
5. Function effectively on teams.
6. Identify, analyze and solve technical problems.
7. Communicate effectively.
8. Recognize the need for and possess the ability to pursue lifelong learning.
9. Understand professional, ethical and social responsibilities.
10. Recognize contemporary professional, societal and global issues and are aware of and respect diversity.
11. Have a commitment to quality, timeliness and continuous improvement.

The engineering technology graduate is qualified to select from a broad array of engineering-related positions. Job titles of engineering technology graduates include field engineer, test engineer, associate engineer, product engineer, sales engineer, tool designer, production engineer, engineering technologist, estimator, scheduler, and project engineer.

Those less intrigued with theoretical concepts but who have the interest and aptitude toward applications are likely engineering technology majors. These students particularly appreciate the engagement of technical specialty courses beginning with the first semester and continuing throughout the course of study. The relevance of the technical science and related technical courses adds further satisfaction.

The Bachelor of Science in Engineering Technology program is composed of the following curricular subdivisions:

Mathematics and science—algebra, trigonometry, applied calculus, general physics, and chemistry or other science.

Technical specialty—technical science and related technical courses.

Communication—English composition, and written and oral technical communication.

Social sciences and humanities—history, government, religion, literature, art, music.

Electives—controlled and general.

Accreditation

Each Engineering Technology program is accredited by the Technology Accreditation Commission of the ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; phone: 410.347.7700; e-mail: accreditation@abet.org; online: www.abet.org/accredittac.asp.

—CO-OP Program. The College of Engineering, Architecture and Technology offers an experience-based program, Cooperative Education (Co-op). Co-op allows technology students to achieve a balanced education through the combination of theoretical and practical knowledge during their early years of professional development. The student's education is a cooperative effort between the University and industry. Students alternate semesters on campus with work semesters in industry during their junior and senior years. The periods of employment constitute an essential element in the educational process. Students gain practical knowledge which is carried back to the classroom, giving academic programs a sense of reality. By the time they receive their degrees, students have accumulated the equivalent of a year-and-a-half of progressively challenging work experience.

Participation in Co-op is voluntary; transfer students must successfully complete at least one semester at OSU prior to their first placement. Students may obtain further information about the program from the coordinator, 101A Engineering North.

Transfer Students

An important, contemporary educational development is the "two-plus-two" bachelor's program. Those completing an associate degree in technology-oriented curricula at other institutions are generally

admissible to the junior year with a minimum loss of academic time. The "two-plus-two" concept provides the attractive feature of two occupational-entry levels—technician or technologist.

Required course work in mathematics and basic science is utilized to meet up to 18 semester hours of General Education requirements also. The Scientific Investigation requirement is met as a part of the course work meeting professional requirements for basic science.

Construction Management Technology

Dana E. Hobson, PhD, PE - *Professor and Head*

The construction industry is the largest industry in the world. Leadership in this field requires a broad knowledge of labor, materials, equipment, capital and construction procedures. The interdisciplinary approach of the construction management technology program offers the student specialized course work in all phases of construction, designed to prepare him or her for responsible positions in industry.

The primary goal of the Department of Construction Management Technology (CMT) is to enhance the quality of the instructional program through effective management of the curriculum, teaching assignments and fiscal and physical resources. This goal includes providing instructional facilities, equipment and support services for faculty and students which maintain an excellent learning environment.

—Educational Objectives. The CMT educational objectives are:

1. Graduates who have the ability to apply fundamental mathematical, analytical and scientific skills and engineering technology concepts to solve problems in construction engineering design, estimating, planning, scheduling and project management.
2. Graduates that successfully work in teams and communicate effectively in written, oral and graphical forms.
3. Graduates that continue life-long career and professional growth actively interact with local industries and participate in their appropriate professional societies.
4. Graduates who are sensitive to ethical responsibilities, global environments and associated social issues.

Faculty with excellent credentials, including a balance of formal education, teaching ability and appropriate industry experience, are recruited nationwide and are provided opportunities for individual professional development and regular contact with the industry. Faculty members are encouraged to become involved in extension and research programs relating to the department's areas of strength or growth and to serve the needs for continuing education within the industry, particularly in the southwestern construction community.

These needs and opportunities for service are assessed regularly through close cooperation with local and regional construction professionals and industry associations. An active Construction Management Advisory Board, representing a broad cross-section of the industry, meets regularly to offer support and guidance necessary to preserve uncompromising excellence.

The bachelor's program in construction management technology is accredited by the Technology Accreditation Commission of the ABET (TAC of ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, phone: (410) 347-7700, e-mail: accreditation@abet.org. The educational objectives of the Department of Construction Management Technology are consistent with those required by TAC of ABET and are listed under "Division of Engineering Technology" in the *Catalog*.

—Undergraduate Admission. Students who satisfy the University admission requirements are eligible to enroll for the first two years of the program in the lower division of the curriculum for construction management technology. Upon completion of these two years, the best qualified students are selected, upon application to the upper division of the curriculum for construction management technology. Admission is based upon academic achievement, professional potential and available resources. Admission criteria are subject to annual review by the CMT department and may be obtained directly from the department.

Transfer students are required to furnish transcripts and course descriptions for previous classroom courses, as well as examples of previous academic work. Evaluation and enrollment by the CMT department is on a course-by-course basis for all transfer students.

The modern constructor must have a great deal of technical knowledge to keep abreast of rapidly changing equipment, materials and methods of construction. Specialized courses in estimating, surveying, structures, construction planning and scheduling, construction law and insurance, field and office management and construction procedures provide students with the background necessary for today's construction industry. These specialized courses, in addition to a blend of the basic sciences, business, and general studies, produce a well-balanced curriculum for students in construction management technology. Special attention is given to computer applications in construction estimating, and the development of graphic, written and oral communication skills is emphasized throughout the curriculum.

Students with an interest in building structures may select courses in the "building" option of the construction management technology curriculum, which provides them with knowledge of working drawings, mechanical and electrical equipment of buildings, and other course work for a career in building construction.

Students with an interest in civil engineering structures may select courses in the "heavy" option of the construction management technology curriculum, which provides them with knowledge of highways, soils, foundations and other course work for a career in the heavy and industrial construction industry.

The department attempts to identify and recruit highly qualified students who will benefit from the instructional program, and faculty members promote retention and ultimate graduation of construction management technology students through effective instruction and advisement. An active program of outcome assessment among graduates and their employers assures that the program continues to provide the academic training required for success. As one method of program assessment, each student, in the final semester, is expected to sit for the Level I Constructor Qualification Examination given once each semester. The student is responsible for the application process, including the appropriate fees. The test fee may be reimbursed to the student through the Office of University Assessment upon completion of the examination.

Graduates of construction management technology have shown the curriculum to be successful in their development as productive members of the construction industry, holding responsible positions as project managers, estimators, material and equipment salespersons, and construction managers at all levels.

Electrical Engineering Technology

Imad Abouzahr, PhD, PE - *Associate Professor and Interim Head*

The electrical engineering technology (EET) curriculum provides preparation for outstanding career opportunities not only in the electronics industry itself but also in many other areas in modern industry which depend upon electronics for control, communications or computation. Outstanding opportunities exist for graduates to work in diverse areas of electronics and computers.

The work of the electrical engineering technology graduate may range from assisting in the design and development of new equipment in the laboratory, applying modern microprocessors in the field, to the operation or supervision of production operations or field representatives.

The program provides the Bachelor of Science in Engineering Technology degree with an electronics major. To meet these diverse needs the program is laboratory-oriented and provides a strong foundation of mathematics and science, specialized course work in electronics technology and related technical areas, and courses in the area of communications and the social studies.

The electrical engineering technology graduate will:

1. have fundamental mathematical, analytical, and scientific skills and abilities to apply engineering technology concepts to a wide variety of problems.
2. combine laboratory/design experience and theory with focus on contemporary applications.
3. be able to work in teams and communicate effectively in written, oral and graphical form
4. be prepared for life-long career and professional growth, students will interact with local industries and be active in their appropriate professional societies.
5. demonstrate an awareness of the importance of ethical and social issues, and responsibilities associated with their engineering technology careers within diverse global environments.

The electrical engineering technology–computer option curriculum provides the preparation for graduates to enter the growing field of computer hardware and software. The demand for graduates having both computer hardware and software skills is quickly developing as the importance of automation, robotics, and artificial intelligence is recognized. Graduates of this program will be prepared for those opportunities in industry requiring considerable knowledge of both computer hardware and software.

The program provides the Bachelor of Science in Engineering Technology degree with an electronics major, and with a computer or telecommunication option. To meet the diverse needs that graduates will have, the program provides a strong foundation of mathematics, science, and specialized courses. Related courses in the humanities and social sciences are included to give the graduate an appreciation of the world in which the graduate will live and work.

The bachelor's program in the electronics major is accredited by the Technology Accreditation Commission of the ABET (TAC/ABET).

Fire Protection and Safety Technology

Michael D. Larrañaga, PhD, PE, CIH, CSP - *Associate Professor and Head*

The fire protection and safety technology (FPST) curriculum provides preparation for assessing and reducing the loss potential with respect to fire, safety, industrial hygiene, and hazardous material incidents. With respect to fire, reducing the loss potential might involve setting design criteria with a special emphasis on life safety or fire resistivity or specifying automatic detection or extinguishing systems. When considering safety, reducing accidents may require special protective equipment or clothing, or the redesign of machinery or processes. Reducing losses caused by environmental problems may require sampling air for contaminants, such as asbestos or toxic chemicals, or monitoring noise levels, and the development of procedures to address practical approaches to compliance with state and federal regulations. Addressing the problems of handling and disposing of hazardous chemicals, such as spill control, is often required. Managing risk and compliance with federal laws and regulations relative to occupational safety and health and hazardous materials is an increasingly important job activity.

The fire protection and safety engineering technology program has existed at Oklahoma State University since 1937. The demand by business and industry for loss control specialists has resulted in the evolution of the program into one that now places emphasis upon fire protection, safety, and occupational health. The program concludes with the Bachelor of Science in Engineering Technology degree in fire protection and safety.

—Program Objectives. The FPST program prepares graduates for careers in loss control. The loss control profession is segmented into three major areas: loss from fire, loss from physical accident, and loss from environmental exposure.

—Educational Objectives. The FPST program prepares students to have the following career and professional capabilities:

1. Recognize and anticipate hazards;
2. Evaluate hazards;
3. Conduct risk analysis and risk management activities;
4. Formulate control and mitigation strategies;
5. Maintain program and system effectiveness;
6. Apply and interpret applicable codes and standards; and
7. Demonstrate an understanding of the conduct of incident investigations, including associated legal responsibilities and record keeping.

The curriculum is designed to immediately introduce the student to studies in fire protection and safety. Therefore, students are able to measure their interest in a fire protection and safety career early in their academic program. The curriculum is rigorous in the areas of mathematics and the physical sciences. Two semesters of calculus are required as well as two semesters of chemistry and one semester of physics. Computer usage is an essential component of most fire protection and safety courses. Interested high school students should design their high school programs to prepare themselves for college level mathematics and science classes.

The Fire Protection and Safety Technology Professional School

In accord with the professional nature of a career in Fire Protection and Safety Technology (FPST), a student entering OSU is admitted into a Fire Protection and Safety Technology pre-professional program. Near the completion of this pre-professional course work, the student is considered for admission to the professional school of Fire Protection and Safety Technology to continue in the upper-division program. Upon meeting admission standards the student then pursues a curriculum leading to the BS degree in Engineering Technology.

—Pre-professional School. The content of the pre-professional program includes course work devoted to mathematics through calculus, communication skills, general chemistry, general physics, engineering sciences, and discipline specific foundation courses. This lower-division course work is devoted to preparing the student for professional school.

—Professional School. Upon formal admission to FPST professional school, the student proceeds through the junior and senior years of the degree program, fulfilling "Major Requirements" as listed on the degree requirements sheets located in the *Undergraduate Programs and Requirements* publication that can be found online at http://registrar.okstate.edu. Upon completion of all degree requirements, the student is awarded the Bachelor of Science degree in Engineering Technology, Fire Protection and Safety Technology.

—Admission to the Professional School. In Fire Protection and Safety Technology (FPST), the lower-division course work is devoted to preparing the student for professional school. To be admitted to the professional school, the student must have:

1. Completed a minimum of 60 credit hours in an accredited institution of higher learning.
2. Demonstrated an acceptable level of competence in subject material comparable to that covered in Pre-engineering

Technology, i.e., General Education and Common Pre-engineering Technology. Such demonstration may be by completion of course work or by examination, with not more than half the requirements satisfied by examination.

3. Been formally accepted by the FPST professional school.

An acceptable level of competence for admission to the professional school may be demonstrated by all of the following:

1. Completion of the pre-professional school requirements as designated on the flow chart corresponding to the student's matriculation date, with an overall grade-point average of 2.30 or higher in these courses. Students may be deficient in no more than six of these hours, and must have completed the required sequences in mathematics, physics, chemistry, English composition, and at least two engineering science courses.
2. Final grades of "C" or better in all courses submitted to meet the University's English composition requirement.
3. Completion at OSU of at least 12 credit hours of courses required for the degree, with a grade-point average of 2.30 or higher in these courses. This must include at least nine hours of technical subjects with a GPA of 2.50 or higher.
4. Achievement of an overall grade point average of 2.50 or higher in the required mathematics, physics, chemistry, engineering science and engineering technology courses completed prior to admission to professional school and final grades of "C" or better in each of these courses.

For these purposes, all GPAs are calculated using only the last grade in repeated courses.

If the number of qualified professional school applicants to the FPST professional school exceeds the number that can be provided a quality program with the resources available, the number admitted each year to the professional school will be limited. In that event, priority for admission will be given to pre-engineering/engineering technology students on a best qualified basis as determined by the grade-point average in relevant courses taken and completed at OSU and professional potential. This practice preserves the high standards demanded of a quality educational experience sought by students and is necessary so that OSU graduates will continue to be highly regarded.

Students may enroll in no more than six hours of upper-division major requirements prior to admission to professional school unless they secure permission from the head of the school.

The graduates of the fire protection and safety engineering technology program at Oklahoma State University are consistently recruited by the major businesses and industries of the United States. Graduate placement, salary offers, and advancement into managerial positions have been excellent due to the uniqueness and high technical quality of the OSU fire protection and safety technology program.

Mechanical Engineering Technology

James E. Bose, PhD, PE - *Professor and Head*

Mechanical engineering technology (MET) is that component of engineering that specializes in design and application. It includes the broad areas of mechanical design, mechanical power and manufacturing. Mechanical engineering technology is applied in robotics, automotive manufacturing, computer-aided drafting and design, computer-aided manufacturing, agricultural machinery and processing, mining, shipbuilding, spacecraft, electronics manufacturing, food processing, aircraft metals and plastics production—nearly the entire spectrum of the industry. In the power areas MET graduates are involved in vapor power cycles, gas power cycles, air conditioning, fluid power and power transmission. Manufacturing areas involving MET graduates include tool design, cost evaluation and control, plant operations, production planning and manufacturing methods.

An important element in MET is the use of laboratory experience as a teaching tool. The MET program has laboratories in fluid power, materials, fluid mechanics and applied thermal sciences, basic instrumentation, computer-aided design (CAD), and manufacturing. A senior capstone design course composed of student teams integrates the knowledge and skills learned during their course of study. These laboratories are supported with the latest computer software that supports the design function. Where appropriate, laboratories with modern computer data acquisition systems and on-screen displays are available.

In addition to the required mechanical engineering technology courses, students are provided a solid foundation in algebra, trigonometry and calculus, physics, chemistry, statics, dynamics, instrumentation, thermodynamics and computer science.

The mechanical engineering technology graduate will:

1. Have fundamental mathematical, analytical, and scientific skills and abilities to apply engineering technology concepts to a wide variety of problems. Specialty areas include manufacturing, graphical communications, and fluid power
2. Combine laboratory/design experience and theory with focus on contemporary applications.
3. Be able to work in teams and communicate effectively in written, oral and graphical form.
4. Be prepared for life-long careers and professional growth, students will interact with local industries and be active in their appropriate professional societies.
5. Demonstrate an awareness of the importance of ethical and social issues, and responsibilities associated with their engineering technology careers within diverse global environments.

Preparation for a specific industrial function can be accomplished by selecting courses that emphasize a given design area, such as fluid power, mechanical design, computer-aided design (CAD) power generation, and air conditioning and heating. Because the program focuses on the application of engineering principles to the pragmatic solution of problems, graduates are immediately productive with minimal on-the-job training, thus increasing their value to industry. Graduates of the MET program are prepared to function in the areas of product design, testing, and evaluation; product application and maintenance field engineering; and technical sales and liaison. Industries employing MET graduates include manufacturing companies of all types, (aircraft, automobile, compressor and turbine, fluid power manufacturers and others); energy companies (such as natural gas, electrical power generation, and the oil and gas industries); and service companies (transportation industry, architecture and professional engineering firms, and those supporting the oil and gas industry).

Companies utilizing the talents of MET graduates are diversified in their products, as well as geographical location, thus providing a variety of choices in respect to both type of work and place of residence and in diverse industrial, governmental and educational institutions.

College of Human Environmental Sciences

Stephan M. Wilson, PhD, CFLE - *Dean*
Shiretta Ownbey, PhD - *Associate Dean for Academic Programs and Services*
Christine Johnson, PhD - *Assistant Dean for Research and Graduate Studies*
Glenn Muske, PhD - *Interim Associate Dean and Assistant Director of Family and Consumer Sciences*

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Web site: http://ches.okstate.edu

Mission

The College of Human Environmental Sciences advances and applies knowledge of the interaction of people with their environments to develop effective professionals, engaged citizens and visionary leaders who promote the physical, social and economic well-being of people.

The College of Human Environmental Sciences (CHES) is composed of three departments—Design, Housing and Merchandising; Human Development and Family Science; and Nutritional Sciences—and the School of Hotel and Restaurant Administration. Each science-based program focuses on the reciprocal relationship between people and their natural, constructed or social environments. Graduates pursue professional careers in business, health, communications, education, international service, research, social welfare and a variety of agencies, organizations and institutions. Pre-professional options and advisement are offered for students interested in pursuing graduate education in law, medicine and dentistry or in their major fields of study.

Interdisciplinary, multicultural and global in perspective, the College programs link knowledge of individual development and environmental quality. The College's graduates are prepared for people-centered professions that develop solutions to many of today's most pressing issues. These issues include promoting and contributing to human development and family functioning, improving nutrition and health, designing and managing environments that address human needs where people live, work and play, and effectively managing and delivering products and services critical to the betterment of the environment.

Further information may be found at http://ches.okstate.edu/.

Accreditation

The Council for Interior Design Accreditation (CIDA) has accredited the undergraduate interior design program. The preproduction and the production management apparel curricula has received approval from the American Apparel and Footwear Association (AAFA), one of only 10 approved four-year programs in North America. The Child Development Laboratory is licensed by the Oklahoma Department of Human Services (DHS) and has received a Three Star Differential Quality Certification from DHS. The Child Development Lab is also accredited by the accrediting branch of the National Association for the Education of Young Children (NAEYC). Program approval has been granted to the *Early Childhood Education* program by the Oklahoma State Board of Education. The *Early Childhood Education* program is accredited by the National Council for the Accreditation of Teacher Education (NCATE). The Marriage and Family Therapy program is accredited by the Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE). The didactic program in dietetics (DPD) and the dietetic internship program at OSU are both accredited by the Commission on Accreditation for Dietetics Education (CADE). The American Dietetic Association may be reached at 120 South Riverside Plaza, Suite 2000, Chicago, IL 60606-6995, (800) 877-1600. The School of Hotel and Restaurant Administration is accredited by the Accreditation Commission for Programs in Hospitality Administration (ACPHA).

The Patricia Kain Knaub Center for Student Success

The *Patricia Kain Knaub Center for Student Success* is located in HES 101 on the south wing of the College. This location is the destination of every student and accompanying family arriving in the College. The center provides a welcoming entry point and a continuing resource for a wealth of integrated academic programming and student services. A student interested in learning about CHES and its academic programs may schedule an appointment with the Recruitment Services coordinator for information and a tour of the College facilities. Upon admission to CHES, students receive an array of services within the Center.

The Center for Student Success serves as a leader within the OSU system and to human sciences academic units nationally to elevate academic advising, the first-year experience, leadership development, and career development through highly engaging, purposeful and integrated programming that educates students to become intentional learners.

The Center offers the following comprehensive and integrated services to undergraduate students in CHES:

- Services to prospective students and their families that clearly articulate CHES academic programs.
- Developmental academic advising, emphasizing a student-centered, holistic approach.
- A foundational first-year experience to facilitate transition of students to a large university.
- Strong leadership development experiences through the first-year experience courses, Student Council and other student leadership organizations.
- Career development opportunities to effectively link educational experiences with career goals and career destinations.

The Senior Career Services Coordinator within the Center for Student Success offers services designed specifically for HES students. CHES Career Services offers students opportunities to explore traditional and nontraditional careers.

Career development projects are integrated into the first-year experience courses required of all freshmen and transfer students. Outside of the classroom, students are provided opportunities to refine their job search materials, interview with practicing professionals who represent HES fields of study, participate in career empowerment workshops, learn of part-time job opportunities related to HES areas of study and identify internship experiences. CHES Career Services provides a link to OSU Career Services, making students aware of resources available throughout campus such as career fairs, career and skill assessments, on-campus interviews and an array of other valuable opportunities. Further information on HES Career Services may be found on the Internet at http://hescareers.okstate.edu/.

Human Environmental Sciences Outreach

The HES Outreach office performs a vital role in the academic programs and services mission within the College, offering courses using a variety of delivery methods to serve diverse student needs. Various types of study abroad programs are offered to engage students in international opportunities and education. In addition, courses that take students to various locations to experience hands-on education are offered through Outreach. Web-based courses and other distance delivery methods serve students who are unable to access traditional educational offerings. As a member of the Great Plains Interactive Distance Education Alliance, HES Outreach manages administration of online master's programs in family financial planning, gerontology, merchandising, and dietetics. Consistent with the mission of OSU and CHES, Outreach serves various communities through delivery of innovative programs to state, national and international audiences.

Honors

Outstanding students in the College of Human Environmental Sciences who meet the requirements of The Honors College may earn the Honors College Degree while completing their undergraduate degree in this college. For more information, refer to the "Academic Enrichment Programs" section of the *Catalog*.

College honors are earned at the upper division (3000- and 4000-level classes) in the student's major and are one of the requirements for receiving a bachelor's degree with honors. Students with 7-59 hours must have a 3.25 cumulative GPA. Students with 60-93 credit hours must have a 3.37 cumulative GPA. Students with 94 or more credit hours must have a 3.50 cumulative GPA. College honors requires HES 4000 Honors Seminar, six hours of upper-division honors credit in the department and three hours of honors thesis or creative component. For further information on the Honors College, refer to the "Academic Enrichment Programs" section of the *Catalog*.

Scholarships

Oklahoma State University has a scholarship program for entering freshmen, and applications should be sent to the Scholarships and Financial Aid Office by February 1. College of Human Environmental Sciences scholarship applications are due for continuing students in January and scholarship awards are made in April. Freshmen and transfer student scholarships are awarded prior to the fall semester. Criteria for and the amount of the scholarship awards vary.

Academic Programs

—Undergraduate Programs. The Bachelor of Science degrees within the College of Human Environmental Sciences are offered by three departments and one school. The majors are:

- *Design, Housing and Merchandising (DHM)*, with options in apparel design and production, merchandising and interior design.
- *Human Development and Family Science (HDFS)*, with options in early childhood education, child and family services, and gerontology.
- *Hotel and Restaurant Administration (HRAD)*.
- *Nutritional Sciences (NSCI)*, with options in allied health, community nutrition, dietetics, dietetics and exercise, human nutrition/ premedical sciences, and nutrition and exercise.

An international studies minor is available through the College of Human Environmental Sciences for HES majors. A combination of language courses, internship/study abroad experience, and completion of International Dimension courses (General Education designated) is required in order to receive the international studies minor designation.

In addition, other subject-focused minors are available through the three departments within the College of Human Environmental Sciences. Details regarding these minors may be obtained by contacting the appropriate programs.

—Transfer Student Admission Requirements. Students transferring into the College of Human Environmental Sciences from another institution or another college at OSU must have a retention GPA of 2.00 or higher unless otherwise specified by a CHES department or school (see DHM and HDFS transfer admission requirements).

—Master's Programs. The Master of Science degree is available in design, housing and merchandising; human development and family science; hospitality administration; and nutritional sciences.

Students seeking admission to a master's degree program in any of the departments must be qualified graduates of colleges and universities of recognized standing. In addition, those seeking admission must have completed 30 semester credit hours in human environmental sciences or closely related subject matter. A student with background deficiencies must compensate for such deficiencies before admission to the master's program. Graduate Record Examination (GRE) scores are required by master's programs within the HDFS and NSCI departments. The DHM department requires only the written portion of the GRE. The School of HRAD requires submission of GRE/GMAT scores for admission consideration. In addition, a 3.00 GPA or higher is required. The plan of study for a master's degree student is individually planned to develop academic excellence specific to the student's career goals. Refer to descriptions of specific master's degree programs for each department or school. The selection and organization of courses are made in consultation with the adviser and the student's advisory committee. At least 21 semester credit hours must be completed in courses numbered 5000 or above.

—Online Master's Programs. The Master of Science degree in Human Environmental Sciences offers an option in family financial planning (FFP). This program is offered online by the Great Plains Interactive Distance Education Alliance (Great Plains IDEA), of which OSU is a member. The FFP master's degree requires 42 credit hours and prepares a student to take the Certified Financial Planner exam. The graduate certificate in family financial planning requires 18 credit hours.

The Human Development and Family Science master's program, with an option in gerontology, is offered through the College of Human Environmental Sciences. The online version of the program requires 36 credit hours and the graduate certificate requires 21 credit hours.

An online master's program in merchandising is offered through the Department of Design, Housing and Merchandising. The online program consists of 36 credit hours.

An online master's program in dietetics is offered through the Department of Nutritional Sciences. For more information on the online master's programs, contact the Office of Academic Programs and Services, Outreach.

—Doctoral Program. The *Doctor of Philosophy* degree is an interdisciplinary degree program through the College in conjunction with the departments of Design, Housing and Merchandising, Human Development and Family Science, Hotel and Restaurant Administration, and Nutritional Sciences. Individualized programs lead to an area of specialization in any one of the departments/school. Admission to the program is based upon evidence that the applicant meets general requirements of the Graduate College, has demonstrated superior achievement, and can successfully complete a doctoral program, as evidenced by letters of recommendation, GRE scores, a 3.50 GPA, and a statement of educational background and goals. Applications are reviewed by a graduate faculty committee in each department or school. This program offers an interdisciplinary combination of courses and research experiences. The program includes a strong emphasis

on research and application of statistical procedures, as well as having students gain experience in resource generation, knowledge sharing and community engagement.

A minimum of 60 semester credit hours beyond the master's degree is required for the PhD degree. The PhD degree prepares individuals to be researchers and educators for research positions in universities, business and industry, for university teaching and for administrative or management level positions.

The *Doctor of Philosophy* degree in food science is an interdisciplinary program available through the Department of Nutritional Sciences in cooperation with other University graduate programs.

Departmental Clubs and Honor Societies

American Society of Interior Designers Student Chapter
CHES Ambassadors
CHES Scholar Leaders
CHES Student Council
Club Managers Association of America
Early Childhood Education Club
Eta Sigma Delta (hotel and restaurant administration honor society)
Graduate Students in HES Association
Hospitality Administration Graduate Student Association
Hospitality Days
Human Development and Family Science Club
International Facility Management Association Student Chapter
Kappa Omicron Nu (scholarship and leadership honor society)
Merchandising and Apparel Design Association
National Society of Minorities in Hospitality
Nutritional Sciences Club
Phi Upsilon Omicron (scholarship and leadership honor society)
Sigma Phi Omega (gerontology honor society)

Design, Housing and Merchandising

Randall Russ, PhD - *Associate Professor and Interim Head*

The mission of the Department of Design, Housing and Merchandising (DHM) is to foster visionary, innovative solutions to global human issues, using creative, critical thinking, and technological processes within the context of Design, Housing and Merchandising. Three undergraduate options are available: interior design, merchandising, and apparel design and production, each requiring a summer internship.

Students in *interior design* are preparing for careers as professionals who assist businesses and families in planning and solving problems relative to the function and quality of interior living and work environments. Course work includes fundamentals of design, design analysis, space planning and programming, design of interior space, computer-aided design (CAD) and related aspects of environmental design. Students must pass the Proficiency Review Process at the end of their freshman year to be accepted into the professional level interior design program. Upon acceptance, students are expected to have their own laptop computer with sufficient capacity for graphics software used in the profession. Career opportunities include professional practice in interior design and architectural firms, lighting, facility management, historic restoration and preservation and product design and sales. The Council for Interior Design Accreditation (CIDA) has accredited the undergraduate interior design program.

Students in *merchandising* are preparing for careers with major firms in apparel, interiors and related retail fields. The focus is on developing competencies associated with merchandising and management for the retail industry. Course work includes retailing, marketing, merchandise planning and analysis, buying practices, promotion, visual merchandising, fashion and market trend analysis, quality assurance and international sourcing. Career opportunities include corporate and store level management, buying and planner positions, retail manufacturing management, merchandise sourcing manager, retail planner/analyst, visual merchandiser, mall management, product development, and manufacturer's representative.

Students in *apparel design and production* are preparing for careers in the apparel, textiles and sewn products industries. The program emphasizes the integration of design principles, construction methods, consumer preferences and mass production strategies. Course work includes principles of design, apparel production, quality assurance, visual presentation techniques, properties and performance evaluation of textiles, patternmaking, CAD and entrepreneurship. Students must pass a Proficiency Review Process to be accepted into upper division design courses. Students complete a required internship to provide industry experience. The American Apparel and Footwear Association (AAFA) has approved the preproduction (design) and production management undergraduate curricula, making OSU one of only 13 programs in North America recognized with an AAFA approved four year apparel program. Career opportunities include apparel designer, apparel engineer, product development manager, accessory designer, patternmaker, pattern company or manufacturer's representative, textile designer, sourcing manager, quality assurance manager and production manager.

Students in all three options will develop business management, communication, creative problem solving and administrative skills. Minors are available in merchandising and apparel design and production.

Admission Requirements

Transfer students must meet the following minimum retention GPA requirements in order to be admitted to the DHM undergraduate program:

Hours Completed	*Minimum GPA Requirement*
Less than 31 hours	2.00
31-45 hours	2.25
Over 45 hours	2.50

Graduate Programs

The Department of Design, Housing and Merchandising offers graduate work leading to the Master of Science in Design, Housing and Merchandising and the Doctor of Philosophy in Human Environmental Sciences with an option in design, housing and merchandising. The programs are scientifically based research and/or design oriented. Graduate degrees in the department are tailored to departmental areas of expertise, professional goals of the candidate and College of Human Environmental Sciences and Graduate College requirements. Graduate programs may focus on either *merchandising or design*. Students may investigate design and merchandising from the following perspectives: product development and evaluation, consumer and supplier behavior, business development and management, and constructed environmental and individual interrelationships.

—The Resident Master of Science Degree. The Master of Science degree is designed to prepare individuals for careers in business, industry, extension and post-secondary or college teaching. The thesis plan (research or design) is available for students in apparel design and interior design. For merchandising master students, research thesis and course work only options are available. Programs of study are built around the academic background, experience, needs, special interests and professional goals of the student. The selection of courses that

meet departmental requirements is made in consultation with the advisory committee. A minimum of 21 credit hours must be taken in the department. Additional courses may be selected from other areas of human environmental sciences or from supporting areas such as marketing, sociology, history, and physiology. If the undergraduate degree is not in the area of specialization, specific undergraduate courses in design, housing and merchandising will be required as prerequisites.

—The Online Master of Science Degree with an Emphasis in Merchandising. Oklahoma State University is a member of the Great Plains Interactive Distance Education Alliance. Great Plains IDEA is an award-winning multi-state alliance led by the Human Sciences colleges founded in 1994, as a means to create a marketplace for sharing distance education programs at the graduate level. Combining today's emerging technologies with program based alliances, it utilizes the field of distance education to connect students around the country and afford them the opportunity to be admitted to one member institution and study at other member institutions via Internet-based courses. Students in the Merchandising program have two options: a 36 credit hour master's degree or a 15 credit hour graduate certificate, consisting of a subset of courses from the master's program. The certificate program has been designed for students whose goal is a credential in merchandising and who feel that they do not need a master's degree.

—The Doctor of Philosophy Degree. The PhD prepares individuals for research positions in universities, business and industry, for university teaching and for administrative or management level positions. The student will be expected to have a master's degree or equivalent in design, housing and merchandising or in a closely-related area from a college or university of recognized standing. A student may be required to demonstrate competence in the area of specialization and in related areas, and further course work may be required before admission will be granted.

The plan of study is individually determined for the student in cooperation with an advisory committee. Each plan of study will be an integrated combination of courses and research providing for specialization within an area of design and merchandising, including synthesis of knowledge drawn from departments within and outside of human environmental sciences. Emphasis is on attainment of competencies rather than on the completion of specific numbers of credits; however, a minimum of 60 credit hours beyond the master's must be completed. Each student will develop competence in the area of specialization which includes courses in the major and the support area. International and management dimensions are included.

The program includes a strong emphasis on research and application of statistical procedures, as well as having students gain experience in resource generation, knowledge sharing, and community engagement.

More detailed information on graduate study in the Department of Design, Housing and Merchandising can be obtained from the department Web site www.ches.okstate.edu/dhm/ or by writing the head of the department.

Hotel and Restaurant Administration

Richard Ghiselli, PhD - *Marilynn Thoma Chair and Director*

The mission of the OSU School of Hotel and Restaurant Administration (HRAD) is to provide superior education, applications, research, service, and outreach in a professional and caring environment. This mission is accomplished by implementing theoretical and practical components in the curriculum identified by industry leaders as requirements for success. The academic program is delivered with balanced emphasis on management principles and practical hospitality business applications. The school has a reputation for providing qualified and skilled managers in lodging, restaurants, meeting planning and other hospitality settings. The HRAD curriculum provides an academic and practical foundation. An educational facility of more than 22,500 square feet houses laboratories, classrooms, exhibit areas and faculty offices. Specific accommodations include: quantity food preparation areas with state-of-the-art commercial equipment and diverse methods of meal preparation; two dining room management and table service laboratories; quick service laboratory; basic food preparation laboratory; classroom and demonstration area; and project room. The School also operates The Atherton Hotel at OSU. The 80-room hotel and The Ranchers Club restaurant, located in the hotel, serve as excellent teaching laboratories for future hospitality professionals.

Career opportunities include restaurant and hotel operations, personnel administration, labor relations, sales and promotion, accounting, front office and general management positions. Positions as regional directors for lodging, restaurant, industrial, and fast food management chains are also available. Other opportunities include event planning, sales, airline catering, vending and individual restaurant entrepreneurship.

To meet the needs of the industry and provide sound academic preparation at the undergraduate level, the curriculum emphasizes professional and general education. The professional area includes courses in accounting, law, cost controls, revenue management, communications and economics. Courses in service management, food and beverage production, purchasing and control, facility management and design, sales and promotion, front office management, and advanced hotel and restaurant management are also included in the specialized area. The BS degree with a major in hotel and restaurant administration may be earned by completing a minimum of 120 semester hours and achieving a "C" grade in courses required in the major area and in the professional electives.

Successful completion of an industry work experience and a management internship are required. Internship placement in hotels, restaurants, and related establishments is arranged globally in cooperation with industry executives and the OSU faculty. Study abroad programs and international internships are available. The School of Hotel and Restaurant Administration is accredited by the Accreditation Commission for Programs in Hospitality Administration (ACPHA).

Further information may be found at http://ches.okstate.edu/hrad.

Graduate Programs

—The Master of Science Degree. Admission to the graduate program in hospitality administration is selective and is based on a variety of factors including undergraduate grade-point average, industry work experience, GRE/GMAT score, letters of recommendation and goals of the applicant. Applicants are required to have a bachelor's degree in hospitality and tourism administration or allied field. Prerequisite courses may be required for students with undergraduate degrees in areas other than hospitality and tourism administration. The master's degree requires a minimum of 32 credit hours for the thesis plan or 34 credit hours for the non-thesis plan (requires a creative component).

The plan of study is individually developed with an adviser who is designated after entry into the program. An advisory committee gives final approval of the plan.

—The Doctor of Philosophy Degree. The PhD is awarded in human environmental sciences with an option in hospitality administration. This program focuses on research and prepares researchers, educators and practitioners to make contributions to hospitality higher education and the literature in the hospitality field. The doctoral program requires a minimum of 60 hours beyond the MS degree or 63 hours if a thesis was not completed in the master's program. The program includes a strong emphasis on research and application of statistical procedures, as well as having students gain experience in resource generation, knowledge sharing and community engagement.

A customized part-time doctoral degree program is also available for those students, especially educators, who would prefer to pursue their degree without maintaining a full-time enrollment on campus.

Competitive graduate teaching and research assistantships, graduate fellowships and tuition waivers are available to qualified applicants.

More detailed information on graduate study in the School of Hotel and Restaurant Administration can be obtained by visiting our Web site at http://ches.okstate.edu/hrad.

Human Development and Family Science

Sue Williams, PhD - *Professor and Head*

The Department of Human Development and Family Science (HDFS) is a premier academic program dedicated to the discovery, integration and application of knowledge to enhance the quality of life and competence of diverse individuals and relationships. The department prepares students to work with individuals, couples, and families. The department's primary focus is on integrative approaches to developing and maintaining individual and relationship competence. The distinguishing feature of HDFS is the interdisciplinary and multidisciplinary integration of instruction, research and application between and among human development, family science, early childhood education and marriage and family therapy.

Committed to enhancing the quality of life of individuals and families by maximizing the development of individual and relationship competence, the Department of Human Development and Family Science provides a dynamic environment for life-long learners through engagement in:

- *instruction* that fosters creative and critical thinking for individuals in their professional and personal lives;
- *research* that contributes to the discovery of knowledge and understanding of human development and family relationships; and
- *application* of knowledge that is responsive to and informed by constituents' needs.

The department offers undergraduate students options in *Early Childhood Education, Child and Family Services* and Gerontology on both Stillwater and Tulsa campuses. Each of the three options emphasizes integration of theory, research, policy, and practice.

Criteria for undergraduate students wishing to transfer into HDFS include a required minimum retention grade-point average.

Hours Completed	*Minimum GPA Requirement*
Less than 31 hours	2.00
31-45 hours	2.25
Over 45 hours	2.50

The *Early Childhood Education* teacher certification option provides professional preparation for individuals to teach in public school programs for prekindergarten through third grade. This option provides a foundation in child development to prepare students to design, implement and evaluate developmentally appropriate curricula for young children. It also provides preparation for working with children from infancy through preschool and their families in a variety of settings. Upon completion of this degree option, students have completed over 1,000 hours in the classroom, including two student-teaching internships.

An *Early Childhood Education* certificate is required to teach prekindergarten through kindergarten in Oklahoma public schools. All students completing the *Early Childhood Education* option must meet Oklahoma State University and Oklahoma professional education requirements.

The *Child and Family Services* option prepares individuals for careers in providing services and leadership to children, youth, adults and their families. The course content focuses on individual development, family dynamics, family life education, policy, management and professional skills in the context of the community. Career opportunities are in public and private social services agencies, policy and advocacy centers, and in business and industry.

This option also provides education for individuals planning to continue their education in graduate programs, medical school, law school or other specialized graduate programs. The curriculum focuses on developing skills in critical thinking, scientific investigation, and written and oral communication. Students are prepared for advanced education in such areas as family therapy, child life, medicine, physical therapy, law and psychology. This option provides flexibility to accommodate the student's particular area of interest or to meet prerequisites for a professional school.

The *Child and Family Services* option has five professional tracks. These include: child and parenting practitioner/child life specialist, family life educator, pre-professional/premed, pre-professional/prelaw and an individualized plan. The individualized plan is provided especially for students planning double majors. Students in all tracks complete an internship with more than 375 hours in the field.

The *Gerontology* option prepares individuals to understand adulthood and aging issues. Given that individuals are living longer, aging adults represent a larger portion of our work force than ever before. Aging adults need appropriate services (e.g., financial, healthcare, travel), and families are the most likely providers of care to elderly persons. Students need to be prepared to respond to these societal changes.

This option prepares students for careers in providing services and leadership to older adults and their families. The course content focuses on individual development, family dynamics, aging families, family life education, policy, management and professional skills in the context of the community. Career opportunities are in public and private social services agencies, policy and advocacy centers, and in business and industry.

This option also provides education for individuals planning to continue their education in geriatrics (medical school), gerontology, law school or other specialized graduate programs. The curriculum focuses on developing skills in critical thinking, scientific investigation, and written and oral communication.

The BS degree requires a minimum of 124 semester credit hours. A minor is also available in the department; information on requirements may be obtained from the department office. Articulation agreements between Oklahoma State University and Tulsa Community College and between Oklahoma State University and Northern Oklahoma College provide for a transition toward a baccalaureate degree in human development and family science.

Further information may be found at http://ches.okstate.edu/hdfs.

Graduate Programs

Graduate study in the Department of Human Development and Family Science (HDFS) is designed to prepare students in the creation, dissemination, and application of knowledge focused on reducing risk and enhancing resilience within individuals and among families. HDFS offers graduate study leading to the Master of Science degree and Doctor of Philosophy degree. Graduate study in HDFS emphasizes the integration of theory, research and application to address key issues risk and resilience. The MS options include *Child and Family Services*, *Developmental and Family Sciences*, *Early Childhood Education*, *Marriage and Family Therapy,* and *Gerontology*. The PhD is offered in human environmental sciences with an option in human development and family science. Students work with their advisors and advisory committees to develop flexible, yet rigorous programs that meet degree requirements and professional competencies in the area of the specialization. Graduate programs in HDFS are central to the departmental research. Faculty and students engage in the

integration of theory and research to advance the development and application of knowledge to reduce risk and enhance resilience for individuals and families across cultures and generations.

HDFS has provided high quality graduate education programs for decades and has graduates in leadership positions across the state and nation in all areas of specialization. The department includes three centers/institutes that enhance student experiences in graduate study: (a) the *Center for Early Childhood Teaching and Learning* that houses the *Child Development Laboratory*, licensed by the state of Oklahoma and the National Association for the Education of Young Children, the *Model Teaching Classroom*, and the *Early Childhood Resource Center* for research information and professional development opportunities; (b) the *Center for Family Services*, offering high quality marriage and family therapy to the public and a training environment for master's degree students who choose the Marriage and Family Therapy option; and (c) the *Gerontology Institute*, focused on advancing the quality of life for aging populations through interdisciplinary programs of instruction, research, and public service.

—The Master of Science Degree. The MS degree in Human Development and Family Science is awarded in five options. Applicants specify the option in which they are seeking the MS degree as part of the application process: *Child and Family Services* (available on both the Stillwater and Tulsa campuses), *Developmental and Family Sciences* (available on the Stillwater campus and as a dual-campus program based on the Tulsa campus), *Early Childhood Education* (available on the Tulsa campus), *Marriage and Family Therapy* (COAMFTE Accredited; available on the Stillwater campus), or *Gerontology* (offered on the Stillwater campus and online through the Great Plains Interactive Distance Education Alliance).

Admission to the MS program is selective and requires the completion of a bachelor's degree in Human Development, Family Science, Child and Family Services, Early Childhood Education, or a related area. Admission decisions are based on a variety of criteria, including grade-point average (3.0 minimum grade-point average in undergraduate work), GRE scores (scores of 450 or higher in each of the Verbal and Quantitative sections and 3.5 or higher on the Analytical Writing section preferred for admission), TOEFL scores (required for students for whom English is a second language, 575 minimum), three letters of recommendation, statement of student goals, and a résumé. Students need to complete both an OSU Graduate College Application and an HDFS Department Application. Admission is available only for the fall semester in the *Marriage and Family Therapy* option. Applications are reviewed for the fall and spring (on a space available basis) in the other four options.

Students in each option take a minimum of 18 credit hours of department core courses designed to prepare students to integrate theory, research, and application focused on reducing risk and enhancing resilience within individuals and among families across cultures and generations. Additional course work (ranging from a minimum of 22 semester hours to a maximum of 43) in each option, approved by the advisor and student's advisory committee, is focused on integrating theory, research and application within the option. Four options (*Child and Family Services*, *Early Childhood Education*, *Marriage and Family Therapy*, and *Gerontology*) offer both a thesis and non-thesis option (requires a creative component). The *Developmental and Family Sciences* option involves a thesis plan. The minimum number of semester hours required for each option is: *Child and Family Services* (39 semester hours for thesis plan or non-thesis plan), *Early Childhood Education* (39 semester hours for thesis plan or non-thesis plan), *Developmental and Family Sciences* (36 semester hours for thesis plan), *Marriage and Family Therapy* (59-62 semester hours for thesis plan, 53-56 semester hours for non-thesis plan), and *Gerontology* (39 semester hours for thesis plan; 36 semester hours for the non-thesis plan; and 36 semester hours for the online program through the Great Plains Interactive Distance Education Alliance).

The *Child and Family Services* option is designed to develop leadership in *Child and Family Services* programs. Graduates: (a) demonstrate an ability to describe, discuss, and integrate theory, research, and application to address key issues related to reduce risk and enhancing resilience; (b) establish a solid theoretical foundation in human development and family science; and (c) gain experiences and demonstrate competence in professional issues related to *child and family services.* Career opportunities include administrator of a *child and family services* agency or program; early interventionist; child development specialist; child life specialist; family life specialist; parent educator; family life educator; state and federal policy and advocacy specialist; or family advocate. Graduates may also pursue doctoral study. The *Child and Family Services* option is available on both the OSU-Stillwater and the OSU-Tulsa campuses.

The *Early Childhood Education* option emphasizes child development as a foundation for the study and practice of professional education of children from birth through age eight. To help students gain a strong understanding of how theory and research inform classroom and professional practice, students take courses in theoretical foundations, learning environments, observation and assessment. Students also complete a field experience in *early childhood education* as part of the degree program.

This degree program prepares graduates for careers including: early childhood teacher educator; staff training and development; administration and evaluation; child, family and educational advocate; early childhood consultant; early childhood classroom teacher (requires teacher certification prior to the MS program). The MS *Early Childhood Education* option is available only on the OSU-Tulsa campus.

The *Developmental and Family Sciences* option prepares students to describe, discuss, and integrate theory, research, and application focused on reducing risk and enhancing resilience. In consultation with their major advisors and advisory committees, students identify courses and experiences that focus on preparing for research-related careers and/or doctoral study. Course work focuses on the integration of theory and research in human development and family science, research methods, and statistics. Students engage in research experiences through a research practicum and thesis. The *Developmental and Family Sciences* option is available on the OSU-Stillwater campus and as a dual campus program based on the OSU-Tulsa campus.

The *Marriage and Family Therapy* option is accredited by the Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE) of the American Association for Marriage and Family Therapy. The *Marriage and Family Therapy* option provides students with basic knowledge, clinical skills and a professional identity essential for entry level practice of marriage and family therapy. Students specializing in marriage and family therapy operate the Center for Family Services, an on-campus family therapy clinic. The MFT curriculum takes at least two and one half years (including summers) to complete. The academic course work includes courses in systems theory, marriage and family therapy techniques, ethics and professionalism, and research. Course work provides a framework for the application of marriage and family therapy theory and research in clinical practice. In addition, all students are required to take at least one calendar year of clinical practice. Graduation requirements include the completion of required course work, a minimum of 500 client contact hours, and the completion of either a thesis or creative component. The *Marriage and Family Therapy* option is only available on the OSU-Stillwater campus.

The *Gerontology* option engages students in an in-depth study of adulthood, the aging process, needs of aging individuals, and services for aging populations. Students may complete the on-campus program (thesis or non-thesis) or the online master's program through the

Great Plains Interactive Distance Education Alliance (Great Plains IDEA).

More information on HDFS MS programs may be obtained from the HDFS department, on the Internet http://hes.okstate.edu/hdfs or by e-mail hes-hdfs@okstate.edu. For additional information on the online master's program in Gerontology visit the Web site at www.ches.okstate.edu/gpidea or e-mail anne.mahoney@okstate.edu.

—The Doctor of Philosophy Degree. The PhD in human environmental sciences with option in human development and family science (HDFS) is a research doctoral program designed to promote breadth, depth and integration of knowledge in HDFS through research collaborations. Doctoral students collaborate with faculty and other graduate students on research projects which integrate the theoretical and empirical knowledge base in HDFS and investigate key processes associated with risk and resilience. Upon graduation, doctoral students have the knowledge and experience to develop into leading scholars able to conduct high quality basic and applied research, to provide relevant instruction, develop effective interventions, and contribute to the development of informed public policy that reduces risk and enhances resilience within individuals and among families across cultures and generations.

The PhD option in HDFS provides students with the opportunity to concentrate on one of the following disciplines: *Human Development* or *Family Science*. Students are admitted to the program to focus in a primary discipline in the department (human development or family science) and to take additional course work in a secondary discipline (human development is the secondary discipline for family science students and family science is the secondary discipline for students in human development).

PhD graduates are prepared to apply knowledge in human development and family science in a collaborative manner in diverse settings. To accomplish this goal, the program is designed around four primary themes: *breadth* (knowledge of substantive content across the two disciplines of human development and family science), *depth* (knowledge of substantive content within one discipline, either human development or family science), *integration* (knowledge synthesized to capitalize on the strengths of the disciplines of human development and family science), and *experience* (knowledge through involvement in research, instruction, and a variety of applications associated with reducing risk and enhancing resilience of individuals and families).

To achieve breadth, depth, and experience in the primary emphasis area and in the integration between human development and family science, students take courses and participate in individualized experiences, approved by their major adviser and doctoral advisory committee, that guide the student in mastering the forms (teaching, research and service) and functions (discovery of knowledge, integration of knowledge, application of knowledge and transmission of knowledge) of scholarship expected of doctoral graduates in HDFS.

The program requires a minimum of 60 semester hours beyond the master's degree and prerequisites, participation in research throughout the doctoral program, and qualifying examinations designed to provide the opportunity to integrate knowledge from the course work and experiences. Course work includes a minimum of 21 semester hours in human development and family science, 21 semester hours in research and statistics, three semester hours in human environmental science, and 15 hours of dissertation research. Students who did not complete a thesis for the master's degree are required to complete a thesis equivalent project (beyond the 60 semester hour requirement).

Admission to the PhD program is selective and requires the completion of an MS in human development, family science, or related field. Admission decisions are based on a variety of criteria including grade-point average (3.0 grade-point average in undergraduate work and 3.5 in previous graduate study preferred; 3.25 in previous graduate study required), GRE scores (450 or higher in each of the Verbal, Quantitative and Analytical sections and 3.5 or higher on the Analytical Writing section preferred), TOEFL scores (required for students for whom English is a second language, 575 minimum), three letters of recommendation, a statement of student goals and a résumé. Students are required to complete both an OSU Graduate College Application and an HDFS Department Application.

More information on the PhD option in HDFS may be obtained from the HDFS department at http://ches.okstate.edu/hdfs or by e-mail: hes-hdfs@okstate.edu.

Nutritional Sciences

Nancy M. Betts, PhD, RD - *Professor and Head*

The Department of Nutritional Sciences advances health and quality of life of individuals and communities and prepares professionals through discovery, education and application of scientific knowledge.

Graduates are prepared for positions in health professions. Six degree options and a minor are offered through the department. Requirements for admission to most medical, dental and pharmacy schools can be met through the *human nutrition/premedical sciences* option. The human nutrition option is ideal for students desiring greater depth in the physiological and biochemical sciences in preparation for medical and other professional schools, graduate study and research in human nutrition.

The *dietetics* option and the *dietetics and exercise* option prepare students for diverse and dynamic professions that integrate human nutrition, food service administration, food science, chemistry, physiology, management and interpersonal skills. Both options meet the Didactic Program in Dietetics (DPD) accreditation requirements of the American Dietetic Association (ADA). The department requires a minimum of a 2.50 GPA for enrollment in professional courses in dietetics. The *dietetics and exercise* option can be used toward the fulfilling most of the American College of Sports Medicine's requirements for becoming a Certified Clinical Exercise Specialist (this certification requires 600 hours of practicum experience not offered in this option).

The dietetic internship at Oklahoma State University requires prior completion of the DPD requirements and meets the American Dietetic Association's supervised practice requirements for registration eligibility. Its mission is to provide students with the knowledge and skills necessary to practice as an entry-level dietitian. Entry into the dietetic internship is competitive requiring an application to and matching process through the American Dietetic Association.

When students successfully complete the academic requirements (DPD) and experience component (dietetic internship), they are eligible for the Registration Examination for Dietitians administered by the Commission on Dietetic Registration of the American Dietetic Association (ADA). Individuals who are successful on the examination become Registered Dietitians and are entitled to use the initials "R.D." to signify professional competence. Many states including Oklahoma also require a license to practice dietetics in the state.

The *allied health, nutrition and exercise, and community nutrition* options are for students who desire to work in the field of foods and nutrition but do not plan to become a registered dietitian. The *allied health* option provides required course work for most nursing schools, physician assistant's programs, schools of physical and occupational therapy and other health professions. The *nutrition and exercise* option can be used toward the fulfilling most of the American College of Sports Medicine's requirements for becoming a Certified Clinical Exercise Specialist (this certification requires 600 hours of practicum experience not offered in this option). The *community nutrition* option provides emphasis in nutrition education.

Nutrition professionals work in a wide range of settings, in both the public and private sectors and assume an array of challenging responsibilities. Career opportunities for a registered/licensed dietitian include: health care dietitian and administrator, nutrition or food science researcher, fitness/wellness consultant, public health nutritionist, entrepreneur in dietetic programs and services, and corporate dietitian/nutritionist.

Some of the specialized careers and university teaching require additional course work or advanced degrees.

All students admitted to the Dietetic Internship must be enrolled concurrently in an appropriate graduate program. Students successfully completing the program may, if desired, continue to work toward a graduate degree and may apply graduate course work from the internship to their degree programs.

Admission Requirements

Transfer students must have earned a 2.5 retention GPA in order to be admitted to the NSCI undergraduate program.

Further information may be found at http://ches.okstate.edu/nsci.

Graduate Programs

The Department of Nutritional Sciences offers graduate study leading to a Master of Science degree in nutritional sciences with an option in nutrition and a Doctor of Philosophy degree in human environmental sciences with a specialization in nutritional sciences. Graduate study in NSCI emphasizes research and the application of research to the field of human nutrition. Graduate students work with an advisor and advisory committee to develop flexible, yet rigorous programs of study and research that meet the degree requirements and student's professional goals within an area of specialization in the field.

The department also offers an online MS degree option in dietetics for Registered Dietitians through the Great Plains Interactive Distance Education Alliance (Great Plains IDEA) and participates in OSU's interdisciplinary food science program at the MS and PhD levels.

—The Master of Science Degree. The MS degree program is designed to develop research skills, stimulate independent thought and critical thinking, and provide up-to-date knowledge in a variety of areas of human nutrition. Admission to the MS graduate program is selective and is based on a variety of factors including the student's grade-point average, Graduate Record Examination (GRE) scores, letters of recommendation and goals. Students in the MS program nutrition option can choose one of two tracks: thesis or non-thesis. The MS degree with thesis requires a minimum of 30 credit hours, including six credit hours for thesis research or NSCI 5000. The non-thesis MS degree requires a minimum of 34 credit hours with three credit hours of NSCI 5870, a comprehensive examination, a written research paper, and an oral presentation. The student's plan of study and research is planned with their advisor and advisory committee. Thesis research is conducted within the advisor's area of interest and is approved by an advisory committee.

An online Master of Science degree in nutritional sciences with an option in dietetics is also offered to Registered Dietitians. Oklahoma State University is a member of the Great Plains IDEA interactive alliance which provides the opportunity for Registered Dietitians to earn a MS in dietetics via Internet-based courses. The program consists of 36 credit hours with three credit hours in NSCI 5870. Students will work with a faculty advisor and the graduate committee from the Nutritional Sciences department to complete the program requirements.

—The Doctor of Philosophy Degree. The PhD degree is awarded in human environmental sciences with an option in nutritional sciences. The focus of the program is to prepare individuals for careers in a variety of areas including higher education, industry, healthcare and governmental programs. Admission to the program is competitive and applicants are expected to provide evidence of exceptional academic ability and preparation, a statement of goals and letters of recommendation. Grade-point average in previous undergraduate and graduate course work and Graduate Record Examination (GRE) scores are considered in the evaluation of the applicant. Completion of an MS thesis or thesis equivalent project is required. If a thesis was not required as a component of the applicant's MS program, a thesis or equivalent must be completed in addition to the requirements for the doctoral degree. Prerequisite course work for full admittance to the PhD program includes at least one graduate or undergraduate course in biochemistry and physiology, six credit hours at the graduate level in nutrition and three credit hours of statistics. Students with MS degrees in a subject area other than nutrition will also be required to have a minimum of 30 credit hours of undergraduate/ graduate course work related to nutritional sciences, including the prerequisite courses listed above. Applicants who do not meet these requirements may be considered for conditional acceptance and required to take certain prerequisite courses.

The PhD program in nutritional sciences includes a strong emphasis on research in areas ranging from basic molecular and cellular sciences to clinical and community applications. Students also gain experience in resource generation, knowledge sharing and community engagement. Degree requirements include a minimum of 60 credit hours beyond the MS degree with 18-30 hours in an area of NSCI specialization, 18-30 hours in research support courses, 3 hours in human environmental sciences and 15 credit hours of dissertation research. The program of study and research is designed and developed under the direction of the faculty advisor and advisory committee.

The department also participates in OSU's interdisciplinary food science program at the MS and PhD levels. To acquire the competencies required, the candidates will need to study in their areas of emphasis and in selected areas within and outside the department.

More detailed information on graduate study in the Department of Nutritional Sciences can be obtained by writing the graduate coordinator, or on the Internet at http://ches.okstate.edu/nsci.

William S. Spears School of Business

Sara M. Freedman, PhD - *Dean*
Robert S. Dooley, PhD - *Associate Dean for Graduate Programs and Research*
Mark Weiser, PhD - *Associate Dean for Academic Programs*

201 Business Building • (405) 744-5064 • Web site: http://spears.okstate.edu

Today's business world is one of excitement and challenge. It offers individuals a professional future as well as an opportunity for meaningful social involvement and civic service. The mission and goals of the Spears School of Business (SSB) are guiding principles to help the School prepare students to meet the demands of new developments in technology, economics, innovations in management techniques and social responsibility. The students of the SSB are provided the opportunity for specialized study in selected areas of business.

The mission of the Spears School of Business, with internationally recognized areas of excellence and innovation, is to serve its stakeholders through its role as a professional school in Oklahoma's comprehensive land-grant university. The following six goal statements help direct the strategic mission of the School.

1. To prepare undergraduate, master's and doctoral students to excel in professional careers and leadership roles in a dynamic environment.
2. To conduct and publish scholarly research.
3. To develop and provide life-long learning programs that serves the needs of professionals.
4. To build strategic partnerships that supports the School's mission.
5. To utilize leading-edge technologies in the pursuit of excellence in School activities.
6. To create and disseminate knowledge that is of value to stakeholders and that fosters the economic vitality and development of Oklahoma.

The SSB provides students with a broad educational experience by including studies in social sciences, communications, humanities, fine arts, natural science and mathematics. In addition, the student is provided with an understanding of the functions of business and how they integrate within organizations.

Accreditation

The Spears School of Business (http://spears.okstate.edu) at Oklahoma State University is fully accredited by The Association to Advance Collegiate Schools of Business (AACSB International).

High School Preparation

Although a sound high school program is adequate preparation, prospective business students will benefit from a strong background in English and mathematics. Also, course work in history and government, science, geography, computer science, foreign language and public speaking will be quite valuable.

Scholarships

Oklahoma State University has an extensive scholarship program for entering freshmen. For full consideration, applications should be sent to the OSU Office of Scholarships and Financial Aid by February 1 during one's senior year in high school. Spears School of Business scholarships are primarily designated for sophomores, juniors and seniors. Scholarship awards are based on academic performance, leadership and need, and applications must be received by the beginning of February.

Academic Advisement and Enrollment Procedure

Students plan their study in conference with a staff adviser in the Office of Student Services of the SSB.

The associate dean for undergraduate programs, as well as the director of the Office of Student Services, is available to all students for counseling on special problems.

Academic Programs

—Undergraduate Programs. *The Bachelor of Science in Business Administration* degree is offered by the five departments and one school. Departmental majors are listed below.

Accounting, with a major in accounting.

Economics and Legal Studies in Business, with majors in economics (with options in business economics and quantitative studies and pre-law) and general business (with an option in pre-law).

Entrepreneurship, with a major and minor in entrepreneurship.

Finance, with a major in finance and an option in commercial bank management.

Management, with a major in management and options in human resource management and sports management.

Management Science and Information Systems, with a major in management information systems and options in management science and computer systems and information assurance.

Marketing, with majors in marketing and international business.

Additional information about the undergraduate programs in the Spears School of Business can be found on the Internet http://spears.okstate.edu/future/undergraduate.

Outstanding students in the Spears School of Business who meet the requirements of The Honors College may earn the Honors College degree while completing their undergraduate degree in this School. For more information, please refer to the Honors College information in the *Catalog*.

—Master's Degree Programs. Two types of master's degrees are available to students desiring to undertake advanced work in the business area, specialized master's of science degrees and the interdisciplinary Master of Business Administration degree.

The Master of Business Administration degree allows concentrations in management, management information systems, marketing, entrepreneurship, or finance. The following identifies where additional information about this degree can be found in the *Catalog*:

The Master of Business Administration degree (see "Business Administration")

The Master of Science degree requires completion of a graduate major in accounting, economics, entrepreneurship, management science and information systems, quantitative financial economics or telecommunications management. The MBA also allows more in-depth study in the areas of accounting, risk management, information assurance and network security, information systems, telecommunications management, entrepreneurship and economics. The following identifies where additional information about these degrees can be found in the *Catalog*:

Master of Science in Accounting degree.
(See "School of Accounting.")

Master of Science in Economics degree.
(See "Department of Economics and Legal Studies in Business.")

The Master of Science in Management Information Systems (MIS) degree. (See "Department of Management Science and Information Systems.")

Master of Science in Quantitative Financial Economics degree.
(See "Department of Finance.")

Master of Science in Telecommunications Management degree.
(See "Department of Management Science and Information Systems.")

—Doctor of Philosophy Degree Programs. Graduate work toward the Doctor of Philosophy degree with a major in economics is offered in the Department of Economics and Legal Studies in Business. Graduate work toward the Doctor of Philosophy degree with a major in business administration is offered in the departments of Entrepreneurship, Finance, Management, Management Science and Information Systems, Marketing and the School of Accounting.

Additional information about PhD programs can be found in the "Business Administration" section as well as in the various departmental sections.

Career Services

Representatives of more than 200 business and industrial concerns and governmental agencies annually interview graduating seniors and graduate students of the Spears School of Business. The School has both undergraduate and graduate career services consultants available.

General Education Requirements

The minimum general education requirements are summarized as follows: not less than 40 semester hours, including six hours of English composition and 34 hours in the breadth areas. These include: six hours in American history and government and six hours in social and behavioral sciences, humanities, and analytical and quantitative thought and seven hours in the area of natural sciences, with one of the hours in scientific investigation.

Students are also required to take a "diversity" (D) designated course. Diversity courses provide an understanding of the cultural context of relationships, issues and trends in a multicultural and diverse society related to such factors as culture, ethnicity, nationality, age, gender, sexual orientation, mental and physical characteristics, education, family values, religious and spiritual values, socioeconomic status and unique characteristics of individuals, couples, families, ethnic groups, and communities.

An additional requirement is an "international dimension." This may be met in any part of the student's program, and thus does not necessarily add to the number of hours required. The international dimension simply requires each student to learn something about cultures and societies outside the United States. The scientific investigation requirement involves some kind of laboratory experience with student involvement.

More details concerning these and other requirements can be found in the next section, "Lower-division Requirements."

Lower-Division Requirements

Work in the freshman and sophomore years is planned in such a way as to give the student basic information in the general areas of (1) behavioral and social sciences, (2) communications, (3) humanities and fine arts, (4) natural science and mathematics and (5) business foundation courses. The student may also select additional hours from courses in these areas, with the opportunity of achieving either further breadth or a certain degree of depth by concentrating these hours in a particular area of interest. As part of the student's general education, one course must be selected that is identified as satisfying the international dimension (I) requirement and one must be selected to satisfy the diversity (D) requirement.

During the freshman and sophomore years, the student will complete courses in each of the following areas:

Behavioral and social sciences: American history, three semester credit hours; American government, three hours; and six hours elected from courses identified by the University as satisfying social science (S) credit.

Humanities and fine arts: Six semester credit hours elected from courses identified by the University as satisfying humanities (H) credit.

Natural science and mathematics: A minimum of 10-13 semester credit hours with the specific number of required hours in mathematics and natural science varying with the major chosen. Specific requirements for each major are published by the University in the book *Undergraduate Programs and Requirements*.

Communications: English composition, six semester credit hours, and introduction to speech communication, three hours.

Business core: All undergraduate business majors must complete the following business core course requirements: ACCT 2103, ACCT 2203, BADM 4513 or EEE 4513, ECON 2103, 2203, FIN 3113, LSB 3213, MGMT 3013, MKTG 3213, MSIS 2103, 3223, and STAT 2023. For non-business students, the University prerequisite for upper-division courses applies. (See "Academic Regulations" elsewhere in the *Catalog*.)

General electives: In addition, the student may elect courses from any area except lower-division aerospace studies and military science and LEIS and HHP activity courses to complete degree requirements.

Credits earned during the freshman and sophomore years at a two-year college may not be substituted for junior and senior course requirements in majors in the Spears School of Business.

Departmental Clubs and Honor Societies

African American Business Students Association
Alpha Kappa Psi
Association of Information Technology Professionals
Beta Alpha Psi (accounting honor society)
Beta Gamma Sigma (business administration honor society)
Business Honors Organization
Business Student Council
Collegiate Entrepreneurs' Organization
Delta Sigma Pi (professional business organization)
Economics Society
Financial Management Association — Stillwater
Freshman Business Student Leaders
GARP Student Chapter: Organization for MSQFE Students

Human Resource Management Association
Marketing Club
MBA Student Association
OSU-Tulsa Business Association
Phi Beta Lambda (business leadership)
Students in Free Enterprise

School of Accounting

Don R. Hansen, PhD, CMA - *Professor and School Head*

The School of Accounting offers three degree programs in accounting: (1) BS in Business Administration with a major in accounting, (2) MS in accounting and (3) PhD in business administration with emphasis in accounting.

The common objective of the BS and MS in accounting programs is to educate students to commence and continue to develop in a wide range of professional accounting careers. The specific objective of the BS in accounting program is to provide basic conceptual and business knowledge as a foundation for accounting career development; the objective of the MS in accounting is to provide candidates with a greater breadth and depth in accounting than is possible in the BS program, in order to prepare graduates for careers as professional accountants in financial institutions, industry, non-business organizations and public practice.

Students who are considering a professional accounting career should have above-average aptitudes in mathematics and English, disciplined work habits, an interest in working with people and an attitude of service.

Students who have the objective of sitting for the CPA exam in Oklahoma must have a BS or higher degree and 150 hours. Candidates are required to complete 150 hours of education, including 30 hours of accounting beyond principles of accounting. Students desiring to become CPAs are strongly encouraged to consider graduate education in accounting. The Professional Program in Accounting (PPA) is especially designed to enable students to become CPA eligible. The PPA allows students to complete the requirement of 150 hours of education and receive a BS and MS in accounting. The MS in accounting earned at Oklahoma State University satisfies educational requirements for CPA candidates in all jurisdictions of the United States.

Considerable electives are available in both degree programs. Specialization in external reporting and auditing or taxation is possible in the MS in accounting program. Candidates for either of these degrees are encouraged to select some electives in quantitative and behavioral science areas.

Accreditation

The School of Accounting is separately and fully accredited by the Association to Advance Collegiate Schools of Business (AACSB International).

Graduate Programs

—The Master of Science in Accounting Degree. The specific objective of the MS in accounting is to provide candidates with a greater breadth and depth than is possible in the BS program, in order to prepare graduates for careers as professional accountants in financial institutions, industry, non-business organizations and public practice and to develop judgmental ability in accounting and related areas. Advanced courses provide a theoretical base for insight into significant problems confronting the accounting profession. In addition, a specialty in financial reporting, professional accounting services or taxation is available for interested candidates. The candidate receives assistance from the faculty in selecting a pattern of courses designed to prepare the student according to the chosen professional goals.

Graduates of recognized colleges and universities whose records indicate adequate intellectual capacity and desirable personal characteristics may qualify for admission. The typical applicant admitted to the program has a GMAT score of 575 or above and an undergraduate grade-point average of 3.50 or above.

—Prerequisites. The following are required: 18 hours of advanced accounting and 18 hours of supporting course work. The supporting course work consists of three semester hours each in designated courses in economics, legal studies in business, marketing, management and statistics. As many as eight semester hours of course deficiencies may be removed within the 32 semester hours required for the degree.

—The Doctor of Philosophy Degree. The PhD in the Spears School of Business with a major in accounting emphasizes flexibility to meet the particular needs and objectives of individual candidates. The program is designed to provide the highest degree of preparation for the individual student, enabling the student to make significant professional contributions in research, teaching or business or government positions.

Graduates of recognized colleges and universities whose records indicate adequate intellectual capacity and desirable personal characteristics may qualify if they have a good academic record and achieve satisfactory scores on the GMAT. Admission is competitive.

The PhD program is designed so that a candidate may, at his or her option, specialize in one of the following accounting areas: auditing, managerial accounting, financial accounting systems or taxation. All candidates are required to take a series of seminars that provide an overview of relevant academic literature. These seminars are restricted to PhD candidates. Two minor areas, one of which may be outside the Spears School of Business, are required, in addition to competence in economics and quantitative analysis. The candidate's advisory committee is responsible for assisting in the development of a plan of study encompassing the above areas. Students in residence are required to do teaching or research on a half-time basis while earning the degree.

Business Administration

Graduate Programs

—The Master of Business Administration Degree. The Master of Business Administration program provides graduate professional education for individuals preparing for administrative careers in either the private or public sectors. It is a comprehensive yet flexible program providing the knowledge and analytical tools to cope with the complexities of management within diverse environments. There are a number of delivery options for the MBA: full-time, part-time, professional and distance.

—Full-Time MBA. The full-time MBA is a 52-credit-hour semi-lock step program designed for individuals who want a cohort-based experience. Applicants must have earned a four-year undergraduate degree or equivalent from an accredited university and have competitive GPA and GMAT scores. Full-time students may choose between a general MBA and an in-depth specialization. Students choosing a general MBA are free to select 12 hours of electives in functional areas of business such as marketing, finance or management. Students seeking a more in-depth area of study may select from the following seven options: accounting, entrepreneurship, risk management, information assurance and network security, information systems, telecommunications management and economics.

—Part-time MBA. The part-time MBA is a 48-credit-hour program designed for individuals who wish to enroll on a part-time basis. The self-paced program allows students to take classes as their schedules permit. Applicants must have earned a four-year undergraduate degree or equivalent from an accredited university and have competitive GPA and GMAT scores

—Professional MBA. The professional MBA was developed with the working professional in mind. It is a 36-credit-hour program that allows for flexibility and course selection to best meet career objectives. Applicants must have a minimum of three years substantive management work experience and a four-year undergraduate degree or equivalent from an accredited university either in business or engineering. Applicants meeting the work experience criteria, but lacking an undergraduate degree in business or engineering, will be considered on a case-by-case basis. Applicants must have competitive GPA and GMAT scores.

—Distance Learning. The MBA part-time and professional programs can be completed through a distance learning format. Distance learning is an ideal educational format for individuals seeking an alternative to the traditional on-campus classroom experience. Classes are delivered via CD-ROM or video streaming on the Internet. Interaction with faculty and other students occurs through a web-based environment.

Regardless of the delivery option, admission is granted to those students whose potential for successful graduate study is clearly indicated by the undergraduate grade-point average, the score on the Graduate Management Admissions Test, letters of recommendation from three sources, past work experience, extracurricular and community activities and stated career goals.

—The Doctor of Philosophy Degree. The PhD in business administration is an interdepartmental program in the Spears School of Business, including accounting, entrepreneurship, finance, management, management science and information systems and marketing. The degree emphasizes flexibility to meet the particular needs and objectives of individual candidates. The program is designed to provide the highest degree of preparation for the individual student, enabling him or her to make significant professional contributions in research, teaching or business or governmental positions.

—Requirements. Students select *one major* area of study from either accounting, finance, management, management information systems/management science or marketing, and *two minor* areas. The dissertation is usually written in the student's major area. One of the minor areas must be taken in the Spears School of Business. The second minor may be taken from another department within the Spears School of Business or from a department outside the SSB.

All candidates for the PhD degree in business administration are expected to have a basic competence in all the major functional areas of business administration—accounting, economics, finance, management, management information systems/management science and marketing. In addition, basic competence is expected in finite mathematics, calculus and statistics. Students who possess a recent master's degree in business from a program accredited by the Association to Advance Collegiate Schools of Business (AACSB International) will generally have satisfied most of the basic competence requirements in these areas.

—Administration. The program is administered by the dean of the Graduate College and the department in which the student enrolls with the assistance of a faculty advisory committee.

—Major and Minor Areas. The candidate's advisory committee is responsible for assisting in the development of a plan of study that assures competence in the major and minor areas and in economics and quantitative analysis. All PhD students in residence are required to do teaching or research on a half-time basis while earning the degree.

For additional information about the PhD see the respective departments.

Economics and Legal Studies in Business

James R. Fain, PhD - *Professor and Head*

Economics is a science of choice. The study of economics centers around individuals' attempts to improve their living standards. It provides a comprehensive view of how a society is organized to transform the limited resources available into want-satisfying goods and services. It investigates the principles underlying the operation of the economic system and seeks to determine its weaknesses and to prescribe policy measures that will improve its operation. In the process, it ranges over a host of the most important problems confronting contemporary society—the causes of and remedies for economic depression and inflation, the determinants of and methods for improving income distribution, poverty problems and welfare measures, the role of the government in economic activity, the requisites for economic growth and development, pollution and congestion and their control.

The primary objectives sought in the undergraduate curriculum are to develop a broad understanding and perspective of the economic aspects of people's activities coupled with thorough training in the fundamental tools of economic analyses. Toward these ends, the development of elementary mathematical and statistical skills is highly desirable, as is complementary study in the social and behavioral sciences, accounting and business administration.

A major in economics prepares students for positions with business firms, non-profit private organizations and national or international government agencies. A degree option in business economics and quantitative studies is offered to provide additional training in analytical methods and communication skills for both public- and private-sector occupations. The undergraduate degree in economics also provides an excellent background for studying law or international relations and, to this end, there is a pre-law option and an international economic relations option. Further, a degree in economics qualifies competent students to undertake the graduate work necessary for professional positions in economic research and college or university teaching.

General Business

The general business program gives students a broad, comprehensive type of business education preparing them to enter employment in a wide range of administrative positions in private business, government or non-profit organizations. The scope of their educational experience enables these graduates to assume management positions in organizations of varying sizes and ranges of operations.

Students majoring in general business will take general education or foundation course work in behavioral and social sciences, communications, humanities and fine arts, natural science, mathematics and statistics, as well as business foundation courses in accounting, business communications, business law, economics, finance, management information systems, management and marketing.

This major, which provides for a high degree of individual student choice, includes required upper-division course work beyond the business core in each of the business disciplines as well as substantial work in business or business-related courses, selected by the student in consultation with his or her major adviser. A pre-law option is offered.

Graduate Programs

The department offers work leading to the Master of Science degree and the Doctor of Philosophy degree. The graduate program in economics prepares economists for academic careers as well as research and administrative positions in business and government agencies.

Graduate fields of specialization include regional and urban economics, public finance, international economics and economic development. In addition, graduate courses are offered in industrial organization, labor, environmental economics and econometrics.

The initial admission to a graduate program is determined by an elected graduate studies committee on the basis of the applicant's previous academic record; verbal, quantitative and analytical scores of the Graduate Record Examination and three letters of recommendation.

—The Master of Science Degree. Admission to the master's program in economics is granted to college graduates with superior academic records whose preparation has been broad and thorough. They need not have majored in economics as undergraduates but must be well grounded in economic theory. A good background in one or more such fields as history, philosophy, mathematics, statistics, political science, English, sociology, accounting, finance, psychology or management is particularly helpful to the graduate student in economics. An applicant whose prior preparation is deficient in some respect may, if otherwise qualified, be admitted to the program but will be required to take prerequisite courses for non-graduate level credit. A total of 30-33 graduate credit hours are required to earn an MS in economics.

Each graduate student is guided in the preparation of a plan of study by the graduate adviser. At the master's level, there are two options. One provides the student with a well-rounded program that does not specialize in a particular area of economics. The second option is applied economics, which stresses communication skills, quantitative analysis and course work from other disciplines related to a career objective. The candidate for the master's degree is required to show competence in basic economic theory and statistical methods, together with an understanding of the fundamental institutional operations of the United States economy.

Each program contains enough electives to permit considerable choice among areas of emphasis. A research report or thesis is required of all students who take only the MS degree. Those accepted for the PhD program have the option of applying for and receiving the MS degree without a research report upon successful completion of the PhD qualifying examinations and successful presentation of a dissertation proposal. A foreign language is not required.

—The Doctor of Philosophy Degree. Admission to the doctoral program in economics is granted to college graduates who have superior academic records. A total of 60 graduate credit hours are required to earn a PhD with a previously earned MS degree. A total of 90 graduate credit hours is required to earn a PhD without a previously earned MS.

The PhD program stresses balanced preparation in economic theory, mathematics and statistics, as well as competence in subject-area fields of specialization. The student is required to pass qualifying examinations in the theory core and in one field of specialization. (The theory core is not considered a field of specialization.) Competence must be demonstrated in a second field of specialization through course work. The graduate adviser helps the student develop a plan of study to achieve these objectives. A foreign language is not required.

A dissertation based upon original research is required of the candidate for a PhD degree in economics. The final oral examination is the dissertation defense.

Entrepreneurship

Michael H. Morris, PhD - *Professor and Head*

The 21st century is the age of entrepreneurship. It is a time of dynamic change where organizations must be faster, more adaptable and flexible, more aggressive, and more innovative in order to survive. The program in entrepreneurship helps prepare students for the entrepreneurial age. Students are encouraged to recognize and develop their innate entrepreneurial potential, and to apply an entrepreneurial mindset to both their professional and personal lives. The program emphasizes the role of entrepreneurial attitudes and behaviors in a wide variety of contexts, including new start-up ventures, growth-oriented small firms, family firms, non-profit entities, and public sector organizations. Students are further encouraged to apply entrepreneurial thinking and acting within other disciplines, from architecture and engineering to social work and theatre.

Entrepreneurship is approached as opportunity-driven behavior. It is a process where individuals put resources together in new and novel ways to create value. The value created can be for customers in conventional markets, or it can be social value created for the community. The program centers on helping students develop entrepreneurial competencies that will enable them to be more entrepreneurial in a wide variety of contexts. Eleven core competencies are emphasized, including recognizing opportunity, assessing opportunity, mastering your creativity, leveraging resources, guerrilla skills, mitigating and managing risk, planning when nothing exists, innovation---developing ideas that work, building and managing social networks, the ability to maintain focus yet adapt, and implementation of something novel or new. A leading-edge entrepreneurship curriculum is built around these competencies.

As a field of study, entrepreneurship helps students see themselves as agents of change, and better equips them to implement creative solutions to emerging opportunities in literally any organizational context. To foster these abilities, the program places considerable emphasis on experiential learning and service learning. Innovative experiential opportunities are built into each of the entrepreneurship courses at the undergraduate and master's levels.

In addition to graduate offerings, the program offers an undergraduate major and minor in entrepreneurship.

Graduate Programs

The Department of Entrepreneurship offers courses that lead to the completion of the Master of Business Administration and the Doctor of Philosophy in business administration degrees.

—The Master of Business Administration (MBA) Degree. (See "Business Administration")

—The Doctor of Philosophy Degree. The PhD in business administration with concentration in entrepreneurship is primarily focused on producing scholars who will be thought leaders in the discipline of entrepreneurship. The program prepares students primarily for careers in academia, but also in business or government. Coordinated by the Department of Entrepreneurship, students are given an intense exposure to theory and research methods.

The doctoral program involves sixty credit hours beyond the master's degree, of which forty-two hours are course work, and the remaining hours are associated with dissertation work. It is a four-year program, with two years devoted to course work, followed by comprehensive exams and a dissertation proposal, and then the writing and defending of the dissertation. Students complete fifteen hours of core doctoral seminars in entrepreneurship and management, twelve hours of statistics and research methods courses, nine hours of doctoral or equivalent hours in a minor field, and six hours of approved doctoral-level or equivalent electives. Students typically minor in such fields as psychology, sociology, anthropology, public policy, or finance.

Doctoral students are expected to publish while in the program, and also to teach entrepreneurship courses. Faculty mentors work closely with students on research projects while they are in the program, initially involving the student in ongoing research projects, and ultimately working on projects initiated by the student. Students are expected to develop and refine their research interests over the first two years of the program, culminating in the identification of a dissertation topic. The Department of Entrepreneurship, with a world-class cadre of entrepreneurship researchers, is well-positioned to support a wide range of topical areas that fit the student's interests.

Outstanding individuals with master's degrees in any field of study may apply. The application for admission to the program is evaluated based on (1) undergraduate and graduate grade point averages, (2) the student's score on the Graduate Management Admission Test (GMAT), (3) a two- to three-page statement describing career goals, academic interests and research questions that intrigue the applicant, (4) three letters of recommendation, and (5) evidence of research potential. Based on this review, a personal interview is arranged with selected candidates, and then a final acceptance decision is made. Applicants are responsible for ensuring all relevant materials are submitted to the Department prior to deadlines.

Finance

John A. Polonchek, PhD - *Professor and Head*

Financial executives are of central importance to the overall planning, control and success of an organization. There are financial implications in virtually all organizational decisions, whether the organization is a business firm, a non-profit organization or a government. Even non-financial managers must know enough finance to determine the financial implications of their decisions on the organization. With each new innovation in the field of finance, the importance of finance for an organization has grown.

Finance has evolved from a descriptive discipline in the early 1900s to the analytical discipline we find today that is recognized as a genuine science. Finance uses a foundation of fundamental economic theory in the development of valuation models, and the tools of financial analysis and risk management. Finance consists of three interrelated core areas: financial markets and institutions, investments and portfolio theory, and managerial (business) finance. Subsets of these core areas include personal finance, real estate finance, international finance, the management of financial institutions, insurance, entrepreneurial finance, and derivative securities and risk management.

The primary objective of the undergraduate finance curriculum is to produce graduates who have a broad understanding of the financial aspects of their decisions and actions and are capable of utilizing the fundamental tools of financial analysis. Toward these ends, the development of elementary mathematical and statistical skills and the study of economics, accounting and business administration are needed to accomplish the objective. The major in finance should prepare students for positions that require special understanding of financial analysis, financial management and financial systems in a wide variety of organizations.

A career in financial management can begin in one of several positions that may lead to a major executive position, including chief executive officer. Initial positions in the managerial finance area include capital budgeting analyst, cash manager, credit analyst, financial analyst (who works closely with accountants), and risk manager. Alternatively, finance majors may choose to enter the financial services industries. Finance majors could enter the workforce in the banking industry as a loan officer, or as a member of the trust department; in the securities industry as a securities analyst, as an investment banker, as a stockbroker or account executive, or as a financial planner; and in the insurance industry as an agent or underwriter.

Graduate Programs

Concentrations in finance are offered through the Master of Business Administration, Master of Science in Quantitative Financial Economics and Doctor of Philosophy degrees.

—The Master of Business Administration (MBA) Degree. (See "Business Administration.")

—The Master of Science in Quantitative Financial Economics Degree. The discipline of quantitative finance has evolved tremendously in recent years, spurred by business and financial institution demand for quantitative skills. Oklahoma State University offers a Master of Science Degree in Quantitative Financial Economics (MSQFE) to meet this demand. The objective of the MSQFE is to produce graduates with mathematical and statistical modeling skills necessary to support advanced financial and economic applications.

The MSQFE is a Spears School of Business degree program that draws on the combined expertise of five OSU departments—Finance, Economics, Mathematics, Statistics and Agricultural Economics. The program is designed to enable students to participate in decision processes and develop solution techniques for applications encountered in current and future financial environments. The program focuses on the analytical methods necessary for effective participation in the fields of investment management, risk management, and financial engineering. Significant course work is devoted to the development of mathematical and statistical skills. These skills are necessary to evaluate the uncertain outcomes found in financial applications. The program provides students the opportunity to apply their knowledge and skills to projects that utilize quantitative financial tools and techniques. The MSQFE program seeks to develop student competencies in risk evaluation methods, empirical estimation techniques, valuation theory and techniques, mathematical solution methods, capital budgeting, demand analysis and risk management.

The MSQFE is a 33 semester hour program. The core 24 hours consists of classes required of all students in the program. Students may elect to complete a master's thesis. This option would reduce the number of elective hours from nine to three.

The admission requirements include an earned undergraduate degree from a college or university of recognized standards. In addition to the Oklahoma State University Graduate College's standard requirements, the program's Curriculum Committee will consider the applicant's letters of recommendation, GMAT or GRE score, previous academic performance and financial/statistical modeling experience. The background necessary to complete the program with only 33 hours of course work includes ten hours of calculus, differential equations, statistical methods, intermediate microeconomics and principles of finance.

Additional information about the program is available on the Internet at http://spears.okstate.edu/msqfe/.

—The Doctor of Philosophy Degree. A PhD in business administration with concentration in finance prepares the student for careers in academia, business or government.

The program is designed to meet the needs and objectives of individual students but all students will seek an in-depth understanding of the theoretical foundations of financial economics, and develop research competency and teaching skills. The small class size provides a supportive environment conducive to the exchange of ideas and the development of new insights by both faculty and students.

Students will select finance as their major area of study. Two areas of concentration are also to be selected. As support for the major field of study, each student is required to attain graduate-level competence in economic theory and quantitative methods.

Prerequisites for admission to the program are appropriate basic courses in calculus, statistics, econometrics, and computer science.

Competence in planning and executing research is demonstrated by a dissertation. In addition, each candidate must pass comprehensive qualifying examinations and a final oral examination on the dissertation itself.

Outstanding students with degrees in any field of study may apply. Applications for admission are evaluated on the basis of (1) undergraduate and graduate grade-point averages, (2) score on the Graduate Management Admissions Test, (3) a two- or three-page statement describing goals and academic interests, (4) at least three letters of recommendation, (5) evidence of research potential and (6) a personal interview when feasible. It is the applicant's responsibility to see that all materials related to these criteria are received by the Department of Finance.

Management

Kenneth K. Eastman, PhD - *Associate Professor and Head*

The majority of accomplishments in contemporary society are created through organization and group effort. Whether the goals are to realize success in business or solve the pressing problems of society, organizational systems must be effectively managed to maximize the probability of success.

As an area of study, the field of management offers dynamic, exciting possibilities to students. The field of management is concerned with the analytical process and the application of relevant theory and research to creative problem solving. Examples of such challenges include designing organizational systems, leadership, motivating people, planning courses of action and efficiently allocating and utilizing resources. Since people in the field of management deal with real-world problems, the student should have a deep interest in applying knowledge in problem-solving situations.

The Department of Management offers an undergraduate major in management. In addition, the department offers two options under the management major. These options are human resource management (HRM) and sports management. Students may choose the general management major, or they can pursue a more focused study in one of the two options. The department also offers graduate studies leading to an MBA degree and the PhD degree in business administration in management.

Management

The disciplines spanned by these majors offer dynamic, exciting possibilities to students at all levels. Students may look forward to both intellectual growth and the development of individual capabilities that are in high demand in today's competitive business world.

Each of the majors is concerned with the analytical process and the application of relevant decision tools and information systems, relevant theory and applications, to creative problem solving. While the topics vary from one major to another, the common thread running through each major is the rational process of building systems that make management effective in problem solving and creating teamwork and productivity.

The major in management offers dynamic, exciting possibilities for study and employment. It prepares students for leadership careers with business or non-profit organizations. It involves the study of knowledge bases and applications relevant to management careers. The discipline of management utilizes analytical processes to apply relevant theory and applications to creative problem solving. Some examples of topics include leadership dynamics, strategic management, planning courses of action, organizational behavior and performance, resource allocation and administration and building management systems. Majors are typically employed by organizations of all types and sizes as managers or staff specialists. The major has flexibility so that the student may elect work in allied fields, including entrepreneurship and new venture development. The management major has much to offer for those interested in leadership roles in business and public sector organizations.

Human Resource Management

The work in human resource management is organized as an option under the management major. It is designed to prepare students for careers in human resource management or for management careers in a variety of venues. Students pursuing the HRM option study many topics pertaining to the management and well-being of an organization's workforce. This includes topics such as compensation administration, forecasting demand for personnel, labor relations and collective bargaining, recruitment of potential employees, training and development and others. For those who enjoy working with people, a career as an HRM professional offers many opportunities for career satisfaction and personal development.

Sports Management

The sports industry is a growing segment of our economy. Whether it is at the amateur, college, minor league or professional level, sports organizations are in need of graduates with business savvy. Sports enterprises are becoming increasingly concerned with their "bottom line," and they need employees who have expertise in both business management and the sports industry. As a competitive advantage, our sports management program is one of the few in the country that is housed within a business management department. Our classes offer students the opportunity to gain important business management skills while learning about the unique nature of sports organizations.

Graduate Programs

The Department of Management offers work leading to the Master of Business Administration and the Doctor of Philosophy in business administration degrees.

—The Master of Business Administration (MBA) Degree. (See "Business Administration.")

—The Doctor of Philosophy Degree. The PhD in business administration program administered through the Department of Management provides intensive study in management. It prepares the student for significant professional contributions in university teaching and research.

The program is flexible and individually structured to meet the needs and objectives of the candidate. Emphasis is placed on understanding the analytical and theoretical foundations of business administration, applications in the depth area of specialization and development of research capabilities in the discipline.

The student selects a major such as management (concentrations are available in organizational behavior or strategic management) and two minors. One of the minor areas must be taken in the Spears School of Business. The second minor area may or may not be taken outside the Spears School of Business. As support for the major and minor fields of study, each student is required to attain graduate-level competence in economics, quantitative and research methods.

As prerequisites to the program, all candidates are to have completed appropriate basic courses in calculus and statistics. Likewise, candidates are expected to have a basic competence in the major functional areas of business—accounting, finance, management, management information systems, management science and marketing. Competence in the functional areas is usually attained by documenting that the student has recently completed an appropriate graduate course in each area through a program accredited by the Association to Advance Collegiate Schools of Business (AACSB International).

Competence in planning and executing research must be demonstrated in a dissertation. In addition, each candidate must pass a series of comprehensive qualifying examinations, both written and oral, and a

separate, final oral examination of the dissertation itself. To enhance teaching skills, all PhD students in residence are required to teach on a quarter-time or half-time basis for at least one semester while earning the degree.

Outstanding students with master's degrees in any field of study may apply. The application for admission to the program is evaluated on the basis of (1) undergraduate and graduate grade-point averages, (2) the score on the Graduate Management Admissions Test, (3) a two- or three-page statement describing goals and academic interests, (4) three letters of recommendation, (5) evidence of research potential and (6) a personal interview when feasible. It is the responsibility of each applicant to ensure that all material related to the above criteria is received by the department.

Management Science and Information Systems

Rick L. Wilson, PhD - *Professor and Head*

There is little doubt that emerging technologies of the 21st Century will continue to alter dramatically the way business is conducted. Those who wish to have a leadership role in developing next generation systems should consider a career in information systems and telecommunications. The need for knowledgeable workers with expertise in information systems will continue to increase at substantial rates for the foreseeable future. In fact, a Department of Labor forecast projected that a bachelor's degree in the management science and information systems area will prepare students for five of the top eight fastest growing occupations over the next decade.

The Department of Management Science and Information Systems offers an undergraduate major in management information systems (MIS) with possible options of management science and computer systems (MSCS) and information assurance (IA). It also offers graduate studies leading to master's degrees in telecommunications management (MSTM) and management information systems (MIS). Also, PhD degrees in business administration with an option in MIS, telecommunications management, management science and operations management can be earned.

Undergraduate degrees in MIS require a common foundation of work in disciplines such as mathematics, statistics, behavioral sciences and communications. A second tier of required work consists of the courses required for all Spears School of Business students such as economics, marketing, accounting and management. The third tier of classes are core MIS courses that develop information technology expertise in students.

Management Information Systems (MIS)

The MIS degree focuses on the business applications of information technology. This includes emphasizing necessary skills required in the analysis, development, evaluation and implementation of various information and communication technologies critical for today's Internet-enabled organizations. The integration of information technology throughout all aspects of business coupled with the critical need for responsive information systems has created a strong demand for graduates with expertise in information systems and business administration.

Once MIS students satisfy the first two tiers of requirements mentioned above, they will focus on specialized courses in areas such as systems analysis and design, business programming, database design and management, expert and decision support systems, data mining applications, data communications and network security, management science methods, enterprise resource planning systems and electronic commerce.

The MSCS option allows developing aptitudes in quantitative tools that are especially critical in today's data-driven organization. Additional course work in statistics, operations research, decision analysis and quantitative analysis is possible with an MSCS option.

The Information Assurance option uses the expertise in the department that led OSU to be named a National Center of Excellence in Information Assurance Education by the NSA. This option provides students with in-depth study and hands-on analysis of critical organizational issues in information assurance and security.

Graduate Programs

The Department of Management Science and Information Systems offers courses that lead to the completion of the Master of Business Administration (MBA), the Master of Science in telecommunications management (MSTM), the Master of Science in management information systems (MIS) and the Doctor of Philosophy in business administration (PhD).

—The Master of Business Administration (MBA) Degree. (See "Business Administration.")

—The Master of Science in Telecommunications Management (MSTM) Degree. In response to industry's need for skilled and knowledgeable telecommunications management graduates, Oklahoma State University offers a Master of Science degree in telecommunications management. This program is offered not only through traditional means to on-campus students but also via distance learning technologies to students at remote locations.

The program is currently housed in the Spears School of Business. However, the telecommunications management program draws on the combined expertise of three OSU colleges—the College of Arts and Sciences, the Spears School of Business and the College of Engineering, Architecture and Technology. As a result, the telecommunications management student will have a traditional home department to achieve a depth of knowledge in one discipline while developing broad knowledge in business, technical and communication disciplines.

This program prepares graduates for managing the telecommunications technologies as well as managing in a competitive environment with telecommunications systems. The graduates of this program are likely to be employed by providers or users of telecommunications technologies.

—Telecommunications Management Curriculum. The program curriculum consists of a minimum of 35 credit hours, including six core courses, one laboratory, one practicum and four electives. Students may choose either a part-time or full-time sequence. Full-time students can complete the program in one and one-half years while part-time students may complete it in two years.

MSTM degree candidates have the opportunity to develop broad knowledge in specific elective areas chosen to best fit their career aspirations.

—Admission Requirements. Qualified graduates of colleges and universities of recognized standards are eligible to seek admission to the OSU Graduate College. Applicants must submit the completed application form to the Graduate College with official transcripts of all academic work and degrees received.

In addition to the OSU Graduate College's standard requirements, the telecommunications management program admissions committee will consider students' letters of recommendation, GMAT or GRE scores, previous academic performance and telecommunications experience.

Information about the program is available on the Internet at www.mstm.okstate.edu.

—The Master of Science in Management Information Systems (MIS) Degree. This degree program combines strong theoretical concepts with intense hands-on instruction, helping graduates not only to understand business processes and the concepts behind the information systems they work with, but also develop, modify, use and protect these rapidly-changing computing systems through their technical expertise.

The MS in MIS is a 33 hour program featuring a core of 18 hours, including a business practicum, plus three options to highlight different interest areas: digital business systems, knowledge management systems and information assurance and security. These three options afford the student opportunities, respectively, to focus on software design and implementation, information retrieval and analysis or management of network and information system security to protect information systems against unauthorized intrusion.

Admission requirements for the MS in MIS are similar to the admission requirements for the other master's programs in the Spears School of Business. Information about the program is available on the Internet at http://spears.okstate.edu/msmis/.

—The Doctor of Philosophy (PhD) Degree. The PhD in business administration program administered through the Department of Management Science and Information Systems provides intensive study in management information systems, management science, operations management and telecommunications management. It prepares the student for significant professional contributions in university teaching and research.

The program is flexible and individually structured to meet the needs and objectives of the candidate. Emphasis is placed on understanding the analytical and theoretical foundations of business administration, applications in the depth area of specialization and development of research capabilities in the discipline.

As prerequisites to the program, all candidates are to have completed appropriate basic courses in calculus and statistics. Likewise, candidates are expected to have a basic competence in the major functional areas of business–accounting, finance, management, management information systems, management science and marketing. Competence in the functional areas is usually attained by documenting that the student has recently completed the appropriate graduate courses in each area through a program accredited by the Association to Advance Collegiate Schools of Business (AACSB International).

Competence in planning and executing research must be demonstrated in a dissertation. In addition, each candidate must pass a series of comprehensive qualifying examinations, written and oral, and a separate, final oral examination of the dissertation. To enhance teaching skills, all PhD students in residence are required to teach on a quarter-time or half-time basis for at least one semester while earning the degree.

Outstanding students with master's degrees in any field of study may apply. The application for admission to the program is evaluated on the basis of (1) undergraduate and graduate grade-point averages, (2) the score on the Graduate Management Admissions Test, (3) a two- or three-page statement describing goals and academic interests, (4) three letters of recommendation, (5) evidence of research potential and (6) a personal interview when feasible. It is the responsibility of each applicant to ensure that all material related to the above criteria is received by the department.

Marketing

Joshua L. Wiener, PhD - *Professor and Head*

The Department of Marketing provides two quite significant majors within the SSB. One of these is marketing. This is an exciting field of study leading to a variety of job opportunities both in the private sector and in not-for-profit organizations. Also, it provides an excellent career path to top management within an organization.

The second major provided by the department is international business. Almost every business has international operations or is affected by events, competitors and conditions in the global economy. This opens career opportunities in the field and prepares one for successful management within the domestic economy.

Marketing

Marketing is concerned with the identification of wants and needs by buyers and the development of products, distribution channels, price and communication methods to satisfy those wants and needs. The buyers may be individuals or organizations, and their buying may include products or services. Since the economic system is dependent on the ability of organizations to match resources with marketplace needs, marketing is gaining in prominence every year.

A marketing graduate will likely be involved in performance and management of many traditional areas of decision-making—sales, advertising, logistics and marketing research. In addition, one frequently assists in product planning, developing marketing information systems and general management. Since these tasks are necessary for all types of organizations, employers of marketing graduates include manufacturers, banks, hospitals, retailers and not-for-profit organizations.

The effective marketing manager must possess a perspective and capability that reflect a three-dimensional program of study: (1) a liberal education in the sciences, humanities, behavioral and social sciences, mathematics and communications; (2) an adequate knowledge of the major functional areas of business and (3) a high-level competency in marketing.

One's liberal education is emphasized during the freshman and sophomore years. The study of the functional areas of business begins in the sophomore year and continues into the junior year. During the junior and senior years, the focus is on marketing. In addition to the introductory course that provides an overview of the field of marketing, the student takes courses in areas such as consumer behavior, promotion, sales management, services marketing, electronic commerce, marketing research, channels and international marketing. While studying marketing, one typically selects courses in other fields such as international business, management, information systems, finance, advertising and public relations to support a particular career choice within the marketing field.

Graduate Programs

The Department of Marketing offers work leading to the Master of Business Administration and the Doctor of Philosophy in business administration degrees. In addition, the Department of Marketing in conjunction with the Management Science and Information Systems department offers work leading to SAS/OSU Data Mining Certificate and Graduate Certificate in Business Data Mining.

—The Master of Business Administration (MBA) Degree. (See "Business Administration.")

—The Doctor of Philosophy Degree. The PhD in business administration program through the Department of Marketing provides intensive study in marketing. It prepares the student for significant professional contributions in university teaching and research or staff positions in business or government.

The program is quite flexible and individually structured to meet the needs and objectives of each candidate. The program is designed to create scholars and researchers in the field of marketing. Highly student oriented, the program focuses on training individuals in current marketing theory and research techniques. Collaboration between students and faculty is strongly encouraged.

—Program Content. The student will take 15 hours of PhD seminars in marketing. The student must also complete a nine-hour minor in another discipline such as economics, management, sociology or psychology. As support for the major and minor fields of study, extensive course work (normally 18 credit hours) in the area of quantitative/research methodology is required.

As prerequisites to the program, all candidates are to have completed appropriate basic courses in calculus and statistics. Likewise, candidates are expected to have a basic competence in the major functional areas of business— accounting, finance, operations management, organizational theory, economics and marketing. Competence in the functional areas is usually assumed for candidates having recently completed an appropriate graduate course in each area in an MBA program accredited by the Association to Advance Collegiate Schools of Business.

—Application Procedure. Outstanding undergraduate or graduate students from any field of study may apply. For those with an MBA, the program will normally consist of two years of course work and two years of dissertation work. For those without a master's degree, the plan of study for the PhD degree will typically allow for the granting of an MBA prior to completion of the PhD degree. Applications for admission to the program are evaluated on the basis of (1) undergraduate and graduate grade-point averages, (2) the score on the Graduate Management Admissions Test or Graduate Record Examination, (3) a two- or three-page statement describing goals and academic interests, (4) three letters of recommendation, (5) evidence of research potential and (6) a personal interview when feasible. It is the responsibility of each applicant to ensure that all material related to the above criteria is received by the Department of Marketing. Application forms and detailed explanation of the PhD degree in business administration with an emphasis in marketing are available through the department.

—SAS/OSU Data Mining Certificate. In the last ten years due to rapid advances in computing power and the availability of massive data bases, there has been a strong demand for students trained in the area of data mining. In response to this demand, the Department of Marketing, with the active support of the Department of Management Science and Information Systems (MSIS) partnered with SAS, leading provider of data analysis and data mining software, to offer graduate students an opportunity to earn SAS/OSU data mining certificate by taking 12 credit hours of graduate courses offered by Marketing and MSIS faculty.

—Program Content. The program curriculum (developed in partnership with SAS) focuses on establishing an understanding of the functionality of large databases, the methods used to access and manipulate data from such databases, and the methods used to analyze data patterns (both statistical and non-statistical), make predictions/forecasts and interpret such analyses in the context of business applications. Established courses from the Marketing Department and the MS in MIS program curriculum along with some newly-developed courses, including hands-on courses to build actual experience in mining large databases, give students the opportunity to develop relevant skills in data mining. Students take 6 credit hours of core courses and 6 credit hours of approved elective courses.

More details about this program are available on the Web site: http://spears.okstate.edu/future/graduate/degrees/certificate/sasosu.

—Graduate Certificate in Business Data Mining. This certificate program is modeled after the SAS/OSU Data Mining Certificate except the intended target audience for this certificate are working professionals who may not want to pursue a full blown masters program but are willing to enhance their data mining skills by taking focused courses. The classes in this program are offered via the distance-learning (online) mode enabling non-traditional working professionals to complete the graduate certificate in business data mining while continuing to work.

—Program Content. The program curriculum (developed in partnership with SAS) is similar to the SAS/OSU Data Mining Certificate curriculum. The core courses are the same between the two programs, but the elective courses are somewhat different. Students take 6 credit hours of core courses and 6 credit hours of approved elective courses.

More details about this program (including procedure and admission requirements) are on the Web site: http://spears.okstate.edu/future/graduate/degrees/certificate/datamining.

International Business

The major in international business provides a fundamental understanding of the global business environment and develops decision-making capabilities in the international setting. It spans cultures, economic conditions, political and legal systems and competitive climates.

This major has the same General Education and Common Body requirements as all other SSB majors. In addition, it includes specific international business courses, international environment courses, modest foreign language competency and a minor field in any business field. Students are encouraged to seek study-abroad opportunities and other avenues for expanding their cross-cultural understanding. The international business major requires 39 credit hours.

Center for Health Sciences

Stanley E. Grogg, DO - *Interim President, Center for Health Sciences*
Jenny Alexopulos, DO - *Vice President for Academic Affairs and Senior Associate Dean*
Leigh B. Goodson, PhD - *Vice President for Sponsored Programs, Research and Institutional Advancement*
James Hess, EdD - *Vice President for Healthcare Administration and COO*
Brad Walker - *Associate Vice President for Development*
Gary L. Slick, DO - *Associate Dean for Graduate Medical Education*
Vivian M. Stevens, PhD - *Associate Dean for Enrollment Management*
Bruce Benjamin, PhD - *Associate Dean for Biomedical Sciences*
Joan E. Stewart, DO, MPH - *Associate Dean for Clinical Education*
William Pettit, DO - *Associate Dean for Rural Health*
David R. Wallace, PhD - *Assistant Dean for Research*

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College of Osteopathic Medicine

As health care grows more complicated, primary care physicians will be needed more than ever. The OSU College of Osteopathic Medicine is helping to fulfill a critical need by training physicians who are able to treat every member of the family and can simplify the health care process by applying his or her knowledge to treat the whole person.

The majority of graduates (59%) of the OSU-College of Osteopathic Medicine practice in the primary care fields—family medicine, pediatrics, internal medicine and obstetrics/gynecology. Others do their postdoctoral training in other specialties and subspecialties—anesthesiology, neurology, psychiatry, radiology, surgery, emergency medicine, dermatology and oncology, to name a few. Regardless of the field they pursue, students are trained to be excellent physicians, starting with a strong background in general osteopathic medicine.

The College was founded in 1972 in response to a physician shortage in the small towns and rural areas of our state. The College opened its doors in 1974 and graduated its first class in 1977. In 1988, the College was merged with Oklahoma State University and reemphasized its mission to prepare students to be primary care physicians with emphasis in rural medicine. In 2001, the Oklahoma State legislature added another designation by creating the OSU Center for Health Sciences – the umbrella organization for the College of Osteopathic Medicine: graduate programs in biomedical and forensic sciences were added to the curriculum.

The main campus is located on 16 acres along the west bank of the Arkansas River with a full view of downtown Tulsa. It houses extensive conference facilities, expanded classroom space and a medical bookstore. On the clinical campus, a half-mile south, is the OSU Health Care Center. First opened in 1981, this clinical teaching facility can accommodate up to 3,000 patient visits a month. It is both a teaching clinic for medical students, interns and residents, and a health care resource for residents of the west Tulsa area. The Health Care Center provides comprehensive health care and is staffed by licensed physicians and other health care professionals who supervise students in the care of patients. Three satellite OSU Physician health care centers are also located in downtown Tulsa, serving more than 100,000 patient visits annually. Additionally, in 2006, Senate Bill 1771 was passed which created the OSU Medical Authority and Trust, allowing for a 50 year Academic Affiliation Agreement between OSU-CHS and Tulsa Regional Medical Center. The agreement secures OSU's residency programs at the hospital, which is operated under a City of Tulsa trust and managed by St. John Health Systems; the facility is known as OSU Medical Center.

Osteopathic Medicine

Promoting a patient-centered approach to health care, osteopathic physicians are concerned with the entire patient and traditionally have excelled in general and family health care. The doctor of osteopathic medicine is a fully-trained physician who selectively utilizes all accepted scientific modalities to maintain and restore health. Osteopathic physicians and surgeons are licensed to practice all phases of medicine, and offer their patients an added dimension of health care through osteopathic manipulation, a hands-on technique that uses palpation and manipulative procedures of the musculoskeletal system to diagnose and treat illness.

Minimum Admission Requirements

At the time of application, the applicant must have an overall grade-point average of at least 3.00 (on a 4.00 scale), a pre-professional science GPA of at least 2.75, and a minimum of 7 average score on the Medical College Admissions Test (MCAT). Applicants must take the MCAT. They are encouraged to take the examination in the spring of the year prior to making application. Under special circumstances, the College may use discretion to admit students who do not meet these minimum requirements.

At the time of entry, the applicant must have completed:

1. At least 90 semester hours and not less than 75 percent of the courses required for the baccalaureate degree at a regionally-accredited college or university;
2. Satisfactory completion of the following courses, with no grade below a "C" (2.00 on a 4.00 scale):
   English (six semester hours)
   Biology (eight semester hours), including laboratory
   Physics (eight semester hours), including laboratory
   General chemistry (eight semester hours), including laboratory
   Organic chemistry (eight semester hours), including laboratory
3. Applicants must have taken at least one upper-division (3000-4000 level) science course, including laboratory. Examples include, but are not limited to: biochemistry, comparative anatomy, cellular biology, embryology, microbiology or molecular biology, histology, physiology, and genetics.

The annual application deadline is February 1. The deadline for supplemental application materials is March 1.

An on-campus interview with the Applicant Interview Committee is by invitation only. Interviews are conducted by clinical and basic science faculty members, as well as alumni. Applicants must participate in the interview to qualify for further consideration. Interview results and other data submitted will be considered when determining which applicants have demonstrated appropriate levels of scholarship, aptitude and motivation for admission to the program. Class size is limited to 115 students.

Selection Factors

The College considers applications for admission from all qualified candidates without regard to age, gender, creed, race, disability, or national origin. Preference is given to Oklahoma residents. Those who have experienced unequal educational opportunities for social, cultural or racial reasons are particularly urged to apply. Applicants must be U.S. citizens or permanent residents of the U.S. Non-U.S. citizens must have a permanent resident visa ("green card") at the time of application in order to be considered for admission.

College Curriculum

Through an integrated model of Biomedical and Clinical Sciences, the curriculum at the College emphasizes primary care. The four-year program emphasizes the integration of biomedical and clinical systems in which subject matter areas are coordinated and clinical problems are continuously introduced in greater depth and complexity.

During the first year students are introduced to core concepts in anatomy, physiology, biochemistry and microbiology and diagnostic imaging. Students begin to develop competence in osteopathic clinical skills such as history taking, physical examination, diagnosis and patient interviewing.

Biomedical Science courses such as pathology and pharmacology are emphasized in the second year, along with transitions into clinical medicine through case-based learning, clinical problem-solving strategies and recognition and understanding of common diseases and conditions frequently seen in primary care settings. Small group learning sessions permit the students to develop critical thinking skills in the clinical context. Students' clinical skills are honed through interactive lab sessions and simulated clinical experiences. Preventive medicine, management of psychiatric disorders in primary care, and multicultural issues in health care are among other topics taught during the second year.

The final 22 months are clinically oriented and community based, consisting of clerkship experiences in hospitals and clinics where students observe patient care and participate in the evaluation and treatment of patients under physician faculty supervision.

The student has rotations through primary care services including surgery, obstetrics-gynecology, pediatrics, psychiatry, internal medicine, family medicine and emergency medicine. The balance of the clerkship program consists of supervised patient contact in small towns and rural areas throughout Oklahoma. The student spends at least one month at each of several locations including a community hospital, family medicine clinic, family practice clinic, rural and urban family practice, and also several elective opportunities.

Students graduate from the four-year program with the Doctor of Osteopathic Medicine (DO) degree. Following graduation, students will enter a residency training program in one of a large number of specialty areas. This training period lasts a minimum of three years with several specialties requiring up to five years of postgraduate education.

The Oklahoma State University College of Osteopathic Medicine is located at 1111 West 17th Street, Tulsa, Oklahoma 74107-1898. The phone number is (918) 582-1972 or call toll-free, (800) 677-1972.

Detailed information on the College of Osteopathic Medicine can be found in the College's academic catalog or on the Internet www.healthsciences.okstate.edu.

Accreditation

The College is accredited by the Council on College Accreditation (COCA) of the American Osteopathic Association, the recognized accrediting agency for institutions that educate osteopathic physicians. The Oklahoma State Regents for Higher Education are empowered by the Oklahoma Constitution to prescribe standards for higher education applicable to each institution in the Oklahoma State System of Higher Education.

Financial Aid

Financing a medical education should be seriously considered. The primary responsibility for meeting your educational costs rests with the student and his or her family; however the Office of Student Financial Aid makes every attempt to assist him or her financially.

The Office of Student Financial Aid supports the mission of the University by enabling students and families to reduce or eliminate financial barriers that might prohibit their participation in the programs offered by OSU Center for Health Sciences. The office administers need-based financial aid programs funded by federal, state, University, and private sources in the form of Federal Stafford loan, Perkins loan, Graduate PLUS loan, employment, as well as need- and merit-based scholarships. The office also administers the Federal non-need based loan programs (Unsubsidized) and provides information and support to students interested in the alternative loan options available to them.

Tuition at the College of Osteopathic Medicine (for the 2008-2009 school year) totals $19,971 per year for Oklahoma residents and $37,893 per year for out-of-state residents. The tuition amounts do not include additional fees that are required.

Most financial aid is renewable on an annual basis, provided there is adequate funding and the student remains eligible (enrolled in a matriculated program, in good academic standing, and with continued need for need-based aid. To qualify, each student should file the Free Application for Federal Student Aid (FAFSA) by February 15th. Students are encouraged to continue to file after this date; however, consideration for funds will be given on a first-come basis.

The FAFSA and other required applications may be obtained by contacting:

Office of Financial Aid
OSU College of Osteopathic Medicine
1111 West 17th Street
Tulsa, OK 74107-1898
Students may apply online at www.fafsa.ed.gov/
(School code is G11282).

Graduate Medical Education

The College administers internship and residency programs in Tulsa; Oklahoma City; Durant; Tahlequah; Enid; Joplin, Missouri and Pine Bluff, Arkansas and maintains close contact with its graduates, offering assistance in setting up a practice following the graduate's internship and residency training.

The College offers MS, PhD, DO/MS, and DO/PhD graduate degree programs in biomedical and forensic sciences. The programs are an excellent option for students who wish to pursue careers in medical research or academic medicine.

The MS program offers a thesis and non-thesis option, with both programs designed to be accomplished in two years, with a minimum of 32 credit hours. The PhD program is designed to be accomplished in four years, with a minimum of 90 credit hours.

The DO/PhD program is designed to be accomplished in a minimum of seven years. The first two years are the basic science years of the program. The middle three years are graduate study, research and dissertation of the PhD program. The final two years are the clinical sciences years of the DO program.

The DO/MS program is designed to be accomplished in a minimum of five years. The first year is primarily the graduate portion of the program. The last four years consist of the medical portion of the degree, with any remaining graduate work completed during the first year of medical school and subsequent summers. DO/MS students are encouraged to pursue a non-thesis Master's Degree.

The Graduate Program in Forensic Sciences develops skills for research, management, and practice in the forensic sciences. The College offers a Master of Science (MS), a Master of Forensic Science Administration (MFSA), and Graduate Certificate in Questioned Documents. All programs offer an online curriculum, with the MS research emphasis conducted on the Center for Health Sciences campus.

A DO/MBA program was added in 2004, offering accelerated studies for admitted and current DO students to gain their MBA in a single year through the William S. Spears School of Business. The 36-hour program includes 30 hours of the MBA course work in the fall and spring semesters with six selective MBA hours taken in the summer.

Honor and Service Organizations

The College emphasizes community service, and many students volunteer their time in giving school and athletic physicals, visiting nursing homes, working with school children, and working at College-sponsored health fairs or the annual Osteopathic Scrub Run. Listed below are official student organizations.

American College of Osteopathic Emergency Physicians

American College of Osteopathic Pediatricians

American College of Osteopathic Family Physicians—Undergraduate Chapter

American Medical Student Association

American Medical Women's Association

Association of Military Osteopathic Physicians and Surgeons

Association of Native American Medical Students

Atlas Fraternity (social)

Christian Medical and Dental Society

Delta Omega (national osteopathic sorority)

Inter-Club Council

International Medical Club

Osteopathic Sports Medicine Society

Sigma Sigma Phi (honor society)

Student Associate Auxiliary

Student National Medical Association

Student Osteopathic Association of Radiology

Student Osteopathic Internal Medicine Association

Student Osteopathic Medical Association

Student Osteopathic Psychiatry Association

Student Osteopathic Research Association

Student Osteopathic Surgical Association

Student Senate

Undergraduate American Academy of Osteopathic Medicine

Wilderness Medical Association

Center for Veterinary Health Sciences

Michael D. Lorenz, DVM - *Dean*
Chris Ross, DVM, PhD - *Associate Dean for Academic Affairs*
Jerry Malayer, PhD - *Associate Dean for Research and Graduate Education*

205 McElroy Hall • (405) 744-6651 • fax: (405) 744-6633
Web site: www.cvhs.okstate.edu

Doctor of Veterinary Medicine Program

A primary objective of the Center for Veterinary Health Sciences is to educate veterinarians for private practice. In addition, the professional curriculum provides an excellent basic biomedical education and training in diagnosis, disease prevention, medical treatment and surgery. Graduates are qualified to pursue careers in many facets of veterinary medicine and health-related professions.

Accreditation

The College has full academic accreditation status approved by the Council on Education of the American Veterinary Medical Association. Accreditation is based on an assessment of 11 essential factors, namely, the college's organization, its finances, facilities and equipment, clinical resources, library and learning resources, enrollment, admissions, faculty, curriculum, continuing and post-graduate education, and research.

Preparatory Requirements

In preparation for the professional DVM training the student must complete both prescribed and elective collegiate courses. The minimum prescribed preparatory studies, totaling 64 semester hours of undergraduate course work, can be completed in three calendar years. Most of the entering veterinary medical students in recent years have had three to four years of preparatory training, often earning a bachelor's degree.

Admission Requirements

Collegiate course requirements for entry into veterinary medical college may be completed at any accredited university or college that offers the required courses. Pre-veterinary curricula are available at Oklahoma State University through the Division of Agricultural Sciences and Natural Resources and through the College of Arts and Sciences. Both offer programs of study in pre-veterinary medical sciences, which provide for the award of a bachelor's degree after successful completion of the first or second year of veterinary medical studies.

Requests for information on pre-veterinary medical study programs and applications for admission to such programs should be addressed to the dean of either the Division of Agricultural Sciences and Natural Resources or the College of Arts and Sciences.

Listed below are the *minimum* course prerequisites for consideration for admission to the Center for Veterinary Health Sciences:

English —nine semester hours including six hours of composition and three hours of an English elective. Course work in speech or technical writing is encouraged.

Chemistry—general inorganic chemistry including labs; an organic chemistry series (8 semester hours) designed for pre-veterinary and pre-medical students that includes both the aliphatic and aromatic compounds or survey course with lab (5-8 hours); and 3 semester hours of biochemistry.

Physics—Eight hours of general physics.

Mathematics—three semester hours. Minimum level of college algebra or higher math. Course work in statistics is not acceptable.

Biological science—16 semester hours. Courses in zoology, general biology, microbiology and genetics are required. These courses must include laboratory work.

Animal Nutrition—three semester hours of the basic principles of animal nutrition, including digestion, absorption and metabolism of the various food nutrients and ration formulation. Courses in human nutrition are not acceptable.

Humanities and social science—six semester hours.

Business electives—although not required, courses in business are encouraged.

The information on admission requirements was current at the time of publication but is subject to change. The admission requirements are under annual review and changes may be made at any time.

Scholarships

The College has scholarships which may be available to matriculating veterinary medicine students; most are based on academic achievement.

Application Process

Admission is competitive and enrollment in veterinary medicine is restricted. Applications for admission must be submitted by October 1, and a new class enters the College each year at the beginning of the subsequent fall semester.

Applicants who are legal residents of Oklahoma will be given first priority. In addition, a limited number of nonresidents will be selected. Questions about residency should be directed to the Office of the Registrar, Oklahoma State University. Requests for application materials should be directed to the manager of admissions and records, Center for Veterinary Health Sciences.

Students are admitted as candidates for the Doctor of Veterinary Medicine degree on the basis of records of academic performance in preparatory studies, GRE and Biology subject tests, and references to determine personal characteristics and career motivation. Details concerning admissions pathways and procedures are available via the Center for Veterinary Health Sciences Web site www.cvhs.okstate.edu/FutureStudents/.

The veterinary curriculum extends over four calendar years. The first two academic years conform to the normal semester system of the University. The last two academic years are continuous, with the fourth starting shortly after completion of the third. The fourth year is clinical in nature and classes are primarily in the Boren Veterinary Medical Teaching Hospital. The fourth year is organized into three-week rotations to provide for lower faculty-student ratio and more efficient use of clinical facilities and resources.

Veterinary Biomedical Sciences Graduate Program

Kenneth Clinkenbeard, DVM, PhD - *Professor and Coordinator of Graduate Studies*

The veterinary biomedical sciences (VBS) graduate program is a multidisciplinary program intended to provide a broad base of research interests to address individual student interests. The program is administered within the Center for Veterinary Health Sciences but may involve faculty outside of the college. Programs of research and study leading to the degrees of Master of Science and Doctor of Philosophy are available within the broad areas of focus: infectious diseases, pathobiology, physiological sciences. The Master of Science degree is also available in the clinical sciences. The program is designed to prepare individuals for careers in teaching and research, and specialization is possible within each area dependent upon faculty interests, student needs and available funding.

Current areas of research focus include molecular, cell and developmental biology, clinical sciences (including laser applications and oncology), infectious diseases (including vector-borne diseases, bacterial and viral diseases in wild and domestic animals), pathobiology and toxicology. Faculty and their specific areas of interest are available through the graduate coordinator or online at www.cvm.okstate.edu/graduate.

—Prerequisites. Candidates for admission must possess at least a bachelor's degree or equivalent, with a background in biological or physical sciences. While there are no absolute grade requirements, applicants with combined verbal, quantitative and analytical GRE total scores of 500, 700 and 4.0 or greater GPAs (last 60 hours) of 3.0 or greater, will receive strongest consideration. Provisionary status may be awarded to those not having these credentials with specific requirements dependent on recommendations of the departmental graduate faculty.

—The Master of Science Degree. The MS may be earned with 30 credit hours beyond a bachelor's degree or 21 hours beyond the DVM degree, including not more than six credit hours for the thesis. The plan of study is designed to meet the student's needs and interests and typically includes two credits of seminar, one course in statistics, and courses in molecular or cell biology, immunology or physiology. The student must also pass a final oral examination covering the thesis and related course work.

—The Doctor of Philosophy Degree. The PhD requires a total of 90 credit hours beyond the bachelor's degree or 60 hours beyond the MS or DVM degree, including up to 45 credit hours for research and dissertation. The plan of study is designed to meet the student's needs and interests and typically includes courses in biochemistry, statistics and seminar. Written and oral qualifying examinations are required. Students must prepare a research proposal and complete a dissertation based on original research.

—Application Procedure. Applications are accepted at any time; however, all documents should be received prior to March 1 for admission to the fall semester, and July 1 for the spring semester. Applicants are required to submit scores for the Aptitude Test portion of the Graduate Record Examination. (The Advanced Test in Biology is also recommended.) International applicants are required to take the English Proficiency Exam (a passing score on the TOEFL of 550 or above on paper-based or 250 or above on computer-based exam), unless a student is from a country where English is a first language. The Test of Spoken English (a passing score on the TSE of 220 or above), is required for students receiving graduate teaching assistantships.

Applicants generally select a major professor before they are admitted to the VBS program. They are urged to correspond with a member of the faculty whose interests reflect their own before making application. Information about faculty research interests is available upon written request to the graduate coordinator. After acceptance to the graduate program, the student and major professor select an advisory committee and develop a plan of study consistent with the VBS graduate group requirements and subject to approval of the dean of the Graduate College.

—Assistantships. A limited number of graduate teaching and research assistantships are available.

Internship and Residency Programs

Internships and residency programs in clinical medicine and surgery are offered through the Department of Veterinary Clinical Sciences. Residency programs in pathology are offered through the Department of Veterinary Pathobiology.

Veterinary Clinical Sciences

Charles G. MacAllister, DVM, DACVIM - *Ricks-Rapp Professor and Head*

Internship and Residency Programs

The department offers graduate professional programs (internships and residencies). Internships are one-year post-DVM clinical programs in small or large animal medicine and surgery.

Internships are designed in part to prepare students for residencies or graduate academic programs. Currently residencies are offered in small animal medicine and surgery, small animal medicine, equine internal medicine, equine surgery, equine theriogenology, food animal medicine and surgery, and anesthesiology.

Residencies are three-year clinical programs in various disciplines designed in part to prepare for specialty board certification. Currently, residencies are offered in small animal surgery, small animal internal medicine, equine internal medicine, equine surgery, food animal medicine and surgery, anesthesia, and theriogenology. Graduate academic programs may be available in association with residencies.

—Application Procedure. Applications are accepted at any time and are considered as positions become available. Most open positions are listed in the Veterinary Internship/Residency Matching Program at www.virmp.org.

Veterinary Pathobiology

James H. Meinkoth, DVM, PhD, DACVP - *Interim Department Head*

Residency programs in anatomical and clinical veterinary pathology and veterinary microbiology are offered. Candidates must have the DVM degree or equivalent. The anatomical and clinical pathology residency programs are three years with options to enter into the PhD program. The programs are designed for those interested in diagnostic veterinary pathology and board certification by the American College of Veterinary Pathologists. Residency training occurs through the Veterinary Medical Teaching Hospital and through the Oklahoma Animal Disease Diagnostic Laboratory. The program involves extensive diagnostic casework on primarily domestic animals and includes weekly case conferences and seminars. In addition, abundant archived materials are available for the specialty board preparation. The clinical microbiology program is a two-year program designed to prepare individuals for a career in veterinary microbiology. In addition to pursuing the master's degree in infectious diseases, individuals will participate, on a limited basis, in the instruction of infectious disease courses in the veterinary curriculum, as well as rotate through the bacteriology, virology, mycology and serology sections of the Oklahoma Animal Disease Diagnostic Laboratory. The program is designed to prepare students for opportunities in several areas, including diagnostic veterinary medicine, teaching, board certification in the American College of Veterinary Microbiologists, and PhD/research programs. For more information about graduate degrees, see "Veterinary Biomedical Sciences Graduate Programs."

—Application Procedure. Applications for the residency program are accepted at any time. Usually one new residency training position is available each year. Open positions are listed in the "Educational Opportunities" section of the *Journal of the American Veterinary Medical Association.*

University Faculty

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Natalie Still, BS

Coordinator, Student Development
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Lecturer
Sharon T. Ford, PhD

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Marvin L. Stone, PhD (emeritus)

Sarkey's Distinguished Professor
John B. Solie, PhD, JD, PE

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Assistant Researcher
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Assistant Extension Specialist
Albert Sutherland, MS

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Director, National Institute for Microbial Forensics and Food & Agricultural Biosecurity (NIMFFAB)
Jacqueline Fletcher, PhD

Assistant Director, National Institute for Microbial Forensics and Food & Agricultural Biosecurity (NIMFFAB)
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Richard Nelson, PhD (adjunct)
Thomas W. Phillips, PhD (adjunct)
Hal Reed, PhD (adjunct)
James Reinert, PhD (adjunct)
Marilyn Roossinick, PhD (adjunct)
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Vincent Russo, PhD (adjunct)
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Russell E. Wright, PhD (emeritus)

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Kiran Mysore, PhD (adjunct)
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Astri C. Wayadande, PhD

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Karen Hickman, PhD (plant ecology)
Arthur Stoecker, PhD
(natural resource economics)

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(soil anthropod ecology)
Kefyalew Desta, PhD
(sustainable agricultural systems)
Chad Penn, PhD
(soil environmental chemistry)

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Robert M. Taylor, PhD
- (adjunct assistant professor)

SCHOOL OF ARCHITECTURE

Professor and Head
Randy Seitsinger, MArch, AIA

Professors
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Suzanne D. Bilbeisi, MArch, RA
Nigel R. Jones, MArch, RIBA, RA
Steve E. O'Hara, MArchEngr, PE
Jeffrey K. Williams, MArch, RA
John Womack, MArch, RA

Associate Professors
Jeanne Homer, MArch, AIA
Khaled Mansy, PhD
John Phillips, MArchEngr, PE
Tom Spector, PhD, AIA

Assistant Professors
Seung Ra, MArch
Michael Rabens, PhD
Carisa Ramming, MArchEngr, PE
Nathan Richardson, MArch
Awilda C. Rodriguez, PhD
Paolo Sanza, MArch, RA
Jerry L. Stivers, PhD

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CONSTRUCTION MANAGEMENT TECHNOLOGY

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Assistant Professors
Miles Hunter, MS, PE
Heather Yates, MS

ELECTRICAL ENGINEERING TECHNOLOGY

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Ellis C. Nuckolls, MS, PE

Sr. Research Engineer
Bill Holloway, CET

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Jim L. Hanson, MS, CSP

Visiting Assistant Professor
John Stevens, PhD, CIH

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Emeritus Regents Professor and Director, Institute for Protective Apparel Research and Technology
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Byoungho Jin, PhD
Glenn Muske, PhD
Shiretta Ownbey, PhD
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Hyun-Joo (Hannah) Lee, PhD
Melinda Lyon, PhD
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Adriana Petrova, PhD
Jane Swinney, PhD

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Associate Director and Associate Professor
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Regents Professor and William E. Davis Chair
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Radesh Palakurthi, PhD, MBA

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Jerrold Leong, PhD

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Sheila Scott-Halsell, PhD
Lisa Slevitch, PhD
Chun-Hung (Hugo) Tang, PhD

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Philippe Garmy, MS

Clinical Instructor and Executive Chef
Heidi Hoart, MS

Clinical Instructor and General Manager, The Atherton Hotel at OSU
Rebecca Eastham

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Assistant Director
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Bryan Close Professor
Amanda Harrist, PhD

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Christine Johnson, PhD
Robert Larzelere, PhD
Amanda Morris, PhD
Sissy Osteen, PhD

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Matthew Brosi, PhD
Whitney Brosi, PhD
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Kami Schwerdtfeger, PhD
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Glade Topham, PhD

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Linda Sheeran, PhD

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Jamie Johnson, MS
Jarrod Marcum-Noftsger, MS
Dianna Ross, MS
Kelly M. Roberts, MS
Sheila Rowland, MS
Lisa Weis, MS

Parenting Specialist
Deborah Richardson, MS

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Professor and Associate Department Head
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Solo Kuvibidila, PhD
Edralin Lucas, PhD
Brenda Smith, PhD

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Arpita Basu, PhD
Stephen Clarke, PhD, RD
Deana Hildebrand, PhD
Lenka Shriver, PhD

Research Associate Professor
Stephany Parker, PhD

CNEP Coordinator
Debra Greene-Garrard, MS

Clinical Instructors
Julie Huber, MS, RD
Carol Jarrett, MS, RD

Director of Didactic Program in Dietetics
Carol Beier

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SCHOOL OF ACCOUNTING

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Patrick B. Dorr, PhD, CPA
Gary K. Meek, PhD
Thomas S. Wetzel, PhD
Charlotte J. Wright, PhD, CPA

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Carol B. Johnson, PhD, CPA
Tony Kang, PhD
M.E. Lacy, PhD, CPA
Maryanne M. Mowen, PhD, CMA
Sandeep Nabar, PhD

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Lance M. Fisher, PhD
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Angela Spencer, PhD
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Orley M. Amos, Jr., PhD
Michael J. Applegate, PhD
Kevin Currier, PhD
Joseph M. Jadlow, Jr., PhD
Keith Willett, PhD

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Mary N. Gade, PhD
Jaebeom Kim, PhD
Tipton F. McCubbins, JD
Andrew L. Urich, JD

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Bidisha Lahiri, PhD
Laurie A. Lucas, PhD
Michael D. Morris, PhD
Abdul Munasib, PhD
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Bruce Barringer, PhD
Vance Fried, JD

Assistant Professor
Justin Webb, PhD

Clinical Faculty
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Regents Service Professor
Janice W. Jadlow, PhD

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Ramesh P. Rao, PhD
Betty J. Simkins, PhD
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David A. Carter, PhD
William H. Dare, PhD
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Joel Harper, PhD
Ronald K. Miller, PhD

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Bilal Erturk, PhD
Ali Nejadmalayeri, PhD

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Kenneth K. Eastman, PhD

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Debra L. Nelson, PhD
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Chalmer E. Labig, Jr., PhD
James Pappas, PhD
J. Craig Wallace, PhD
Margaret White, PhD

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W. Matthew Bowler, PhD
Bryan Edwards, PhD
Rebecca Greenbaum, PhD
Timothy A. Hart, PhD
Scott Johnson, PhD

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Regents Professor
Ramesh Sharda, PhD

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David C. Ho, PhD
Tim C. Ireland, PhD
Marilyn G. Kletke, PhD
G. Daryl Nord, PhD
Jeretta H. Nord, EdD
Rathindra Sarathy, PhD
Mark Weiser, PhD

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Dursen Delen, PhD
Nicholas Romano, PhD

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David P. Biros, PhD
Jin Kyu Lee, PhD

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Professor and Head
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Regents Professor
John C. Mowen, PhD

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Goutam Chakraborty, PhD
L. Lee Manzer, PhD

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Xiang Fang, PhD
Karen Flaherty-Pappas, PhD
Gary L. Frankwick, PhD
James Hromas, PhD
Marlys Mason, PhD
Ajay Sukhdial, PhD
Tracy Suter, PhD
Kevin Voss, PhD

Assistant Professors
Susan Wei, PhD
Alex Zablah, PhD

CENTER FOR HEALTH SCIENCES

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Bruce Benjamin, PhD

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Doris K. Patneau, PhD
Kent S. Smith, PhD

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Anne Weil, PhD
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Michael H. Pollak, PhD
Sue K. Redwood, PhD
Nancy Van Winkle, PhD

Associate Professor
Richard A. Wansley, PhD

Clinical Assistant Professor
Teri L. Bourdeau, PhD

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Professor and Interim Chair
Charles G. Sanny, PhD

Professors
Martin W. Banschbach, PhD
Robert S. Conrad, PhD
Charles G. Sanny, PhD

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Franklin R. Champlin, PhD
Rashmi Kaul, PhD
Gregory W. Sawyer, PhD

Assistant Professors
Gervald Köhler, PhD
Dorothy Turetsky, PhD

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Robert W. Allen, PhD

Professor
R. Tom Glass, DDS, PhD

Assistant Professor
Jarrad R. Wagner, PhD

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Alexander J. Rouch, PhD

Professors
Craig Stevens, PhD
David R. Wallace, PhD

Associate Professors
Bruce Benjamin, PhD
Warren E. Finn, PhD
Randy S. Wymore, PhD

Assistant Professors
J. Thomas Curtis, PhD
Kathleen S. Curtis, PhD
Randall L. Davis, PhD

CLINICAL EDUCATION

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Joan E. Stewart, DO, MPH

FAMILY MEDICINE

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Chuck Thurman, DO

Professors
Jenny J. Alexopulos, DO
Larry D. Cherry, DO
William Stephen Eddy, DO, MPH

Associate Professors
James Hess, EdD
William J. Pettit, DO
Thomas R. Pickard, DO

Assistant Professor
Lora D. Cotton, DO

Clinical Assistant Professors
Jeffrey Chasteen, DO
Regina Lewis, DO
Cornelia O. Mertz, DO
Susan Steele, DO

Clinical Assistant Professors - Emergency Medical Section
Dennis E. Blankenship, DO
Mark E. Blubaugh, DO
Jennifer Jo Eischen, DO
Michele M. Fowler, DO
Gavin Gardner, DO
David Gearhart, DO
Aaron Q. Lane, DO
John C. Stepanek, DO
William Wylie, DO

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Professor and Chair
Damon L. Baker, DO

Professors
David F. Hitzeman, DO
Paul B. Rock, PhD, DO
Gary L. Slick, DO

Associate Professor
Johnny R. Stephens, PharmD

Assistant Professors
Scott Hendrickson, DO
Mousumi Som, DO

Clinical Associate ProfessorS
John DeWitt, DO
Daniel A. Nader, DO

Clinical Assistant Professors
A. Nicole Farrar, DO
Jeffrey S. Stroup, PharmD

OBSTETRICS & GYNECOLOGY

Clinical Assistant Professor and Chair
Joseph R. Johnson, DO

Assistant Professor
Terry K. Badzinski, DO

Clinical Associate Professor
William Po, MD

Clinical Assistant Professor
Fred Fumia, DO

Research Associate Professor
Anil K. Kaul, MD

OSTEOPATHIC MANIPULATIVE MEDICINE

Associate Professor and Chair
Robin Dyer, DO

Professor
Kenneth E. Graham, DO

Associate Professor
Leigh B. Goodson, PhD

Clinical Professor
Harriet H. Shaw, DO

Clinical Assistant Professor
Kelley Jean Joy, DO
Caryn J. Roelofs, DO

PATHOLOGY

Associate Professor and Interim Chair
Karlis I. Sloka, DO

Professors
Edward Goljan, MD
Joseph Price, PhD

PEDIATRICS

Associate Professor and Chair
Kayse M. Shrum, DO

Professor
Stanley E. Grogg, DO

Associate Professors
Christine Clary, DO
Rhonda L. Casey, DO

Assistant Professor
Shawna Duncan, DO

Clinical Associate Professors
M. Hany Elsayed, MD
Adolfo D. Garnica, MD

Clinical Assistant Professors
Amanda Foster, DO
Colony S. Fugate, DO
Jennifer Sunday, DO

RADIOLOGY

Adjunct Clinical Professor and Chair
Dean Fullingim, DO

SURGERY

Associate Professor and Interim Chair
Michael H. Whitworth, DO

Associate Professor
Douglas C. Foster, DO

Assistant Professor
Brian C. Diener, DO

Clinical Assistant Professors
Laurie A. Duckett, DO
Timothy Frink, DO
Dan Langley, DO
Michael Thomas, MD
Susan B. Young, DO

CENTER FOR VETERINARY HEALTH SCIENCES

VETERINARY PATHOBIOLOGY

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*James H. Meinkoth, DVM, PhD, DACVP

Regents Professors and Endowed Chairs
*Anthony W. Confer, DVM, PhD, DACVP
Katherine M. Kocan, MSPH, PhD

Professors
William Barrow, PhD and endowed chair
Kenneth Clinkenbeard, DVM, PhD
*Jean M. d'Offay, DTVM, PhD, DACVM
Richard W. Eberle, PhD
Sidney A. Ewing, DVM, PhD (emeritus)
J. Carl Fox, PhD (emeritus)
*Robert W. Fulton, DVM, PhD, DACVM and endowed chair
*Bill Johnson, DVM, DACVP
*Sanjay Kapil, DVM, PhD
*Susan Little, DVM, PhD, DEVPC and endowed chair
*Rebecca Morton, DVM, PhD, DACVM (emerita)
*Roger Panciera, DVM, PhD, DACVP (emeritus)
*Jerry W. Ritchey, DVM, PhD, DACVP

Associate Professors
*Gregory Campbell, DVM, DACVP
*Brad Njaa, DVM, MS, DACVP

Assistant Professors
*Robin Allison, DVM, PhD, DACVP
*Melanie Breshears, DVM, PhD, DACVP
*Catherine G. Lamm, DVM
*Brenda Love, DVM, PhD, DACVM
Tom Oomans, PhD
Mason Reichard, PhD
*Timothy Snider, DVM, PhD, DACVP

Lecturers
Carole Muchmore, PhD
Jarod Taylor, DVM, MPH

Clinical Associate Professor
Eileen Johnson, DVM, PhD

Clinical Assistant Professors
Grant B. Rezabek, DVM, MPH
*Theresa Rizzi, DVM, MPH, DACVP

Research Professor
Jose de la Fuente, PhD

Associate Research Professors
Edmour Blouin, PhD
Mady Dabo, PhD
Phil Bourne, BS, BTEC

Assistant Research Professors
Sahlu Ayalew, PhD
Christina Bourne, PhD

Residents
Sarah Cramer, DVM
Laura Devai, DVM
Steve Smith, DVM
Adam Stern, DVM
Karen Velguth, DVM

Graduate Teaching Associate
Holly Evers, DVM, MS

Graduate Research Assistant
Emily Thaden

VETERINARY CLINICAL SCIENCES

Ricks-Rapp Professor and Head
*Charles G. MacAllister, DVM, DACVIM

Professors
Joseph Alexander, Director of External Relations
Kenneth E. Bartels, DVM, MS
*John P. Hoover, DVM, MS, DACVIM, DABVP
*Michael D. Lorenz, DVM, DACVIM
*Mark Neer, DVM, DACVIM
*Mark C. Rochat, DVM, MS, DACVS
Richard Shawley, DVM, MS, DACVA (emeritus)

Associate Professors
*Robert J. Bahr, DVM, DACVR
*Lionel J. Dawson, BVSc, MS, DACT
*Margi A. Gilmour, DVM, MS, DACVO
*Todd Holbrook, DVM, DACVIM
*G. Reed Holyoak, DVM, PhD, DACT
*Henry W. Jann, DVM, MS, DACVS
*John Kirkpatrick, DVM, MS, DACVIM (emeritus)
Carolynn T. MacAllister, DVM
*Gregor L. Morgan, MVSc, PhD, DACT
*D. L. Step, DVM, DACVI

Clinical Associate Professor
*Marjorie Gross, DVM, MS, DACVA

Adjunct Associate Professors
Wei R. Chen, PhD
*Mark Munson, MD
*Robert Streeter, DVM

Assistant Professors
*Jason Arble, DVM, MS, DACVR
*Melanie Boileau, DVM, MS, DACVIM
*Mary H. Bowles, DVM, DACVIM
*Jill Brunker, DVM, DACVIM
*Lyndi Gilliam, DVM, DACVIM
*Justin D. Thomason, DVM, DACVIM

Clinical Assistant Professors
Cornelia J. Ketz-Riley, DVM
*Jennifer Peters, DVM, DABVP
Nicole M. Ponzio, DVM, MS, DACVM

Adjunct Assistant Professors
*Kay Backeus, DVM, DACZM
Bonnie Boone, DVM
*Paul L. DeMars, DVM, DABVP
Jennifer D'Agostino, DVM

Visiting Professor
*Robert Pechman, DVM, DACVR

Lecturers
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*John Gilliam, DVM, DACVIM, DABVP
Ryan Royse, DVM

Residents:
Heidi Banse, DVM
Simona Buoncompagni, DVM
Brandy Dugas, DVM
Suzanne Genova, DVM
James Hart, DVM
Chelsea Makloski, DVM
Emily Medici, DVM
Valerie Moorman, DVM
Brent Newcomb, DVM
Danielle Pawloski, DVM
Kelci Porter, DVM
Heath Qualls, DVM
Zachary Ricker, DVM
Teresa Seyfert, DVM
Katherine Simpson, DVM

Interns:
Destinee Bearden, DVM
Christopher Schreiber, DVM
Robert Carmichael, DVM
Sabrina Reilly, DVM
Theresa MacNab, DVM
Jonathan Pucket, DVM
Sara Gresham, DVM
Jennifer Schultz, DVM

PHYSIOLOGICAL SCIENCES

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(Sitlington Chair in Toxicology)

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Nicholas L. Cross, PhD (emeritus)
*Michael S. Davis, DVM, MS, PhD
(Oxley Chair in Equine Sports Medicine)
Lin Liu, BS, PhD
(Lundberg-Kienlen Professor of Biomedical Research)
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Charlotte L. Ownby, MS, PhD (emeritus)
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Alastair G. Watson, BVSc, PhD

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Stephen Brimijoin, BA, PhD
Larry P. Gonzalez, BS, MA, PhD
David Marlin, BSc, PhD
Terence H. Risby, PhD
E. William Sarver, AB, MS, PhD

Associate Professors
Guangping Chen, MS, PhD
James W. Lish, MS, PhD
*Denver D. Marlow, BS, DVM
*Lara K. Maxwell, DVM, PhD
Joseph P. McCann, PhD
*Sandra E. Morgan, DVM, MS
Larry E. Stein, PhD

Adjunct Associate Professors
David R. Wallace, BS, PhD
Guolong Zhang, BS, MS, PhD

Assistant Professors
Myron Hinsdale, DVM, PhD
Pamela G. Lloyd, BA, PhD
*Dianne McFarlane, MS, DVM, PhD

Adjunct Assistant Professors
Joseph R. Bidwell, BSc, MSc, PhD
Terry A. Gipson, BS, MS, PhD

Research Scientist
Jing Liu Pope, MD, PhD

Research Associates
Narendranath R. Chintagari, BVSc, MVSc, PhD
Eduard Condac, BS, MS, PhD

Post Doctoral Fellows
Yue Chen, MS, PhD
Chaoqun Huang, MD, PhD
Eduard Tyapochkin, BS, PhD
Linnzi Wright, PhD
Dong Xi, MD, MS, PhD

Graduate Teaching Associates
Praveena Baireddy, BVSc
Melissa Cordero-Valentin, BS, DVM
Sabrina Cummings, BS, DVM
Amarjit Mishra, BVSc, MVSc

Graduate Research Associates
Satyanarayana Achanta, BVSc
Yujie Guo, BS
Eric Loetz, BS
Lijing Su, BS
Yang Wang, BS, MS
Tingting Weng, BS, MS

Staff
Beatrix K. Ferencz, BSc, MSc, PhD
Kristen A. McDaniel, BS
Kathleen D. Phillips
Christopher H. Pivinski, BS
Shannon C. Russell, Assoc.
Lingjin Xiang, MS, MD
Praveen Yerramsetti, BS, MS

OKLAHOMA ANIMAL DISEASE DIAGNOSTIC LABORATORY

Professor and Director
*Bill J. Johnson, DVM (pathologist)

Professor
*Sanjay Kapil, DVM, MVSc, PhD (virologist)

Associate Professors
*Gregory A. Campbell, DVM, PhD, MRCVS (chief pathologist)
*Sandra E. Morgan, DVM, MS (toxicologist)

Assistant Professor
*Brenda Love, DVM, PhD

Clinical Assistant Professor
Grant B. Rezabek, MPH, DVM (pathologist)

Clinical Instructor
Catherine G. Lamm, DVM (pathologist)

*Board Certification in Specialty Area

Graduate College Academic Calendar

Refer also to the *University Academic Calendar,* pg. 7

2009-2010 and 2010-2011*						
	Fall 2009	**Spring 2010**	**Summer 2010**	**Fall 2010**	**Spring 2011**	**Summer 2011**
Class work begins	Aug. 17	Jan. 11	June 7	Aug. 23	Jan. 10	June 6
Admission to doctoral candidacy for summer due in Graduate College (for students with approved plans of study dated before January, 2009)		Jan. 29			Jan. 28	
Admission to doctoral candidacy for fall due in Graduate College (for students with approved plans of study dated before January, 2009)			June 18			June 17
FORMAT REVIEW DRAFT of dissertation or thesis due in Graduate College	Oct. 16	Mar. 12	June 18	Oct. 22	Mar. 11	June 17
Last day to file a diploma application with the Registrar's Office	Oct. 30	April 1	July 1	Nov. 1	April 1	July 1
Last day to file a revised plan of study (if needed) and Graduation Clearance Form to Graduate College	Oct. 30	April 1	July 1	Nov. 1	April 1	July 1
Admission to doctoral candidacy for spring due in Graduate College (for students with approved plans of study dated before January, 2009)	Nov. 6			Nov. 5		
Results of thesis/dissertation defense forms due in Graduate College	Nov. 20	April 23	July 16	Dec. 3	April 22	July 15
Online submission of electronic dissertation or thesis due	Dec. 4	April 30	July 23	Dec. 10	April 29	July 22
Term ends	Dec. 11	May 7	July 30	Dec. 17	May 6	July 29
Graduate Commencement	Dec. 11	May 7		Dec. 17	May 6	

*tentative

Graduate College

A. Gordon Emslie, PhD, DSc - Dean and Associate Vice President for Research
Mark E. Payton, PhD - Associate Dean
Craig Satterfield, EdD - Sr. Director, Recruitment and Admissions
Michael Heppler, MEd - Assistant Director of Student Academic Services
Susan Mathew, EdD - Coordinator of Admissions

202 Whitehurst - (405) 744-6368 • admissions: (405) 744-6371 • fax: (405) 744-0355
Web site: http://gradcollege.okstate.edu **• e-mail:** grad-i@okstate.edu

Students in pursuit of advanced degrees and certificates in the Graduate College, and the members of the graduate faculty with whom they interact, share a number of common goals. First and foremost is the scholarly pursuit of new knowledge, both through didactic instruction and through independent and group research conducted utilizing the facilities and resources of a major university. A closely related goal is the dissemination of that knowledge to the scholarly community. Oklahoma State University strives to maintain national and international recognition through the scholarly research and creative work performed by faculty and students under the auspices of OSU's graduate programs.

Organization of the Graduate College

Consistent with its objective of maintaining the highest standards in graduate education, the Graduate College administers regulations and requirements specified and established by the Graduate Faculty. The Graduate Council is the executive committee of the Graduate Faculty; it is elected by the Graduate Faculty to work with the dean of the Graduate College in the development and administration of applicable policy. The Graduate Faculty is composed of six Subject Matter Groups (Biological Sciences, Humanities, Physical Sciences & Technology, Social Sciences, Education, and Biomedical Sciences); each group has three elected representatives serving on the Council, of which two may represent the Group at meetings of the Council. The Graduate Council formulates and reviews policies concerning the conduct of graduate study at OSU, and it participates in the periodic review of graduate programs. All proposed policies and all requests related to the initiation and development of graduate curricular offerings are referred to the Graduate Council for review, comment, and approval.

Accreditation

Oklahoma State University is accredited by the Higher Learning Commission, (HLC) of the North Central Association of Colleges and Schools. (The HLC may be reached at 30 N. LaSalle Street, Suite 2400, Chicago, IL 60602-2504; telephone (800) 621-7440; the Internet address is: www.ncahigherlearningcommission.org. Several programs within the colleges are also accredited by other agencies; see "Accreditation" in "The University" section of the *Catalog*.

Services for Graduate Students

Library

The Oklahoma State University Library contains over 7 million books, documents and microforms. Graduate students are entitled to a 120-day check-out period for books. Through its Web site, the Library provides access to more than 200 bibliographic databases and more than 41,000 full text journals. Students have access to all online resources from computers located in the Library or any computer with Internet access, regardless of location via the Library's proxy server. The following databases are a small sample of those provided by the Library: *Web of Science, LexisNexis, ProQuest Direct, SciFinder Scholar, Early English Books Online, Classical.com, PsycInfo and Compendex*. A complete list of databases is available at www.library.okstate.edu/database.

Of particular interest to graduate students is *Digital Dissertations*, an online, fully searchable archive of doctoral dissertations, including work from over 1,000 graduate schools and universities completed from 1861 onward. Citations for dissertations published after 1980 also include 350-word abstracts. OSU users of *Digital Dissertations* have free full text access to dissertations from OSU and other institutions published from 1997 forward. The Library recently underwrote the cost of digitizing most OSU dissertations completed between 1961 and 1996, giving OSU users full text access to more than 30 years of OSU dissertations. Several other institutions are adding their older dissertations to *Digital Dissertations* and these are also available to OSU users.

Through the Library, students have access to more than 41,000 online full text journals, including all titles from the following publishers: *Academic Press, Blackwell Science, Elsevier, Pergamon, Wiley Interscience, Kluwer, Dekker, Annual Reviews, American Institute of Physics, American Physical Society, Optical Society of America, Institute of Physics*, and the *Institute of Electrical and Electronic Engineers*. A complete list of full text journals is available at www.library.okstate.edu/ftdb.

With help from the Student Technology Fee, the Library launched the first "floating computer lab" on campus. Laptops are available to students for five-hour check-out periods. The laptops have wireless access to the Internet anywhere in the building. For material the library does not own, Interlibrary Loan Service accepts requests for both books and articles online through the library Web site. Most articles requested through Interlibrary Loan are delivered electronically to the requestor's desktop computer. While many articles are available online, there are some publications to which OSU only has print access. Any print article owned by the Library will be made available electronically by request through the Document Delivery service. Requests can be made online at any time, and are downloaded and processed during work hours. The Library normally fills requests within 48 hours of receipt.

Information Technology

Information Technology provides administrative and academic computing services and support, data communications and telephone services for Oklahoma State University. Services include network and communications infrastructure, software development, enterprise application systems management, data center services, system security operations, enterprise server administration, computer training, publications, desktop computing support and a comprehensive Help Desk.

The IT Help Desk provides diagnostic support and assistance by phone, by e-mail, or in person. The Help Desk is open Monday through Friday 7:00 a.m. until 1:00 a.m., Saturday 10:00 a.m. to 5:00 p.m. and Sunday 2:00 p.m. to 11:00 p.m. More Help Desk information may be found at http://help.okstate.edu.

Student technology resources are provided via an Ethernet-based network. All campus housing provides each resident and common living space with a 10/100 megabit per second dedicated connection to the Internet. OSU's Edmon Low Library, Classroom Building, Student Union and various other public areas provide wireless access for central campus. An extensive data communications network provides interfaces to OneNet, the Internet and Internet 2. Students receive computer laboratory access, network data storage space and electronic mail as soon as they enroll at OSU.

Five general campus labs (three of which are open 24 hours a day, seven days a week) and 24 departmental labs provide easy on-campus access to computing resources for students. The labs provide general word processing, spreadsheet, database, graphics, electronic mail and Internet access on PC-compatible and Apple Macintosh computers with connections to the campus network. Multimedia and CD capabilities are also available. All labs have wheelchair access and feature Adaptive Technology software.

OSU students are eligible for free Microsoft products through OSU's Microsoft Campus Agreement, discounted pricing on computers with Dell Computers, and Internet service at reduced rates through Chickasaw Telecommunications.

Additional information about Information Technology at Oklahoma State University can be found at http://it.okstate.edu.

Living Accommodations

Oklahoma State University offers over 20 residence halls, seven family-first neighborhoods, and over 30 dining options to meet the needs of every student.

Graduate students have many options of on-campus housing. While all residence halls (including traditional halls, deluxe suites and apartments) are open to graduate students, several halls are classified as non-freshman halls. Both nine- and 12-month contracts are available, and all halls are open continuously throughout the academic year.

The family-first University Apartments features seven neighborhoods. The units are primarily two-bedroom units with some three-bedroom units available. All units are available as furnished or unfurnished. These units are available to married and graduate students, and as space is available, juniors and seniors. To be eligible, the resident must be a full-time student (nine credit hours per semester) or be enrolled in six credit hours and be employed by the University on a part-time basis.

To apply for either housing option, an application and appropriate fee must be submitted to the Residential Life office. Space is assigned by the date on which the completed housing contract is received, so early application is essential. For more information, contact the Residential Life office (phone 405-744-5592) or at http://www.reslife.okstate.edu.

Students With Children

Information on child care in the Stillwater community is available at the following locations on campus:

Family Resource Center - 719 N. Walnut, 744-6539

Nontraditional Student Services - 060 Student Union, 744-5488

Non-traditional Student Organization - 045 Student Union, 744-7508

Health Services

University Health Services provides medical care to OSU students. All students enrolled in at least one hour at the Stillwater campus are eligible to be seen at the University Clinic. Personal counseling is available from University Counseling Services.

Refer to the "Student Services" section of the *Catalog* for a full description of University Health Services.

Campus Recreation

Intellectual exercise involves complete development of the mind, body and spirit. Opportunities for students to use their free time include concerts, lectures, films and other media forms. Many student organizations function to enhance the educational experience of the student. Campus recreation offers a wide variety of organized and informal recreational programs at the Colvin Recreation Center. These activities include intramural sports, sport clubs, Outdoor Adventure, instructional classes, and adaptive programs. More information may be found on the Internet http://campusrec.okstate.edu.

Student Union

The Student Union offers a host of programs and services making it the place to be on the Oklahoma State campus. The facilities include a bookstore, retail shops, banking services, a travel agency, a campus post office, restaurants, lounges, meeting rooms and a hotel. In the basement of the Student Union is an extensive Campus Life facility that houses a computer lab and campus organizations such as the International Student and Scholars Organization and the Non-Traditional Student Organization.

More information about the Student Union and its offerings can be found at http://union.okstate.edu.

Graduate and Professional Student Government Association

The Graduate and Professional Student Government Association (GPSGA) is an official advisory body to the University President and serves as the representative voice for graduate and professional students at OSU. Its mission is to improve all aspects of post-graduate education and student life at OSU.

The Association has representatives from each graduate and professional degree program. Representatives are nominated by the programs with membership conferred by the GPSGA president. Each representative is appointed for a term of one year; a representative must be in good academic standing and enrolled in at least two credit hours.

The GPSGA provides funds for graduate and professional student organizations and travel grants to help students defray costs incurred by attending and presenting at professional meetings. For more information consult http://gpsga.okstate.edu.

Tuition and Fees

Refer to the section on "Tuition, Fees and Cost Estimates" at the front of the *Catalog*.

Financial Support For Graduate Students

Financial Aid

There is no centralized location for graduate student financial aid; therefore, the student should also contact the reference section of the library for information, as well as Financial Aid options at www.okstate.edu/finaid.

Federal Financial Aid

All domestic students who want to qualify for federal financial aid should complete the Free Application for Federal Student Aid (FAFSA). Students are encouraged to complete the FAFSA annually as soon after January 1 as possible to receive aid for the subsequent academic year. The FAFSA is available at www.fafsa.ed.gov.

Miscellaneous Sources of Financial Aid

1. A listing of various fellowships and similar opportunities can be found at http://gradcollege.okstate.edu/financial_aid/scholarships.htm.

2. Many federal agencies, such as the National Science Foundation, promote and advance graduate student research by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics and engineering.

3. University and public libraries have information on federal, state and private sources of aid. Factors other than financial need are often taken into account.

4. Many companies and labor unions have programs to help defray the cost of advanced education for their employees or members of their families.

5. Students should check foundations, religious organizations, fraternities or sororities, town or city clubs, community and civic organizations such as Rotary, the American Legion, 4-H Clubs, Kiwanis, Jaycees, Chamber of Commerce and the Masonic Lodge.

6. Organizations connected with a student's field of interest often provide scholarships. These organizations may be listed in the U.S. Department of Labor's Occupational Outlook Handbook, or a student can often find out more about these by contacting faculty members in the major field.

OSU Short-Term Emergency Loans

In addition to federal loans awarded once the student submits the Free Application for Federal Student Aid (FAFSA), OSU assists students in need of immediate funds through the Short-Term Emergency Loan Program. This program is designed to assist OSU students who are currently enrolled and attending classes to meet educationally-related off-campus expenses. The program is not designed to pay a debt owed to Oklahoma State University. Qualified students may borrow up to $300 less a $10 service charge one time per semester. Additional information about the Short-Term Emergency Loan Program can be found at www.okstate.edu/finaid/loans/stl.html.

Financial Support for Graduate Assistants

Oklahoma State University recognizes three types of graduate assistants:

A Graduate Teaching Assistant (GTA) is a matriculated graduate student who is employed by the University to provide services that are directly related to the teaching mission of the department or unit that employs the assistant. The GTA must have direct involvement with the students enrolled in the offered course.

A Graduate Research Assistant (GRA) is a matriculated graduate student who is employed by the University to provide services that are directly related to the research activities of the department or unit that employs the assistant.

A Graduate Assistant (GA) is a matriculated graduate student who is employed by the University to provide other services that do not warrant classification as a GTA or GRA. In cases where the duties assigned leave the classification of a graduate assistant is in doubt, the dean of the Graduate College shall have the final authority as to the classification.

General Benefits

All graduate assistants employed at least 0.25 FTE (10 hours a week; 170 hours per semester) receive a waiver of the non-resident portion (if applicable) of the tuition for all eligible hours taken (i.e., courses offered for credit, other than year-long independent study or outreach). The nonresident tuition for summer will also be waived even if the student is not employed as a graduate assistant for that term, enrolled in at least three hours, and held an assistantship (0.25 FTE or greater) for the preceding spring semester.

Health Insurance Benefits

• Graduate assistants employed in a GA/GTA/GRA position at least 10 hours per week (170 hours for the semester) during the fall semesters, and who are enrolled in at least six graduate credit hours throughout that entire semester, are eligible for single-person-coverage health insurance through OSU for the fall semester in question.

• Graduate assistants employed in a GA/GTA/GRA position at least 10 hours per week (170 hours for the semester) during a spring semester, and who are enrolled in at least six graduate credit hours throughout that entire semester, are eligible for single-person-coverage health insurance through OSU for the spring semester in question. Such coverage will continue through the immediately succeeding summer term, regardless of employment or enrollment status.

• Graduate assistants who are not eligible for health insurance coverage during the summer session by virtue of their eligibility during the previous spring semester, but who are employed in a GA/GTA/GRA position at least 10 hours per week (85 hours for the session) during an eight-week summer session, and who are enrolled in at least three graduate credit hours throughout an entire summer session (not necessarily the eight-week session), are eligible for single-person-coverage health insurance through OSU for the summer term.

The University provides the student's coverage on a semester-by-semester basis. Students receiving the GA/GTA/GRA insurance are required to pay the semester health fee. Coverage is through Academic Health Plans, Inc., Information on the policy is available at www.academichealthplans.com, at the Graduate College or through University Health Services.

Teaching and Research Assistantship Benefits

The University awards numerous teaching and research assistantships with competitive stipends. Opportunities for supplementary fellowships are also available. These supplementary fellowships are credited monthly, directly to the student's Bursar account, each month in which the student holds the GTA or GRA position associated with the supplementary fellowship.

An offer of a teaching or research assistantship is a commitment by a department or school to provide financial support to admitted graduate students. Assistantships are an investment made by a school or department and are granted primarily to enable the student to pursue an advanced degree. Accepting an assistantship brings with it a professional obligation to fulfill all of the responsibilities associated with the assistantship assignment. Included in this professional obligation is the expectation that students who have accepted an assistantship will diligently pursue their degree to completion in the department or school providing the assistantship.

The service expected and the numbers of hours of graduate work a student may take are governed by the terms of the appointment. Applications should be addressed to the head of the department in which the appointment is desired.

All graduate teaching and research assistants employed at least 0.25 FTE (10 hours a week; 170 hours per semester), but less than 0.5 FTE (20 hours per week, 340 hours per semester) receive a three hour resident tuition scholarship each term in which they are employed and enrolled in at least nine hours of "eligible courses"(i.e. courses offered for credit, other than year-long independent study or outreach). Those employed at least 0.5 FTE receive a six hour resident tuition scholarship each fall and spring semester, in which they are employed and enrolled in at least six hours of eligible courses. GTA/GRA's employed at least 0.25 FTE and who are enrolled in at least 3 hours of eligible courses in

the summer term receive a 3-hour resident tuition scholarship for that term. The granting of these tuition scholarships is contingent on the student submitting a signed contract to the Graduate College, in which they acknowledge the employment and enrollment responsibilities associated with the benefit. Contracts are available in the Graduate College or in departmental offices.

International students who are dependent upon an assistantship for their financial guarantee must remember that forfeiture of that assistantship may require the re-submission of a newly revised financial guarantee to the Office of International Students and Scholars. Also, if out-of-state and international students forfeit their graduate assistantships, they risk losing all tuition waivers, as well as any health insurance coverage for graduate assistants provided by the University.

Resident Tuition Waivers

Resident tuition scholarships are available on a limited basis each semester for graduate students who are U.S. citizens and have been admitted to a degree or graduate certificate program, but do not hold an assistantship. Interested students should contact the graduate coordinator of their department or program.

McNair Scholars

Graduate students who are graduates of a McNair Scholar Program, receive a tuition waiver of the nonresident portion of their enrollment, as well as up to nine hours of resident tuition in each fall and spring semester and up to six hours of resident tuition in each summer session in which they are enrolled for. Nonresident and/or resident tuition waivers do not apply to audit, outreach or year-long independent study classes.

Tuition Waiver Policy for Graduate Student Spouses

A graduate student spouse of a graduate assistant is eligible to apply for a waiver of the non-resident portion of tuition for all courses taken. Contact the Office of the Registrar for details.

Student Employment

Career Services provides assistance to OSU students seeking part-time employment or work study programs. Students are informed of job opportunities on campus and in the Stillwater community. Applications are available in 360 Student Union. Jobs on campus usually offer 12 to 20 hours of work per week in clerical, technical, food service or general labor positions. Rate of pay and work schedules vary.

Individual job search assistance is available with the graduate career consultant in the Student Union Career Services Office or with any of the college career consultants located in their respective colleges. Services include resume and curriculum vitae development, written correspondence assistance, mock interviews and interview preparation, academic and non-academic job search assistance, workshops and career fairs. More information may be found online at HireOSUgrads.com.

Special Programs

Certification Programs

Oklahoma State University offers Oklahoma State Department of Education-approved post-bachelor's certification programs for elementary school principals, school counselors, reading specialists, library/media specialists, and secondary school principals. Certification is also offered in speech and language pathology and in special education.

Master's degrees are available in most of these programs and doctorates are available in many.

Post-master's level certification programs are available for school superintendents and school psychologists.

Inquiries concerning any aspect of the Professional Education program should be addressed to the Office of Professional Education at (405) 744-6252 or the head of the department offering the program.

Off-Campus Programs

OSU-Tulsa

Oklahoma State University offers graduate courses in Tulsa. All courses offered by OSU-Tulsa are considered resident credit for degrees granted by Oklahoma State University.

The graduate degree and certification programs that Oklahoma State University offers in Tulsa are:

COLLEGE OF ARTS AND SCIENCES

- Certificate in Teaching English as a Second Language
- MS in Communication Sciences & Disorders
- MS in Computer Science
- MA in English
- MS in Fire & Emergency Management Administration
- MS in Mass Communications
- PhD in Computer Science

WILLIAM S. SPEARS SCHOOL OF BUSINESS

- Certificate in Business Data Mining
- Certificate in Information Assurance
- Master of Business Administration
- MS in Management Information Systems

COLLEGE OF EDUCATION

- MS in Counseling
  - Community Counseling
  - School Counseling
- MS in Educational Psychology
  - Educational Psychology
  - Educational Research and Evaluation
- MS in Educational Leadership Studies
  - Higher Education
  - School Administration
- MS in Teaching, Learning and Leadership
  - Curriculum Leadership Studies
  - Elementary, Middle, Secondary, K-12 Education
  - Mathematics/Science Education
  - Occupational Education Studies
  - Reading & Literacy
  - Secondary Education for Teachers Non-Traditionally Certified
  - Special Education
- EdD in Applied Educational Studies
  - College Interdisciplinary Studies - College Teaching
- EdD in Higher Education
- EdD in School Administration
- PhD in Education
  - Curriculum Studies
  - Occupational Education Studies
  - Professional Education Studies
  - Social Foundations of Education
- PhD in Educational Leadership and Policy Studies
  - Educational Administration
  - Higher Education

PhD in Educational Psychology
Educational Psychology
Research and Evaluation

COLLEGE OF ENGINEERING, ARCHITECTURE AND TECHNOLOGY
MS in Civil Engineering
MS in Electrical Engineering
MS in Engineering and Technology Management
MS in Environmental Engineering
MS in Industrial Engineering and Management
MS in Mechanical Engineering
PhD in Electrical Engineering

INTERDISCIPLINARY PROGRAMS
Certificate in International Studies
MS in Environmental Science
MS in Natural and Applied Sciences
Aviation and Space Science
Health Care Administration
MS in Telecommunications Management
PhD in Environmental Science

Prior to enrollment in OSU-Tulsa courses, a student should secure approval from his/her advisor concerning the appropriateness of any courses relative to the degree objective.

Graduate Programs at the OSU Center for Health Sciences in Tulsa

Leigh Goodson, PhD - *Associate Dean for Graduate Studies*

In 2001, the campus of OSU College of Osteopathic Medicine was renamed the OSU Center for Health Sciences (CHS) to reflect its expanding status as an academic health center with multiple academic programs. Through the CHS, Oklahoma State University offers graduate programs in biomedical sciences (MS, PhD, and a dual degree tract DO/PhD) and in forensic sciences (MFSA and MS).

—Biomedical Sciences. The MS and PhD programs in biomedical sciences are interdisciplinary programs involving the basic biomedical science disciplines of anatomy, biochemistry, cell biology, microbiology, pathology, pharmacology and physiology. The programs consist of core basic sciences medical courses, additional basic sciences graduate courses, research, thesis for the MS and a dissertation for the PhD. A non-thesis MS is also available.

—Forensic Sciences. The graduate program in forensic sciences is an interdisciplinary master's program that reflects a broad range of disciplines and offers specialization in both research and non-thesis tracks. All students must satisfactorily complete 39 credit hours to receive the Master of Science in Forensic Sciences.

Students working toward a degree requiring a thesis can specialize in one of four areas: forensic identification through DNA, forensic pathology, forensic psychology, or forensic toxicology. Successful presentation and defense of a thesis is required for a master's degree in these areas.

Non-thesis options include forensic science administration and forensic document examination, with courses in both options offered entirely online. Applicants to the administrative program must have professional experience in a related field, while those entering the document examiner program must be either in training/apprenticeship positions or under the guidance/supervision of a certified document examiner.

The Graduate Certificate in Forensic Examination of Questioned Documents is for individuals preparing for examiner certification under the guidelines of the American Board of Forensic Document Examiners. The program consists of 12 credit hours of online courses. Admission requires related training or experience and permission from the lead instructor in this area. The Graduate Certificate does not equate to professional certification, which includes additional standards.

—Health Care Administration. This OSU program is administered under the auspices of the Center of Health Sciences in Tulsa. It is an option within Natural and Applied Sciences and is designed for individuals who seek to pursue a career in the field of health care management. The program requires students to take core courses in health care administration and research methods along with a series of electives selected from applicable courses in business and social sciences. The multidisciplinary approach to the health care administration discipline provides students with a unique perspective on the complex issues facing the profession today.

General Regulations

Full authority on all academic decisions within the Graduate College rests with the dean of the Graduate College. The Graduate College policies and procedures described in the *Catalog* are for informational purposes. They are subject to regular review and may be revised at any time by the dean of the Graduate College in consultation with the Graduate Council.

Responsibilities

All graduate students are expected to read and to comply with the written regulations. The regulations presented in the *Catalog* may be supplemented by written departmental or program requirements available at departmental offices. Admission to a specific graduate program obligates the student to adhere to the policies of that program.

General regulations in the following sections relate to requirements for admission, enrollment and academic standing. Subsequent sections outline requirements for the following credentials: Graduate Certificate, Master's, Specialist in Education, Doctor of Education, and Doctor of Philosophy degrees. Particular attention should be given to timing and substantive requirements for matriculation, especially admission, the plan of study, residence, language proficiency, research and thesis or report, and graduation. The regulations are prescribed by the Graduate Council with the intent of assuring high-quality graduate programs and effective interaction of Graduate Faculty members and graduate students.

—Request for Waivers. Any request for a waiver of, exception to, or deviation from, any requirement set forth in the "Graduate College" section of the *Catalog* must be in the form of a written petition to the dean of the Graduate College. Such petitions should include a supporting letter from the major advisor.

Admission to the Graduate College

Holders of baccalaureate or first professional degrees from colleges and universities of recognized standing (including U.S. institutions accredited by agencies recognized by the U.S. Department of Education) are eligible to seek admission to the Graduate College. In some cases the Graduate College, in consultation with the major department, may require certain prerequisite courses to bring the applicant's credentials from international institutions to the equivalent of a four-year U.S. bachelor's degree. These "bridge" courses must be completed within a designated period of time and/or prior to enrollment beyond a prescribed number of hours of graduate course work. *Applicants must submit the completed application form to the Graduate College, with official transcripts of all academic work and degrees received. The application fee must accompany the Application for Admission.*

1. The student should request all institutions previously attended to send one official transcript to the Graduate College, 202 Whitehurst, Oklahoma State University, Stillwater, OK 74078.

2. To be official, the transcript be issued from the school and must show the complete scholastic record, bear the official seal of the institution, be signed by the issuing officer, and be in a sealed envelope.

To assure adequate time, application forms and transcripts should be received at least 30 days prior to the department application deadline or the beginning of the semester, whichever comes first. *Transcripts and other submitted documents become the property of Oklahoma State University and cannot be returned.*

—Standardized Test Scores. Many departments require standardized test scores, such as the Graduate Record Examination (GRE) Miller Analogies Test (MAT) or Graduate Management Admissions Test (GMAT). Applicants must contact the appropriate department for information regarding requirements for these tests.

International Student Admission

International applicants are expected to submit applications, financial affidavits, transcripts and/or mark sheets, and, if required, results of the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) examinations by March 1 for fall enrollment and by August 1 for spring enrollment. Applications that become complete after these deadline dates will be reviewed, but the Graduate College cannot guarantee an admissions decision will be made for sufficiently timely issuance of the I-20 form required to obtain an entry visa.

—English Proficiency. As a condition of admission to regular graduate study at OSU, all persons for whom English is a second language are required to present proof of English competency regardless of the number of semesters or terms completed at OSU or in other institutions of higher education. A waiver of this requirement can be obtained for students who have completed a degree from an accredited U.S. institution of higher learning, or who have graduated with a degree from an accredited institution of higher learning, at which English is the primary language of instruction, located in a country in which English is a recognized primary language.

Proof of English competency can be in the form of an official TOEFL score or the score on an official IELTS, academic stream, examination. Either examination must have been taken within the last two years. Applicants who present evidence of undue hardship or other extremely extenuating circumstances may be admitted without a TOEFL or IELTS score. These students will be required to take the Test of English Language Proficiency (TELP) immediately upon arrival at OSU, and to comply with the provisions associated with that test.

Applicants who present a TOEFL score of at least 79 iBT/550 PBT or an IELTS score of at least 6.5 satisfy the Graduate College's English proficiency requirements for admission to a graduate program. Note that some departments require a TOEFL score above these levels, and applicants should contact the department for specific TOEFL or IELTS requirements.

Applicants who present a TOEFL score of at least 61 iBT/500 PBT, but less than 79 iBT/550 PBT (or an IELTS score of 6.0) and who demonstrate unusual academic promise may be admitted to graduate study on conditional status.

Applicants who present a TOEFL score below 61 iBT/500 PBT cannot be admitted to graduate study; such students should instead enroll in the OSU English Language Institute (ELI) in their first semester, and will be issued an I-20 to this effect. Upon successful completion of the ELI program students will be issued an I-20 by the Graduate College and will be admitted conditionally. Such students will be required to take the institutional TELP (see below) at the first opportunity thereafter and to comply with its provisions. Students who do not satisfactorily complete the ELI in their first semester/term must re-enroll in the ELI the next semester/term; departments may petition for such students to take up to one course (maximum 4 semester hours) concurrently with such subsequent ELI enrollments.

Students who submit TOEFL scores from the Internet-based test (iBT) for reading, listening and writing shall be evaluated for additionally needed course work.

Students who submit TOEFL scores and who score at least 42 on the combined reading and listening portions, with a score of at least 20 in each section, are not required to enroll in any English language proficiency courses. Students who score less than this on the reading and listening portions of the TOEFL (irrespective of the score on the written portion) are required to enroll in ENGL 0003 during their first semester. ENGL 0003 carries a grade of S/U and may not be used toward minimum degree requirements. Students must enroll in ENGL 0003 each semester until a grade of S is earned. Students who complete ENGL 0003 and who have a score less than 22 on the writing portion of the iBT are also encouraged to enroll in ENGL 4893*.

Students who score at or above the minimum score(s) on the reading and listening portion of the TOEFL, but less than 22 on the writing portion, are required to enroll in ENGL 4893* at some point in their studies. ENGL 4893* carries graduate credit and may be used toward minimum degree requirements; a grade of C or better in this course is required.

In situations when the student is required to take ENGL 0003 or ENGL 4893*, the appropriate course must be listed on the student's Plan of Study and becomes part of degree completion requirements.

—Test of English Language Proficiency. Students for whom English is not their native language and who submit a PBT (paper-based test) version of the TOEFL, or who take the IELTS, must take the Test of English Language Proficiency (TELP) upon arrival at OSU and comply with the provisions associated with that test. The TELP is administered on the Stillwater and Tulsa campuses before each regular semester through University Testing and Evaluation. A waiver of the TELP requirement will be granted to a student who has:

1. achieved a score of 600 PBT or higher on the TOEFL and a score of 5.0 or higher on the Test of Written English (TWE) or Essay; or
2. achieved an IELTS, academic stream, overall band score of 6.5 or higher on each of the band scores for Listening, Reading and Writing.

A score of 70 on both portions of the TELP is considered passing. Students who score less than 70 on the Listening/Dictation portion of the TELP (irrespective of the score on the writing portion) are required to enroll in ENGL 0003 during their first semester. ENGL 0003 carries a grade of S/U and may not be used toward minimum degree requirements. Students must enroll in ENGL 0003 each semester until a grade of S is earned.

Students who score at least 70 on the Listening/Dictation portion of the TELP, but less than 70 on the Writing portion are required to enroll in ENGL 4893* at some point in their studies. ENGL 4893* carries graduate credit and may be used toward minimum degree requirements; a grade of C or better in this course is required. In situations when the student is required to take ENGL 0003 or ENGL 4893*, the appropriate course must be listed on the student's Plan of Study and becomes part of degree completion requirements.

—Spoken English Proficiency for Employment. OSU policy requires all persons for whom English is a second language to demonstrate an acceptable level of spoken English before being employed in an instructionally related capacity, including laboratory assignments. Graduate students who serve only as laboratory assistants (e.g., setting up and/or maintaining equipment) are not required to comply with the provisions of this section.

Employment as a GTA requires:

(1) demonstrated proficiency of a score of 50 or better on the Test of Spoken English (TSE) or by taking the OSU administered SPEAK

(Spoken English Assessment Kit) and scoring at least 50. No other spoken English examinations are acceptable as substitutes for the TSE or OSU-administered SPEAK.

The TSE may be taken on campus or at any of the many testing sites provided by the Educational Testing Service. Results must be received prior to the beginning of the school semester in which the student will be teaching. SPEAK Tests are given the Monday and Tuesday before the fall and spring semesters begin and only in Stillwater. The purpose of the SPEAK Test is to determine the spoken language proficiency of speakers of English as a Second Language (ESL). The test is administered in a language laboratory and takes about half an hour. It is divided into seven sections, each of which is evaluated for two or more of the following categories: pronunciation, grammar, fluency and comprehensibility. Further information about the OSU administered SPEAK can be found at http://english.okstate.edu/ita/index.htm.

(2) a passing score on the OSU-administered ITA test. The ITA test is a 10-minute evaluation procedure in which the ITA presents five minutes of information for an undergraduate lab, recitation, or lecture. Each ITA Test (the five minute mini-lesson and the question and answer period) is evaluated by two faculty members from the English Department, a faculty member from the ITA's department and a small group of undergraduate students. A score of 250 or better on the ITA test is an unconditional pass. A score of at least 220 is a provisional pass requiring the graduate assistant, if he or she is assigned to instructional duties, to concurrently enroll in GRAD 5990, a one credit course. Students who score less than 220 may not be employed in an instructionally related capacity (including laboratory instruction). Students who fail the ITA may retake it if they have either passed or are currently enrolled in GRAD 5990.

—International Teaching Assistant Program. Any new international teaching assistant (ITA) is required to participate in the international teaching assistant orientation and evaluation workshop. New ITAs must attend the two orientation sessions (whether they have taught in a classroom somewhere else or not) offered at the beginning of the fall and spring semesters.

Types of Admission

When the applicant's file is complete, the faculty in the department or program of the student's area of interest reviews the material and recommends an admission status to the dean of the Graduate College. The final decision for admission to the Graduate College is determined by the dean on the basis of the department's recommendations, prior academic performance of the applicant, and availability of space, facilities, and faculty advisors in the program. The decision is conveyed to the applicant by means of a mailed letter.

—Admission Without Qualification**.** Students planning to work toward a graduate degree in a recognized graduate program may be admitted without qualification provided they meet all Graduate College and departmental requirements.

—Provisional Status. A student can be admitted provisionally upon recommendation of the major department at Oklahoma State University and concurrence by the dean of the Graduate College. Admission with provisional status is granted to an applicant who does not meet one or more of the major program's admission requirements or when the applicant does not have the necessary academic background. The department can require additional courses, higher test scores, or other departmental criteria to be met prior to the student's full admission into the major program. The first obligation of a student admitted provisionally is to meet all of the conditions specified at the time of admission. Failure to meet these conditions could result in the dismissal from the program.

—Probation Status. A student can be admitted with probation status upon recommendation of the major department and concurrence by the dean of the Graduate College. Admission with probation status is granted to an applicant who has attained less than an acceptable grade-point average in all previous academic course work. A student admitted in probation status must make at least a 3.0 grade point average through the semester in which s/he completes 12 hours of courses eligible for graduate credit. Upon successful fulfillment of these requirements the student will be granted good academic standing. Failure to meet the required level of academic performance while in a probationary status may result in dismissal from the Graduate College. A student may be placed on probation if his or her cumulative GPA for courses eligible for graduate credit taken at OSU falls below 3.0, or if the Dean of the Graduate College judges the student's overall academic performance warrants probation status.

—Special Student Status. An applicant may be admitted to the Graduate College as a special student if he or she does not have immediate plans to become a degree candidate, but wants to take graduate courses, prerequisites or other courses. Admission to the Graduate College as a special student means only that the student will be permitted to enroll in courses through the Graduate College. It does not necessarily imply that the student has been or will be admitted to a program leading to an advanced degree or that the student will be able to obtain a graduate degree.

—Requirements:

1. Special students are subject to the same admission standards as degree-seeking students. Applicants for special student status are not automatically admitted without due deliberation of their past academic performance. An special student applicant can be considered for admission "Without Qualification" provided his/her overall grade point average is 3.00 or higher for all courses on his/her bachelor's degree transcript or his/her master's degree transcript. An applicant whose GPA does not meet this criteria can be considered for admission after consultation and recommendation of the Special Student Advisor who may consider additional factors in making a decision such as:
   - Length of time since last attendance at an institution of higher learning
   - A written appeal from the applicant explaining exceptional circumstances that warrant admission
   - A recommendation written from faculty who knows the applicant
2. The student is responsible for filing a new application for admission to the Graduate College should he or she wish to become a degree candidate. The new application will be evaluated by faculty of the department or program and the dean of the Graduate College to ascertain admissibility to the degree program.
3. As such work is not guided by a plan of study or approved by an advisor, no more than nine semester credit hours of course work taken while a special student may be used on a plan of study to meet requirements for a degree or certificate program. Special students may not enroll in more than nine hours of courses eligible for graduate credit without permission of the dean of the Graduate College, or his/her designee. To ensure that special students do not inadvertently exceed this limitation, an enrollment hold will be placed on each student in special status after the student has registered for six (6) or more hours. This hold may be removed by the Special Student Advisor (see below) once the student has formally re-acknowledged this nine-hour limitation.
4. Special students are subject to the same academic regulations as those students admitted into degree programs. Special students are strongly encouraged to consult with the instructor of any course in which they intend to enroll in order to ensure that they are adequately prepared for that course.

5. Special students may not enroll in thesis (5000) or dissertation (6000) courses.
6. Generally, *International students with an F-1 visa, except students on OPT or OCT, may not be admitted or enroll as special students.*

Academic advising for students with special student status is carried out by an advisor appointed by the Graduate College. Students should contact the Graduate College at (405) 744-6368 for details.

—Faculty Members. No member of the faculty, with the rank of associate professor or above or equivalent rank at the time of completing the requirements, may be granted a degree from this institution. This regulation also applies to faculty members in the schools of engineering holding the rank of assistant professor or above.

Transfer of Graduate Credits

Transfer credit **must** be recommended by the advisory committee through submission and approval of the plan of study and approved by the Dean of the Graduate College.

Transfer of graduate credits to the Graduate College is possible only when the student was formally admitted to graduate study at another accredited institution and the applicable course(s) was/were certified as graduate credit by that institution. All courses used as transfer credit must have a grade of "B" or better.

Up to nine credit hours of transfer credit may be used toward any OSU graduate degree (up to three hours toward an OSU graduate certificate). A doctoral student may transfer more than nine hours if the courses in question were housed in a department or program that offers an EdD or PhD (or equivalent) degree. Doctoral students must include a minimum of 30 hours of OSU credit on their plan of study.

Departmental or Program Requirements

The General Regulations of the Graduate College are minimum requirements that must be met by all graduate students at OSU. Students are also subject to any additional requirements that are determined by their major department. Departments may require additional admissions material such as test scores, GMAT, GRE, vita, or recommendation letters. Students should contact the major department directly to inquire about additional admissions materials or test score requirements. Any additional information should be mailed directly to the graduate coordinator of the major department.

Initial and Continuous Enrollment Policy

A prospective student must enroll for courses at OSU within a year after his or her admission date to retain active status. A prospective student who does not enroll within one year must reapply for admission.

A student who interrupts enrollment for one year (i.e., a consecutive period of one fall semester plus one spring semester plus one summer term) must re-apply for admission, and will then be subject to the regulations in effect at the time of reapplication.

Enrollment

Enrollment as a Graduate Student

Students with a bachelor's degree are expected to enroll in the Graduate College unless they want to obtain another bachelor's degree. If they enroll as an undergraduate, the courses taken cannot be given graduate credit at a later date.

Date of Matriculation

Graduate College matriculation occurs when a student first enrolls as an admitted graduate student. That date will be used in calculating time limits for degree completion and validity of courses in a graduate plan of study.

Enrollment Requirements

Students are required to be enrolled in at least two credit hours in each semester in which they are using physical or faculty resources of the University. (Students holding graduate assistantships should note that additional requirements apply; see below.) Regardless of the number of hours taken, a student may not count more than 16 credit hours taken in the fall or spring semester toward a degree. During the summer session, a student may not count toward a degree more than nine credit hours taken in any session during the eight-week summer session. No more than three credit hours taken during the first summer session (intercession) may count toward a degree. Summer intercession is defined as any course that begins after the end of the spring semester and ends prior to the beginning of the eight-week summer session. For any short course session less than eight weeks in length, enrollment shall not exceed one credit hour for each week.

International students on F-1 or J-1 visas must maintain full-time status (as defined below) during the first semester of enrollment, and during each fall and spring semester thereafter.

Each degree-seeking graduate student must be enrolled in at least two hours of courses eligible for graduate credit during their graduating semester (defined as the semester in which they satisfactorily complete all degree requirements). Further, students with a Fall (Spring/Summer) graduating semester who have research courses (i.e., courses numbered 5000 or 6000) on their approved plan of study must satisfactorily complete no fewer than six hours of courses eligible for graduate credit during the calendar (academic) year which includes the graduating semester. As an example, a student wishing to graduate in a fall semester must be enrolled in a total of at least six hours for that fall semester plus the preceding spring semester and summer session. As an example, a student wishing to graduate in a fall semester must be enrolled in a total of at least 6 hours for that fall semester plus the preceding spring semester and summer session.

Students must enroll in research, thesis, or dissertation hours, as appropriate, during each semester in which they are involved in research leading to a thesis or dissertation, irrespective of the number of credit hours of such courses either required or permitted for the degree.

—Enrollment Guidelines and Regulations for Graduate Assistants. Any graduate student holding an assistantship or fellowship of 0.50 FTE (or greater) must enroll in at least six resident credit hours during the fall and spring semesters and at least three resident credit hours during the summer. A student holding less than a 0.50 FTE graduate assistant appointment must be enrolled in a minimum of nine resident credit hours during any fall or spring semester, or three resident credit hours during any summer semester, in which they are so employed.

—Enrollment and Financial Assistance. For the purpose of receiving monetary assistance through the Office of Scholarship and Financial Aid, the amount of the award is related to the total number of enrolled credit hours that apply toward the degree (for graduate students, such courses must be offered for graduate credit), including 3000*, 4000*, 5000 and 6000 level courses. Certifiable enrollment status, based upon a combination of enrollment and employment, only assists with the deferral of loan repayments, never qualification for aid, which is based solely on enrollment.

Although the University considers a graduate student full-time if he or she is enrolled in six credit hours in the fall or spring semester or three credit hours in the summer session with a 0.50 FTE assistantship, many federal financial aids are based on the total number of hours in which a student is enrolled toward the degree. In general, a graduate student must be enrolled in 4 hours of courses eligible for graduate credit each Fall and Spring semester, and 2 hours of courses eligible for graduate credit in the summer term, to be eligible for Federal Aid. Some students may be required to enroll in more hours in the fall or spring or summer to receive the full amount of federal financial aid. Students should verify

with their financial aid advisor in the OSU Office of Scholarship and Financial Aid the number of hours they are required to take.

Graduate Student Enrollment in Undergraduate Courses

Students admitted to the Graduate College may enroll in, or audit, undergraduate courses that do not carry graduate credit if approved to do so by their principal advisor. Such courses cannot subsequently be used as part of a graduate plan of study.

Some 3000 and 4000 level courses are approved for both undergraduate and graduate credit; these courses are noted with an asterisk (*) in the *Catalog.* Enrollment in such a course by a graduate student usually implies the course is being taken for graduate credit; extra course work is required to earn graduate credit. Some graduate students may, however, wish to enroll in such courses for undergraduate credit only (e.g., to complete additional courses specified in the graduate admission provisions). They may do so by completing the "Undergraduate Credit for 3000*/4000* Courses" form and submitting it to the Graduate College by the end of the second week of the regular semester, or by the end of the first week of the summer session, in which the 3000*/4000* course is taken. Submission of this form implies that the student wishes to be graded using the same criteria and course completion requirements used for undergraduates in the course. Such courses may not subsequently be used as part of a graduate plan of study.

Undergraduate Student Enrollment in Graduate Courses

An OSU undergraduate senior may take a limited number of courses for graduate credit toward an OSU degree program. The credits may not be utilized for both a baccalaureate degree and a graduate degree. The courses in question must be approved for graduate credit (denoted by an asterisk next to the course number as listed in the *Catalog*). The applicability of such graduate courses to a specific graduate program will be determined by the student's graduate advisory committee when the student enrolls in the Graduate College and submits a plan of study for an advanced degree.

To receive credit, a *Graduate Credit for Seniors* form must be completed by the student to receive graduate credit for courses taken. This form must be submitted prior to the end of the second week of class instruction of a regular semester, or the first week of a regular summer session. The required form is available on the Graduate College's Internet site or in the Graduate College.

Such credit may be earned only if the following conditions are satisfied at the time of application:

1. Students must have a minimum cumulative graduation/ retention undergraduate GPA of 3.00.
2. The total semester enrollment must not exceed 18 credit hours for a regular semester or nine credit hours for a summer session.
3. The student must be within 12 semester credit hours of completing requirements for the baccalaureate degree at the beginning of the semester or summer session in which courses are taken for graduate credit.
4. Admission to courses taken for graduate credit must have approval of the course instructor, the dean of the academic college associated with the student's major, and the dean of the Graduate College.

Not more than 15 semester credit hours taken while a senior may be approved for graduate credit. The student must earn a grade of "B" or higher in those courses for which he or she seeks graduate credit. Credit will be applied to the student's graduate transcript only after the student has been admitted as a graduate student at OSU. Students are cautioned that institutions other than OSU may or may not allow courses taken for graduate credit during the senior year to be transferred into one of their graduate programs.

Courses Offered Through Outreach

Courses offered through Outreach are considered equivalent to courses offered through traditional formats. Any student wishing to enroll in a graduate credit course offered through outreach must make application for admission to the Graduate College at OSU.

Tuition waivers are not applicable to Outreach courses. Outreach courses do not count toward minimum enrollment requirements for graduate assistants.

Correspondence Credit

Oklahoma State University does not offer graduate level courses by correspondence and does not accept credit taken by correspondence toward an advanced degree. Graduate students may enroll in correspondence courses; however, such courses will not be considered as part of minimum degree or certificate requirements. *Tuition waivers are not applicable to courses taken through correspondence study.* Courses taken through correspondence do not count toward minimum enrollment requirements for graduate assistants.

Enrollment Procedure

Students are strongly encouraged to review the course offerings for the upcoming semester prior to attempting to enroll. For convenience, OSU provides two options to review course listings.

1. The class schedule for upcoming semesters is available for download as a PDF file from the Office of the Registrar at http://registrar.okstate.edu.
2. Available courses for upcoming semesters can be viewed using the SIS web system http://prodosu.okstate.edu. Select the "Available Courses" icon.

First semester students must first obtain their advisor's clearance through the Student Information System prior to attempting to enroll.

If the student has not completed a plan of study or if this is the first semester as a graduate student, the student should consult with the graduate faculty advisor. The graduate faculty advisor can provide information about required courses, course sequencing, and other information in order to select appropriate courses. The advisor should give approval for course selections prior to enrollment.

If a plan of study has been completed, the student should verify that all planned courses are listed on the plan of study. Students should consult with their advisor any time they deviate from courses listed on the plan of study. The ultimate responsibility for completing degree requirements rests with the student.

Students who have active academic, financial or advising holds must clear these holds prior to attempting to enroll. Students can view any holds by logging into the SIS system at http://prodosu.okstate.edu.

There are three ways graduate students can enroll:

—Through the Internet. Graduate students may enroll using the Student Information System (SIS) http://prodosu.okstate.edu. The system gives students access to their academic records.

- First semester students must first obtain their advisor's clearance through the SIS computer system prior to attempting to enroll.
- Special students may be granted enrollment clearance through the Graduate College or through the special student advisor, a faculty member who is charged with working with all non-degree-seeking students. This designated faculty member is available to assist with selecting course work, issues surrounding the transferability of special student credits, applying to degree-seeking programs, and other academic topics.
- Students without a completed plan of study should first meet with their advisors to determine their class schedules for the semester.

• Students will need their student CWID and PIN numbers to access the SIS system. The initial PIN number is set to the student's date of birth. Students may change their PIN through the SIS system.

—In Person. Graduate students may enroll in person in Stillwater or in Tulsa.

• In Stillwater, students can go to the Office of the Registrar located in 322 Student Union. Students will need to have a Trial Study approved and signed by their advisors before they enroll.

• In Tulsa, students can go to the Enrollment Services Office located on the first floor of Administration Hall. Students will need to have a Trial Study approved and signed by their advisors before they can enroll.

—Through the Graduate Advisor or Department. Students can contact their graduate advisor, graduate coordinator, or academic department to ask for assistance.

Last Day to Enroll

Information regarding dates to enroll, when courses begin, and last days to drop are listed in the Class Schedule available at the Office of the Registrar's Web site at http://registrar.okstate.edu.

Generally, the sixth class day of a regular semester or the third class day of the eight week summer session is the last day a course may be added (nonrestrictive) via the SIS enrollment system. A short course may be added no later than the first day of the short course.

Late Enrollment

Graduate students should enroll prior to the end of the official enrollment deadline for the semester. If they do not, there are limited options to enroll in classes. The options available to the student depend on the number of weeks past the deadline and the student's current enrollment status.

During the second week of fall/spring or first week of the eight-week summer session:

• If a student wishes to add course hours or is not currently enrolled, they must submit a drop/add card or Trial Study signed by their advisor giving permission to enroll.

• If the student is adding a course they must have the instructor's signature on the add/drop card or Trial Study.

• If a student has Special status, they must have the signature of the dean of the Graduate College and the instructor of the course in which they wish to enroll.

After the second week of fall/spring or first week of the eight-week summer session graduate students may add any course which has not started.

—Other Enrollment. In order to enroll in a given semester, a student must have received grades for at least six semester credit hours (including "I" and "R" and excluding "W") in the 12 months prior to the beginning of that semester.

Academic Regulations

Refer also to "Adding Courses," "Dropping Courses," and "Withdrawing from the University" in the "Office of the Registrar" section of the *Catalog*.

Graduate Credit Courses

Courses numbered 5000 and above are primarily for graduate students. Seniors who have obtained prior approval may enroll in graduate level courses in accordance with the provisions of "Enrollment" stated earlier.

Courses numbered 3000 and 4000 that are identified by an asterisk in the "Course Listings" of the Catalog can be taken by graduate students and may be used to meet requirements for a graduate degree on the plan of study if approved by the student's advisory committee and the dean of the Graduate College. Graduate students enrolled in these courses will be considered as taking the courses for graduate credit (unless they pre-declare the course as taken for undergraduate credit; forms are available in the Graduate College) and will be expected to fulfill appropriate additional academic requirements as proposed by the instructor. Courses that are not identified by an asterisk may not be used to fulfill requirements for a graduate degree.

Academic Standing

—Minimum Grade Requirements. A grade-point average of "B" (3.00) is required to (1) maintain good standing as a graduate student and (2) meet requirements for a degree. In determining whether a student has met minimum requirements for a degree, grades for courses on the plan of study are averaged separately from courses not on the plan of study. In order to continue enrollment in the Graduate College, a student is expected to maintain a cumulative graduate GPA of at least 3.00. In order to receive a degree, a student must have a minimum 3.00 GPA in the course work listed on the plan of study.

No course with a grade below "C" can be used as part of the minimum number of semester credit hours required for the degree.

Some departments have more stringent requirements. The major department should be consulted concerning minimum grade requirements.

—Academic Progress. Each semester, the dean of the Graduate College reviews the academic progress of any graduate student who receives a grade of "C" or lower in a class. Departments are notified which of their students have received a "C" or lower and of the dean's academic progress decision. The dean recommends one of four actions based on the student's current semester performance and past academic history.

1. *Departmental Notice.* The department is notified and is encouraged to review the student's performance to determine if any departmental intervention is needed.
2. *Academic Probation.* If a student's overall GPA drops below a 3.0, or if the Dean of the Graduate College judges the student's overall academic performance so warrants, then s/he is subject to being placed on academic probation. Probation will be removed only after the student brings his or her cumulative GPA for courses eligible for graduate credit taken at OSU to 3.0 or greater, or completes all degree requirements, whichever comes first.
3. *No Further Enrollment Without Departmental Consent (NFEWDC).*
   a. If the student was admitted on academic probation and did not meet the requirements of this admission, or
   b. If the student was on academic probation the previous semester, or
   c. If the dean believes the student's overall academic performance warrants departmental intervention, then the student is not permitted to enroll further without the consent of the department. To continue in the program, the student must submit a written petition to the Graduate College requesting reinstatement and outlining a plan to remedy the academic situation. This petition must be accompanied by a letter of support from the department head or graduate coordinator. Failure to submit such a reinstatement petition could result in the canceling of any pre-enrollment for the upcoming semester.

4. *No Further Enrollment (NFE).* The student has consistently performed below the acceptable standards for graduate students. The student is not permitted to continue graduate study at OSU.

—Grades for Thesis (5000) and Dissertation (6000). The grade of "SR," indicating satisfactory research progress, or "UR," indicating unsatisfactory progress will be assigned to thesis (5000) and dissertation (6000) courses at the end of the semester in which the course is taken. These grades are permanent and have no impact on a student's grade point average. Only courses in which a grade of "SR" (or a previously-awarded grade of "R," "A," "B," or "C") is earned may be used toward minimum degree requirements.

—Grades for Creative Component Courses. The "R" grade can be assigned in a course identified as a creative component portion of a master's degree by the department concerned. The grade of "R" may be assigned if more than one semester is required to complete the creative component. Upon completion of the creative component, the advisor submits a Change of Grade form to have the final grade entered.

—Pass-No Pass Grading System. Graduate students may take a course utilizing the Pass-No Pass grading system with the consent of their major advisors, but courses taken under this system cannot be used on a plan of study to meet graduate degree requirements.

—Course Grade Appeals. A student may appeal a grade given by an instructor in a case in which he or she believes the grade awarded is inconsistent with the announced grading policy. The student should consult the "*Student Rights and Responsibilities*" or contact the Office of the Provost and Senior Vice President for information regarding initiating the appeals process.

—Appeals of Research Grades and Non-grade Issues. A student wishing to appeal a "UR" grade issued for a research course (5000 or 6000), or an academic issue not involving a grade that is the responsibility of the student's advisory committee (e.g., result of a candidacy examination or thesis/dissertation defense) should submit an appeal, containing information on the circumstances of the appeal and the remediation action sought, to the dean of the Graduate College. More information regarding this appeal process is available at the Graduate College.

—Time Limits. Students are expected to complete the requirements for a certificate, master's, or specialist degree within seven years from first enrollment after admission to the program. Students are expected to complete the requirements for a doctoral degree within nine years from first enrollment after admission to the program. After that time a student must submit a written petition to the Graduate College requesting an extension of time to degree completion. Credit for all courses on a graduate plan of study must have been awarded within ten years of completion of all degree requirements. Any exception to these time limits must be approved by the dean of the Graduate College.

—Advisory Committee Decisions-Criteria for Passing. In decisions resulting from a vote of a graduate student advisory committee (e.g., PhD candidacy exam, final thesis defense, approving a dissertation, etc.), a pass requires that the thesis/dissertation advisor vote in the affirmative and that no more than one member of the committee dissent. Departments/programs may impose more stringent requirements.

—Discontinuance from a Program. In instances when a student reaches a situation when it is no longer possible to complete the intended degree (e.g., failure of all permitted attempts of the PhD qualifying exam, comprehensive exam or candidacy exam), but is still in good academic standing within the Graduate College, a domestic student will be transferred to special student status and be subject to all special student rules (including maximum number of hours that can later be used toward a graduate degree or certificate program). If visa restrictions prohibit the student's matriculation as a special student, the Graduate College will inform the Office of international Students and Scholars of the student's impending dismissal from the program; the student will have until the end of the semester to be admitted into another graduate program. This change in status is initiated with a letter from the department head or graduate coordinator to the dean of the Graduate College, copied to the student, and should detail the reasons for the student's dismissal from the program. The student has ten working days from the letter date to petition the Graduate College for a hold of this action. If a petition for such a hold is made, the student shall remain in the program while the petition is heard.

Research Involving Human Subjects

If the thesis, dissertation, formal report or creative component involves the use of human subjects, the research project is governed by federal regulations that require review by the OSU Institutional Review Board (IRB). Approval to conduct the research must be obtained from the IRB before the research is started.

An investigator's failure to obtain approval for any research project using human subjects puts the University in non-compliance with its assurance with the federal government, which states all research involving human subjects will receive IRB review and approval.

When the research plans have been finalized, the IRB application should be completed and submitted as directed to the IRB office in 415 Whitehurst for review. After the conditions for approval have been satisfied, the IRB office will send a letter stating that the research project is authorized to begin. Each research project is governed by a protocol number, and the approval is for a maximum of one calendar year. If the research extends beyond one year, a request for continuation must be submitted. If any aspect of the approved research protocol changes, approval for the change must be obtained from the IRB by submitting a modification form.

Failure to obtain IRB approval will result in the University's rejection of the thesis, dissertation, or formal report. While the Graduate College does not monitor the process resulting in a creative component, this does not negate the student's responsibility to obtain IRB approval if human subjects are involved in that creative activity.

This section is meant to be informational only and does not contain a complete description of the IRB review process. All of the forms and guidance for completing the application are available on the IRB Internet site http://compliance.vpr.okstate.edu/IRB/forms.aspx. The IRB office is located in 415 Whitehurst.

Graduation Clearance Process

At the time of enrollment for the last semester or summer session of work toward a degree, graduate students should complete an Application for Diploma with the Office of the Registrar and submit a Graduation Clearance Form to the Graduate College. The Graduation Clearance Form is completed in conjunction with the academic advisor and confirms that a student has met or will meet by the end of the semester in question, all departmental and Graduate College requirements to earn the degree s/he is seeking. If these requirements are not met, the student must complete a new Graduation Clearance Form and Application for Diploma for a future semester. *In order to allow opportunity for any class schedule changes necessitated by the review of the Graduation Clearance Form, this form and the Application for Diploma, should be submitted before the end of the first two weeks of the regular semester or the first week of a summer session*.

Graduate Commencement and Diplomas

The University holds one Graduate Commencement exercise at the close of the fall semester and one at the close of the spring semester. Students who plan to meet graduation requirements at the close of the summer session are invited and encouraged to participate in the Graduate Commencement at the close of the previous spring semester. Although attendance is not compulsory, the University encourages all candidates

for advanced degrees to be present at the Graduate Commencement exercises. Candidates should also notify the Office of the Registrar of the address to which the diploma should be mailed.

Records and Transcripts

All permanent records are stored in the Office of the Registrar. Requests for grades, transcripts and diplomas should be made to that office.

A graduate student who does not complete the requirements in time to receive the degree at the end of the semester may secure a statement from the Office of the Registrar when all requirements for the degree have been satisfied. Such a statement will not be issued until all grades for the semester have been recorded.

Graduate Programs Offered At OSU

Interdisciplinary Programs

Oklahoma State University has a series of interdisciplinary graduate programs designed to provide students with a breadth of knowledge that is not ordinarily found in traditional programs. Descriptions are given below for the following interdisciplinary programs:

Environmental Science
Food Science
International Studies
Natural and Applied Sciences with programs of study in
    Aviation and Space Sciences
    Health Care Administration
    Interdisciplinary Sciences
    Natural Sciences
Photonics
Plant Science
Telecommunications Management

Environmental Science

Will Focht, PhD - *Director*
Talya Henderson - *Program Coordinator*

The environmental science graduate program at Oklahoma State University is based on the premise that an understanding of, and solution to, environmental problems require the application of skills and knowledge derived from multiple disciplines. Graduate faculty members from the agricultural, biological, physical, and social sciences, as well as from education and engineering, contribute to the master's and doctoral curricula. Important resources include campus research and learning institutes and laboratories, cooperative programs with public and private agencies, and off-campus research and teaching facilities. Many of these are staffed by personnel drawn from more than one discipline and address problems that are transdisciplinary in scope and solution. The program is designed to utilize these resources to serve students whose interests transcend the traditional demarcations of knowledge and whose goals include broad understanding obtained by crossing disciplinary boundaries in the classroom, laboratory and field.

Graduates from the environmental science graduate program are expected to have skills and knowledge that are applicable to a wide range of environmental research, management and planning vocations. Government, industry, consulting firms, non-government organizations, and educational institutions offer employment opportunities for environmental science graduates.

—Programs of Study. The breadth of offerings at Oklahoma State University affords flexibility to the student interested in specific aspects of the environment. A student can design a unique degree plan to target a particular focus area that meets his or her professional goals or can follow structured plans recommended for specializations in:

- environmental management
- environmental disaster management
- environmental education
- environmental policy
- environmental sustainability
- environmental toxicology and risk assessment
- environmental conflict management
- water and watershed management

The student's graduate committee assists the student in preparing a plan of study to assure focus, breadth and quality.

—The Master of Science Degree. To obtain an MS degree in environmental science, a student must complete a 36-credit hour course of study, which must include a fifteen-hour core curriculum (ENVR 5303, ENVR 5123, three hours research or statistics, three hours in social science and three hours in natural science), at least 21 additional course hours (including a general ecology course if not taken prior to admittance).

—The Doctor of Philosophy Degree. To obtain a PhD degree in environmental science, a student must complete a 60-hour plan of study beyond the masters degree program. The plan must include at least 36 credit hours of course work consisting of a six-hour skill component, a general ecology course (if not taken prior to admittance), ENVR 5303, ENVR 5123, ENVR 6011, ENVR 6022, ENVR 6031 and a minimum of 21 credit hours that reflect the biological, social and physical aspects of the concentration area selected by the student. Finally, the student must complete at least 15 credit hours of dissertation research.

—Admission. Students seeking participation in the Environmental Science MS or PhD degree programs must submit the following materials: (1) An official Graduate College application for admission, and a nonrefundable fee of $40 for domestic students and $75 for international students, (2) Official transcripts for all college level courses, minimum college grade point average of 3.0 on a 4.0 scale, (3) A statement of career goals, including competencies wishing to have upon graduation, (4) Three letters of recommendation describing potential for graduate work and beyond, (5) GRE test scores (use institution code 6546 and department code 0502), (6) International students must also have a TOEFL score of at least 90iBT/577PBT and submit a financial affidavit for the amount required by OSU, and (7) applicants must demonstrate knowledge of the fundamentals and principles of chemistry, biology and mathematics, else they will be required to obtain this knowledge in addition to their regular plan of study.

All applications to the environmental science graduate programs should be submitted at least 60 days before the opening of the semester for which enrollment is first intended. International students should supply all application materials by March 1 for summer enrollment, June 1 for fall enrollment, and October 15 for spring enrollment.

—Financial Assistance. Tuition waiver scholarships are available through the Graduate College for environmental science students.

Graduate research assistantships and other funding opportunities are often available through faculty members participating in the environmental science program. The initial application should specify an interest in a research assistantship.

Additional information about the environmental science graduate program can be found at http://environ.okstate.edu/es.

Food Science

William McGlynn, PhD - *Program Coordinator*

The following departments participate in the food science program: Agricultural Economics, Animal Science, Biochemistry and Molecular Biology, Biosystems and Agricultural Engineering, Horticulture, Plant and Soil Science, and Nutritional Sciences.

Food science is an interdisciplinary graduate program designed to provide an opportunity for students to acquire basic knowledge of the food industry encompassing the biological and physical sciences.

The increasing complexity of the problems involved in the production, processing, and utilization of food demands increased fundamental knowledge to solve these problems. There is a great demand for personnel with advanced training in the broad area of food science to staff research and quality assurance facilities of industry, universities and the federal government.

—Admission Requirements. Admission to either the Master of Science or Doctor of Philosophy degree program requires an undergraduate major in animal science, biochemistry, dairy science, food science, human nutrition, microbiology or poultry science. Students majoring in other curricula may qualify by remedying specific undergraduate deficiencies recognized by the student's graduate committee. A student enrolling in a degree program must have been accepted by an advisor prior to official admission.

The GRE is required for admission. Three letters of reference, sent to the program coordinator, are also required.

International Studies

James Hromas, PhD - *Director of the School of International Studies*

Leaders in today's global community require a broad international understanding as well as specific knowledge within a discipline. For this reason, the School of International Studies offers three multi-disciplinary graduate programs: the Master of Science in International Studies, the Master's International Program (MIP), and the Graduate Certificate in International Studies. The MIP combines the MS in International Studies with service in the Peace Corps.

—Master of Science in International Studies. Students complete 33 credit hours, including four core courses, four - five courses in a designated focus area, and two - three elective courses. Students are encouraged to participate in an international internship or other international experience. MS students complete their degree with either a thesis or a creative component.

—Master's International Program (MIP). This program provides the opportunity to incorporate Peace Corps service into the MS in International Studies degree plan. Candidates receive nine credit hours in the SIS master's program for their Peace Corps service.

—Certificate of International Studies. Taken on its own or in conjunction with another graduate program, students can receive a graduate certificate by taking 15 credit hours in International Studies. Three of the four core courses and two additional courses are selected from a focus area.

The more than 150 faculty members affiliated with the School of International Studies (SIS) come from every academic college at Oklahoma State University. Students select courses from a rich variety of subjects taught by nationally and internationally recognized scholars. Besides the interdisciplinary core courses, students concentrate in one of five focus areas:

- International Trade and Development
- International Business and Economic Relations
- International Human Relations, Society and Education
- Preservation of Environmental and Ecological Resources
- Cultural Heritage and Tourism Development

The SIS graduate programs enroll approximately 70 students from the U.S. and 28 different countries. This dynamic group is equally divided between men and women and between U.S. and international students. Graduates become part of a global network of friends and colleagues positioned to meet tomorrow's challenges.

Natural and Applied Sciences

The Master of Science in Natural and Applied Sciences consists of three program options, each with different specializations designed to address the needs of students with specific interests. The three options are health care administration, interdisciplinary sciences and natural sciences. For detailed information on these programs of study, students should contact the program coordinators.

Health Care Administration

Leigh Goodson, PhD - *Program Coordinator*

This option within natural and applied sciences is designed for individuals who seek to pursue a career in the field of health care management. The program requires students to take core courses in health care administration and research methods along with a series of electives selected from applicable courses in business and social sciences. The multidisciplinary approach to the health care administration discipline provides students with a unique perspective on the complex issues facing the profession today.

Interdisciplinary Sciences

Mark Payton, PhD - *General Program Coordinator*

This option within natural and applied sciences is for students who wish to increase their competence in a particular thematic area by taking a series of courses in several disciplines. This multidisciplinary approach provides educational opportunities leading to a variety of careers. Interdisciplinary sciences consist of no fewer than three separate fields of study with at least six hours in each field. No more than 15 hours may be taken in any one area. The advisory committee will assist the student in formulating the plan of study.

—Admission Requirements. An undergraduate grade-point average of 3.00 is required for unqualified admission. Students with a grade-point average between 2.50 and 3.00 may be admitted on a probationary basis.

Applications to the program should include:

1. a cover letter indicating the personal goals and professional objectives to be obtained from the program;
2. transcripts from all schools previously attended;
3. three letters of recommendation from persons who can describe abilities, interest, and motivation as a student;
4. a proposed course of study with an endorsement from an OSU faculty advisor.

Particular courses are not specified for the degree; the advisory committee can assist in selecting appropriate courses. The course of study must include at least 21 credit hours at the graduate level (5000 or above). Up to nine graduate hours can be transferred from a regionally-accredited graduate program with consent of the advisory committee. The student chooses any of the three master's degree plans:

1. a 30-hour plan, including a six-hour research thesis;
2. a 34-hour plan, including a two-credit hour formal report; or
3. a 36-hour plan with a well-defined, creative and scholarly component.

Natural Sciences

Mark Payton, PhD - *General Program Coordinator*

This program is for science teachers or other individuals who desire a broader program than that offered in departmental programs. The goal of the program is to provide the student with a breadth of training in science and related areas. To enter the program, the student should have completed a minimum of 30 undergraduate credit hours of science, with biological, physical and earth sciences represented.

—Admission Requirements. An undergraduate grade-point average of 3.00 is required for unqualified admission. Students with a grade-point average between 2.50 and 3.00 may be admitted on a probationary basis.

Applications to the program should include:

1. a cover letter indicating the personal goals and professional objectives to be obtained from the program;
2. transcripts from all schools previously attended;
3. three letters of recommendation from persons who can describe ability, interest, and motivation as a student;
4. a proposed course of study with an endorsement from an OSU faculty advisor.

Particular courses are not specified for the degree; the advisory committee can assist in selecting appropriate courses. However, not more than two-thirds of the courses for the degree may be taken in any one of the areas of biological, physical or earth sciences. The course of study must include at least 21 credit hours at the graduate level (5000 or above). Up to nine graduate hours can be transferred from a regionally-accredited graduate program with consent of the advisory committee. The student chooses any of the three master's degree plans:

1. a 30-hour plan, including a six-hour research thesis;
2. a 34-hour plan, including a two-credit hour formal report; or
3. a 36-hour plan with a well-defined, creative and scholarly component.

Photonics MS and PhD Programs

Robert Hauenstein, PhD / Rama Ramakumar, PhD - *Program Coordinators*

Oklahoma State University offers multidisciplinary programs in photonics leading to both the MS and the PhD degrees. Both programs draw on the faculties of the departments of Physics and Electrical and Computer Engineering. A student typically chooses either of these as his or her "home department" on the basis of academic background and research interests. A multidisciplinary program of course work is tailored to the goals of each individual student mentored by a chosen faculty member from the home department and guided by the advisory committee. Both the MS and PhD programs provide a biophotonics specialization with faculty from the departments of Chemistry or Microbiology and Molecular Chemistry, or the College of Veterinary Medicine serving as research advisors.

—MS Program Paths and Degree Requirements. There are three paths leading to the MS degree in Natural and Applied Sciences with an option in Natural Sciences and a specialization in photonics. All paths require a minimum of 24 credit hours of course work, with at least one course taken outside the student's specialization. Beyond this, the first (30 credit hour) path requires six credit hours of original research culminating in the successful defense of a master's thesis. The second (32 credit hour) path requires six additional credit hours of course work and a two credit hour report. The third (36 credit hour) path requires 12 additional credit hours of course work with a creative component. For the second and third paths at least two courses must be from outside the field of specialization; an oral presentation of the report or the creative component by the student must be acceptable to the advisory committee. A detailed plan of study specific to the specialization and path chosen is formulated by the student in consultation with the advisory committee.

—PhD Program Requirements. A total of 90 credit hours beyond the BS (60 beyond the MS) degree are required for the PhD in photonics. All students must form a preliminary advisory committee to guide them initially in the photonics PhD program. Eventually a student chooses a permanent research advisor who chairs the graduate research committee. Course work is taken from the basic and advanced courses offered by the Departments of Physics and Electrical and Computer Engineering. Courses from other departments may also be recommended by the graduate research committee. In addition, students are required to take two or more photonics tutorials, offered by faculty in their research lab, emphasizing particular research problems and techniques. A preliminary exam is administered usually during the student's second year in the PhD program. Admission to PhD candidacy follows the successful completion of the qualifying exam. The focus of the PhD program is the completion of a faculty directed research project and the defense of the resulting dissertation. A detailed plan of study specific to the research specialization chosen is formulated by the student in consultation with the advisory committee.

—Research Opportunities. The faculty emphasizes both basic and applied interdisciplinary research. To accomplish this, in addition to a myriad of state-of-the-art laser systems and computational facilities, the OSU campus houses two molecular beam epitaxial (MBE) growth and analysis facilities and unique optoelectronic THz beam systems. Current research programs include quantum optics, quantum cryptology, "whispering gallery modes," experimental and calculational programs in nanostructured materials, optical fiber communications and optical circuits for computing as well as high speed optoelectronic applications to fundamental and applied problems in the THz frequency range. Other investigations center on the preparation and characterization of specialty-doped insulators and semiconductors for use as lasing materials, non-linear optical crystals for data storage and holographic applications, and photonic-based chemical, physical and biochemical environmental sensors. Research programs in the biomedical applications of lasers at both the basic research and clinical application levels seek to understand the interaction of light with biological materials at the tissue, cellular and molecular levels.

—Admission Requirements. Students with a BS degree in physics, electrical engineering, chemistry (or related fields) are welcome to apply to the MS or PhD photonics program. No additional tests (such as the GRE) are required, but such scores may be submitted in support of an application. A TOEFL score of at least 600 is required of international students.

Applications should include:

a. a cover letter indicating the program, the department of specialization and whether the student wishes to be considered by that department for a fellowship or teaching assistantship;
b. a personal statement of interests and goals, noting especially how they relate to the degree in photonics;
c. transcripts of all previous academic work (an unofficial transcript will suffice for the application; official transcripts are required by the Graduate College after admission.)
d. the names of three persons who have been requested to submit letters of reference. The student is expected to ask the references to forward the letters to the Department of Physics.

—Financial Aid. Most students entering the photonics programs are offered a teaching assistantship in their home department. A student pursuing an original research project may receive support as a research assistant (RA) through grants and contracts to the individual faculty member who serves as the advisor.

Plant Science

Gerald Schonknecht, PhD - *Program Coordinator*

Solutions to current problems in plant science often require integration of knowledge from a number of disciplines. The Plant Science program at Oklahoma State University provides the opportunity for the exceptional PhD student to develop an academic and research program tailored to his or her individual interests and needs. Faculty participating in this program comes from the departments of Biochemistry and Molecular Biology, Botany, Entomology and Plant Pathology, Forestry, Horticulture and Landscape Architecture, Microbiology and Molecular Genetics, and Plant and Soil Science. The multidisciplinary nature of this program allows students to experience many facets of plant science and affords them the flexibility to seek employment in a variety of settings in the plant sciences. Students, in consultation with their graduate committees,

develop a program in one of three specialization areas (cellular and molecular, organismal or ecological), but are expected to develop a sound foundation across all disciplines of plant study.

—Admission Requirements. Application for admission must first be made to the Graduate College. Additional information required by the plant science steering committee includes a statement defining plant science interests, a resume, three letters of reference, an abstract of the Master of Science thesis (if applicable), GRE scores (the Advanced Biology GRE is also desirable), and a minimum TOEFL of 88iBT/570PBT. A student must be accepted by a faculty advisor prior to official admission.

—Financial Assistance. Students seeking financial assistance should inquire directly to the department(s) and faculty of interest within the plant science program.

Telecommunications Management

Mark Weiser, PhD - *Program Director*

The goal of the Master of Science degree in telecommunications management at Oklahoma State University is to prepare students with the skills necessary to manage data, video, and voice communications with telecommunication technologies and to use those technologies to manage other areas. This program is offered through traditional means to Stillwater and Tulsa students as well as via distance learning and Internet technologies to students at remote locations.

The telecommunications management program draws on the combined expertise of three OSU colleges—the College of Arts and Sciences; William S. Spears School of Business; and the College of Engineering, Architecture and Technology. This allows students to achieve a depth of knowledge in one discipline, while developing broad knowledge in business, technical and communication disciplines. It is also possible for students to emphasize information assurance through the Center for Telecommunications and Network Security and to earn multiple related government certifications.

This program prepares graduates for managing voice, video and data technologies in a competitive environment. Graduates of this program are likely to be employed by providers or users of telecommunications and network technologies.

—Telecommunications Management Curriculum. The program curriculum consists of 32-33 credit hours, including seven core courses, one practicum, and three electives. Students may choose either a part-time or full-time sequence. Full-time students can complete the program in one and one-half years while part-time students may be able to complete it in two years.

—Admission Requirements. In addition to the OSU Graduate College standard requirements, the telecommunications management program admissions committee will review students' letters of recommendation, GMAT or GRE scores, previous academic performance, and telecommunications experience.

Program information can be accessed at http://mstm.okstate.edu.

Graduate Certificate Programs

Graduate certificate programs offer students the opportunity for focused study of a body of knowledge at the graduate level, leading to the award of an academic credential that can be earned in a relatively short time. Graduate certificate programs can serve both as the core for more advanced study leading to the master's or doctoral degree, and as an opportunity to pursue specialized education that assists the individual in an established career or provides opportunity for career advancement. OSU offers graduate certificate programs in the following areas:

Business Data Mining
Engineering & Technology Management
Family Financial Planning
Forensic Examination of Questioned Documents
Information Assurance
International Studies
Negotiation and Alternative Dispute Resolution
Teaching English to Speakers of Other Languages
University Faculty Preparation

—Admission to a Graduate Certificate Program. Any student admitted to the Graduate College may apply for admission to a graduate certificate program. Some certificate programs may have additional requirements, such as official scores on a standardized test, letters of recommendation, etc. Contact the appropriate department for specifics.

—Basic Requirements. A graduate certificate requires completion of 12-21 credit hours of course work eligible for graduate credit, of which at least two-thirds must be at the 5000 level or above. Specific certificate programs may have more stringent requirements.

—Transfer of Courses. With the approval of the major department and the Graduate College, up to 3 hours of graduate-level credit from another institution may be used toward certificate requirements. The GPA must be at least 3.0 on any transfer credit.

—Academic Standing. A grade-point average of "B" (3.0) is required on courses applicable to a graduate certificate. No grade lower than a "C" may be used as part of the minimum requirements for the certificate. Individual certificate programs may have more stringent requirements.

—Plan of Study and Certificate Completion Procedures. Upon application for award of a certificate, a student should complete a plan of study listing the courses intended to be used in earning the certificate. This plan must be approved by the department head and the Graduate College prior to the credential being placed on the student's academic record. The Graduate College will prepare a certificate acknowledging completion of the required work and send it to the student, and the Office of the Registrar will place a record certifying completion of the certificate on the student's transcript.

Master's Degree Programs

Abbreviations:

MA	Master of Arts
MAg	Master of Agriculture
MBA	Master of Business Administration
MFA	Master of Fine Arts
MFSA	Master of Forensic Science Administration
MM	Master of Music
MS	Master of Science

Accounting, MS
Agricultural Communications, MS
Agricultural Economics, MS
Agricultural Education, MS
Animal Science, MS
Biochemistry and Molecular Biology, MS
Biomedical Sciences, MS
Biosystems and Agricultural Engineering, MS
Botany, MS
Business Administration, MBA
Business Geographics, MS
Chemical Engineering, MS
Chemistry, MS
Civil Engineering, MS
Communication Sciences and Disorders, MS

Computer Science, MS

Counseling, MS
(Community Counseling; School Counseling)

Creative Writing, MFA

Design, Housing and Merchandising, MS

Economics, MS

Educational Leadership Studies, MS
(College Student Development; Higher Education; School Administration)

Educational Psychology, MS
(Educational Psychology; Educational Research and Evaluation; School Psychometrics)

Educational Technology, MS
(Educational Technology - School Library Media)

Electrical Engineering, MS

Engineering and Technology Management, MS

English, MA

Entomology and Plant Pathology, MS
(Entomology; Plant Pathology)

Environmental Engineering, MS

Environmental Science, MS

Fire and Emergency Management Administration, MS

Food Science, MS

Forensic Science, MS

Forensic Science Administration, MFSA

General Agriculture, MAg
(Agribusiness; Agricultural Economics; Agricultural Education; Agricultural Leadership; Animal Science; Entomology; Horticulture; International Agriculture; Natural Resource Ecology and Management; Plant Pathology; Plant Science; Soil Science)

Geography, MS

Geology, MS

Health and Human Performance, MS
(Applied Exercise Science; Health Promotions; Physical Education)

History, MA

Horticulture, MS

Hospitality Administration, MS

Human Development and Family Science, MS
(Child and Family Services; Developmental and Family Sciences; Early Childhood Education; Gerontology; Marriage and Family Therapy)

Human Environmental Sciences, MS
(Family Financial Planning)

Industrial Engineering and Management, MS

International Studies, MS

Leisure Studies, MS

Management Information Systems, MS

Mass Communications, MS

Mathematics, MS

Mechanical Engineering, MS

Microbiology, Cell and Molecular Biology, MS

Natural and Applied Sciences, MS
(Aviation & Space Sciences; Health Care Administration; Interdisciplinary Sciences; Natural Sciences)

Natural Resource Ecology and Management, MS
(Fisheries and Aquatic Ecology; Forest Resources; Rangeland Ecology and Management; Wildlife Ecology and Management)

Nutritional Sciences, MS
(Dietetics; Nutrition)

Pedagogy and Performance, MM
(Applied Music; Conducting)

Philosophy, MA

Physics, MS

Plant and Soil Sciences, MS

Political Science, MA

Psychology, MS

Quantitative Financial Economics, MS

Sociology, MS

Statistics, MS

Teaching, Learning and Leadership, MS
(Curriculum and Leadership Studies; Elementary/Middle/Secondary Education/K-12 Education; Mathematics/Science Education; Occupational Educational Studies; Reading and Literacy;
Secondary Education for Teachers Non-traditionally Certified; Special Education)

Telecommunications Management, MS

Theatre, MA

Veterinary Biomedical Sciences, MS

Zoology, MS

—Basic Requirements. The master's degree may be earned by one of three plans:

Plan I—with thesis, 30 credit hours, consisting of 24 hours of course work and six hours of research with a grade of "SR;"

Plan II—with report, 32 credit hours, consisting of 30 hours of course work and two hours of research with a grade of "SR;"

Plan III—with no thesis or report, 32 credit hours of course work, including the creative component. The creative component may be a special report, an annotated bibliography, a project in research or design, or other creative activity, as designated by the advisory committee. Courses numbered 5000 or 6000 may not be used on a plan of study involving a creative component.

The numbers of credits specified for each plan are minimums set by the Graduate College. Departmental requirements may exceed these minimums.

The major department, with the approval of the dean of the Graduate College, decides which alternatives are open to the students. Some departments may require a minimum number of credit hours of upper-division and graduate courses in the major field, including courses taken as an undergraduate.

A student who holds a DVM, MD, DO, DDS, LLB, JD, or equivalent professional degree may receive up to nine hours credit toward a master's degree, subject to the recommendation of the advisory committee and the approval of the dean of the Graduate College. However, a student receiving this credit may not transfer additional hours to OSU from other graduate programs.

—Residence Requirements. Candidates for a master's degree must complete a minimum of 21 semester credit hours from OSU if they follow Plan I, or 23 semester credit hours if they follow Plan II or III. Nine semester credit hours of the 30 or 32 required for the degree may be completed by graduate courses taken at another accredited college or university.

Courses taken at OSU-Tulsa are considered resident credit. Courses taken from the other cooperating universities in Tulsa are considered to be transfer credit. Up to 15 graduate credit hours may be transferred from OU in Tulsa to an OSU master's plan of study.

—Advisory Committee. Upon recommendation of the head of the major department and approval of the Graduate Dean, an advisory committee of no fewer than three voting members will be appointed.

The advisory committee must include a minimum of three members of the Graduate Faculty. The chair of the committee need not necessarily serve as the student's research advisor, but must hold an OSU faculty appointment and have familiarity with the academic requirements of the degree sought. To view the roles and responsibilities associated with members of advisory committees, go to http://gradcollege.okstate.edu/faculty.

—Level of Courses Applied to Graduate Degree. Graduate students must complete no fewer than 21 semester credit hours of 5000- and 6000-level courses through Oklahoma State University as presented on the plan of study to meet requirements for the master's degree.

—Plan of Study. The plan of study for the degree must be submitted to the Graduate College *prior to completion of the 17th graduate credit hour* of enrollment for a master's program. The student should secure the plan of study form from the Graduate College, (also available from the Graduate College Internet site http://gradcollege.okstate.edu, develop the plan with the advisor, have it approved by the advisory committee and the student's department or school, and submit it to the Graduate College for final approval.

The plan of study is subject to modification. All changes must have the approval of the advisor and the student's department or school, and a final plan of study incorporating all changes should be filed in the Graduate College by the end of the second week of the semester in which the degree is to be conferred.

Graduate credit, up to a maximum of nine hours, used to obtain one master's degree may, with the approval of the advisory committee, be counted toward completion of another master's degree.

—Major Subject or Field. A major field of study may cross departmental or school lines subject to the decision of the major department or school.

To receive a master's degree, the student must have completed in the major department or field a minimum of 16 semester credit hours above the prerequisites required for graduate work in that subject or field.

—Minor Subject or Field. A minor may vary from six to 15 graduate credit hours, drawn from courses in, at most, two departments. After completing the courses required for the minor, the department head(s) or program chair(s) of each minor subject area should submit a memorandum to the Graduate College certifying the completion of the minor requirements and listing the courses completed. A notation of the minor will be added to the student's transcript after the conferral of a degree.

—Language Requirements. A candidate for a master's degree may be required to demonstrate a reading knowledge of a modern foreign language. Any such requirement of the department is included on the plan of study and is noted at the time the preliminary plan is approved by the student's advisor.

A foreign language requirement for a master's degree may be met either by examination or by college credit, according to individual department requirement.

—Written Examinations. Some departments require a written examination covering the major and minor fields. It is usually taken before the thesis or report has been completed. Arrangements for taking the examination should be made with the department at least three weeks in advance. The written examination must be passed before a final examination is scheduled, if a thesis or report option is used.

A student who fails all or part of the written examination should consult the chair of the examination committee to find out what must be done before taking another examination.

—Thesis. Any student working on a thesis should obtain a copy of the *Graduate College Thesis/Dissertation Handbook* available from the Graduate College at http://gradcollege.okstate.edu/student/thesis/default.html. A thesis must conform to the format specifications set forth in this document. The style of the document is to be determined by the advisory committee and should be reflective of publications in the student's discipline.

After completing the research, the student prepares a paper draft copy of the proposed thesis, and submits it, along with the abstract, to each member of the examining committee and to the Graduate College for a review of the format. The draft copy must be signed by the advisor and be submitted to the Graduate College no later than the stated deadline (see "Graduate College Calendar").

The student should submit an electronic copy of the final thesis through the OSU electronic submission Web site. Directions for the Web site submission are given to the student when he or she picks up the draft copy reviewed for proper format from the Graduate College. In addition, the student must submit to the Graduate College (a) one paper copy of the approval page with all original signatures and the student's name and eight digit CWID number entered at the top of the page; and (b) two signed abstracts on OSU thesis bond paper. Copies must be received no later than the stated final copy submission deadline date (see the Calendar at the front of the "Graduate College" section for dates). The student should then pay the submission fee at the Office of the Bursar.

—Report. The student must submit to the Graduate College one paper copy of the approval page with all original signatures and the student's name and eight digit CWID number entered at the top of the page.

—Final Examination. If the thesis or report option is used, the student should arrange with the major department for the final examination after the format review copy of the thesis or report has been filed in the Graduate College and distributed as described in the preceding section. The final examination may be oral or written or both.

The final examination is primarily a defense of the thesis or report. If the defense is judged inadequate, a decision on whether to permit re-examination will be made by the advisory committee. Examinations are open to all members of the Graduate Faculty, and may be attended by anyone else who obtains the permission of the committee.

The committee will notify the Graduate College immediately of results of the final examination. Following satisfactory completion of the final examination, the candidate will make changes in the thesis or report as required by the committee and by the Graduate College, and submit it in final form signed by the committee to the Graduate College by the semester deadline.

A student who fails to pass either a written or oral final examination should consult the chair of the examining committee. Another examination cannot be given for two months after a failure, and a department may limit the number of times that the examination may be repeated.

Specialist in Education Degree Program (EdS)

Education, EdS
(School Psychology)

The Specialist in Education degree is conferred as an appropriate recognition of achievement as evidenced by:

1. Successful professional performance in the area of the student's specialization.
2. Satisfactory completion of a program of graduate study of approximately two academic years.
3. Satisfactory performance on examinations designed to reveal the student's understanding of the field of specialization and its relation to other areas.
4. Preparation of a thesis dealing with some aspect of concern to the student's profession and its defense before a committee of the Graduate Faculty.

—Temporary Advisor. At the beginning of a student's Specialist in Education program, the school head will designate a member of the Graduate Faculty to serve as temporary advisor to the student. The temporary advisor will guide the student in the selection of courses for the first semester.

—Advisory Committee. Upon recommendation of the school head or the graduate committee of the school, an advisory committee of no fewer than three voting members will be appointed by the dean of the Graduate College. At least one member of the advisory committee must be from a school or department outside the student's major field of study. This committee (1) conducts the preliminary examination and conference, (2) approves the proposed plan of study, (3) supervises the student's progress in the program, (4) supervises the research, and (5) arranges for and conducts the final examination. The chair of the committee need not necessarily serve as the student's research advisor, but must hold an OSU faculty appointment and have familiarity with the academic requirements of the degree sought. To view the roles and responsibilities associated with members of advisory committees, go to http://gradcollege.okstate.edu/faculty.

—Plan of Study. The plan of study for the degree must be submitted to the Graduate College prior to completion of the 17th graduate credit hour of enrollment for a specialist in education program. The student should obtain the plan of study forms from the Graduate College or they are also available at http://gradcollege.okstate.edu, develop the plan with the advisor and submit it to the Graduate College.

The plan of study may be modified with the approval of the advisor. A final plan of study incorporating all changes should be filed in the Graduate College by the end of the second week of the semester in which the degree is to be conferred.

—Credit-hour Requirements. A minimum of 60 credit hours beyond the bachelor's degree or 33 credit hours beyond the master's degree are required for the Specialist in Education degree. This may include as many as 10 credit hours for the practicum study and accompanying report.

—Character of Work. The satisfactory completion of course work (see "General Regulations") is only one requirement for receiving the degree. The student must also: (1) pass a qualifying examination, (2) conduct an appropriate study of education, (3) show qualities of professional leadership and (4) pass a final examination.

—Residence Requirements. While the Graduate College does not have a specific residence requirement that applies to all graduate programs, departments may require a period of time in residence for students enrolled in departmental graduate programs. Departments must inform students of any residence requirements upon their admission to departmental graduate programs. No more than nine hours may be transferred from another university.

Courses taken at OSU-Tulsa are considered resident credit. Courses taken from the other cooperating universities at Tulsa are considered to be transfer credit. Up to 15 graduate credit hours may be transferred from OU-Tulsa to an OSU EdS plan of study.

—Qualifying Examination. A qualifying examination is required of all candidates for the Specialist in Education degree. The nature of this exam is determined within each specialization.

—Credit Toward an EdD or a PhD. A student holding an EdS may have the credit hour requirements for a PhD or EdD reduced to 30 hours subject to recommendation by the advisory committee and approval of the dean of the Graduate College. However, all of the remaining 30 hours toward the doctoral degree must be taken at the 5000 or 6000 level and all must be taken at OSU.

Doctor of Education Degree Programs (EdD)

Applied Educational Studies
(Aviation and Space Education; College Interdisciplinary)
Higher Education
School Administration

The degree of Doctor of Education is a professional degree conferred in recognition of outstanding ability as an educator in some special field or fields as shown by: (1) satisfactory completion of a program of study; (2) passing examinations showing an understanding of the field of specialization and its relation to allied subjects; (3) the preparation of a dissertation demonstrating ability to approach problems with a high degree of originality and independence; and (4) passing an examination covering the dissertation and related fields.

—Basic Requirements. The Doctor of Education degree requires a minimum of 90 semester credit hours beyond the bachelor's degree, or a minimum of 60 semester credit hours beyond the master's degree in a related discipline. Courses at the 5000 and 6000 level should make up at least 75 percent of the plan of study and must include ten hours, with a grade of "SR," for the doctoral dissertation. Students may use 90 hours beyond the bachelor's degree as a degree total only if admitted directly into the doctoral program from the bachelor's degree.

A student who holds a DVM, MD, DO, DDS, LLB, JD, or equivalent professional degree may also have the minimum credit hour requirement reduced to 60 hours, subject to the recommendation of their advisory committee and the approval of the dean of the Graduate College. A student may receive only one 30-hour credit reduction in the EdD requirement regardless of the number of master's or professional degrees that he or she holds.

—Temporary Advisor. At the beginning of a student's doctoral program, the school head will designate a member of the Graduate Faculty to serve as temporary advisor to the student. The temporary advisor will guide the student in the selection of courses for the first semester.

—Advisory Committee. Upon recommendation of the head of the major department and approval of the Graduate Dean, an advisory committee of no fewer than four voting members will be appointed. The duties of the advisory committee consist of (1) advising the student, (2) assisting the student in preparing a plan of study, (3) assisting in planning and conducting the research, (4) supervising the writing of the dissertation, and (5) conducting the dissertation defense.

The chair of the committee need not necessarily serve as the student's research advisor, but must hold an OSU faculty appointment, be a member of the Graduate Faculty with doctoral chairing privileges, and have familiarity with the academic requirements of the degree sought. Each doctoral committee must have at least one member of the Graduate Faculty from outside the student's major department. To view the roles and responsibilities associated with members of advisory committees, go to http://gradcollege.okstate.edu/faculty.

The student should consult the members of the advisory committee frequently and keep them informed on the progress of his or her work.

—Preliminary Conference. As soon as the student is notified that an advisory committee has been appointed, the student should arrange with the chair for a conference with the committee. During the conference, the preparation and qualifications of the student for graduate work will be discussed and appropriate plans made for future study.

—Plan of Study. After the preliminary conference, the student should complete the plan of study for the degree, have it approved by the advisory committee and submit the original form to the Graduate College.

Because the acceptance of work that the student desires to use toward the degree rests with the advisory committee, it is important to plan a complete program and have it approved by the dean of the Graduate

College as soon as possible. Forms for preparing the plan of study may be obtained at http://gradcollege.okstate.edu.

The plan of study must be submitted to the Graduate College prior to completion of the 28th credit hour of enrollment in the doctoral program.

The plan must include all the acceptable graduate work that has been completed and all that will be taken for the degree. The plan should include (1) at least 75 percent of courses taken at the 5000-6000 level, (2) a minimum of 60 hours beyond the master's degree or 30 hours beyond the EdS and (3) at least 10 hours of dissertation credit. Courses from a master's degree or EdS are not listed on the doctoral plan of study.

Credit for all courses on a graduate plan of study must have been awarded within 10 years of completion of all degree requirements.

Changes in the plan of study can be made with the approval of the advisory committee and the dean of the Graduate College. A final, accurate and approved plan must be filed before the end of the second week of the semester in which the degree is to be conferred.

—Minor Subject or Field. A minor may vary from six to 15 graduate credit hours, drawn from courses in, at most, two departments. After completing the courses required for the minor, the department head(s) or program chair(s) of each minor subject area should submit a memorandum to the Graduate College certifying the completion of the minor requirements and listing the courses completed. A notation of the minor will be added to the student's transcript after the conferral of a degree.

—Character of Work. The satisfactory completion of course work (see "General Regulations") is only one requirement for receiving the degree. The student must also: (1) pass a qualifying examination, (2) prepare an acceptable dissertation, (3) demonstrate the ability to do independent study, (4) pass a defense of dissertation and (5) comply with any other requirements of the major department.

—Residence Requirements. A minimum of 30 credit hours must be taken at Oklahoma State University. While the Graduate College does not have a specific residence requirement that applies to all graduate programs, departments may require a period of time in residence for students enrolled in departmental graduate programs. Departments must inform students of any residence requirements upon their admission to departmental graduate programs.

Courses taken at OSU-Tulsa are considered resident credit. Courses taken from the other three cooperating universities in Tulsa are considered to be transfer credit. Up to 15 graduate credit hours may be transferred from OU in Tulsa to an OSU doctoral plan of study.

—Language and Research Instruments Proficiency. All candidates will be expected to have a command of those instruments necessary in the study of educational problems. The doctoral advisory committee of each candidate may require evidence of proficiency in one or more foreign languages, educational research, statistics and computer usage.

—Admission to Doctoral Candidacy. Admission to doctoral candidacy marks the transition into the research phase of a doctoral degree and indicates agreement that the student has demonstrated the ability to do acceptable graduate work and that satisfactory progress has been made toward a degree. Consideration for candidacy requires the presentation of a written research proposal for doctoral research to the doctoral advisory committee, who will assess the proposal and offer the student pertinent counsel, advice and feedback. The approval of the research proposal by the advisory committee is the basic requirement for admission to doctoral candidacy; individual programs will normally impose additional requirements, such as the successful completion of oral and/or written comprehensive or qualifying examinations. These additional requirements may occur in conjunction with the presentation of the research proposal, or they may occur at different times within the course of doctoral study. It is the responsibility of the chair of the advisory committee to notify the Graduate College when admission to candidacy is granted by submitting the Admission to Doctoral Candidacy form.

—Dissertation Hours Taken as a Doctoral Candidate. A doctoral student should be examined for doctoral candidacy prior to completion of one-third of the required dissertation research hours (respective 6000 course) for the degree sought. Admission to candidacy must occur at least one full semester prior to the date the degree is to be conferred. An EdD student must complete at least 7 hours of dissertation research (respective 6000 course) after formal admission to doctoral candidacy.

Since admission to candidacy may occur at various times related to the academic calendar, the following guidelines assist in defining enrollment counted toward the final hours of dissertation research taken as a doctoral candidate.

- If a student is admitted to candidacy prior to the first day of a given term, all dissertation hours taken that term and following may be included in the hours of dissertation research required as a doctoral candidate.
- If a student is admitted to candidacy during a given term, but before the end of the 8th week of a regular semester (4th week of the summer term), one-half of the dissertation hours taken that term may be included in the hours of dissertation research required as a doctoral candidate.

—Dissertation. A dissertation is required of each candidate for the Doctor of Education degree. The dissertation has three principal functions: (1) training in research, (2) promoting professional growth, and (3) contributing to professional knowledge in education. Not every dissertation will be expected to serve these three functions in the same way or to the same extent.

The format specifications, procedures and regulations for the dissertation are the same as for the PhD. The EdD candidate should refer to the "Doctor of Philosophy" section on dissertations and submission procedures through the Graduate College.

Doctor of Philosophy Degree Programs (PhD)

Agricultural Economics

Agricultural Education

Animal Breeding and Reproduction

Animal Nutrition

Biochemistry and Molecular Biology

Biomedical Sciences

Biosystems and Agricultural Engineering

Business Administration (Accounting; Finance; Management; Management Science and Information Systems; Marketing)

Chemical Engineering

Chemistry

Civil Engineering

Computer Science

Crop Science

Economics

Education (Curriculum Studies; Occupational Education Studies; Professional Education Studies; Social Foundations of Education)

Educational Leadership & Policy Studies

Educational Psychology (Counseling Psychology; Educational Psychology; Research and Evaluation; School Psychology)

Electrical Engineering

English

Entomology

Environmental Science

Fire and Emergency Management Administration

Food Science

Geography

Geology

Health, Leisure and Human Performance
(Health and Human Performance; Leisure Studies)

History

Human Environmental Sciences
(Design, Housing and Merchandising; Human Development and Family Science; Hospitality Administration; Nutritional Sciences)

Industrial Engineering and Management

Mathematics

Mechanical Engineering

Microbiology, Cell and Molecular Biology

Natural Resource Ecology and Management
(Fisheries and Aquatic Ecology; Forest Resources; Rangeland Ecology and Management; Wildlife Ecology and Management)

Photonics

Physics

Plant Pathology

Plant Science

Psychology (Clinical; Life Span Development)

Sociology

Soil Science

Statistics

Veterinary Biomedical Sciences

Zoology

The Doctor of Philosophy degree is granted in recognition of high achievement in scholarship and independent investigation. The student must prove his or her acceptability by (1) successfully completing a series of courses comprising a plan of study; (2) passing various examinations demonstrating academic competence; (3) carrying out a research program under supervision and preparing an acceptable dissertation; and (4) demonstrating initiative, creative intelligence, and ability to plan and carry out research in his or her chosen field.

—Basic Requirements. The Doctor of Philosophy degree requires a minimum of 90 credit hours beyond the bachelor's degree, or a minimum of 60 credit hours beyond the master's degree in a related discipline. This includes a minimum of 15 and a maximum of 60 credits, with a grade of "SR", for the dissertation (6000). Students may use 90 hours beyond the bachelor's degree as a degree total only if admitted directly into the doctoral program from the bachelor's degree.

A student who holds a DVM, MD, DO, DDS, LLB, JD, or equivalent professional degree may also have the minimum credit hour requirement reduced to 60 hours, subject to the recommendation of their advisory committee and the approval of the dean of the Graduate College. A student may only receive one 30-hour credit reduction in the PhD requirements regardless of the number of master's or professional degrees that he or she holds.

—Temporary Advisor. At the beginning of a student's doctoral program, the head of the major department will designate a member of the Graduate Faculty to serve as temporary advisor to the student. The temporary advisor will assist the student in the early selection of courses. Often, it is the graduate coordinator who serves as the temporary advisor.

—Advisory Committee. Upon recommendation of the head of the major department and approval of the Graduate Dean, an advisory committee of not fewer than four voting members will be appointed. The duties of the advisory committee consist of (1) advising the student, (2) assisting the student in preparing a plan of study, (3) assisting in planning and conducting the research, (4) supervising the writing of the dissertation, and (5) conducting the dissertation defense.

The chair of the committee need not necessarily serve as the student's research advisor, but must hold an OSU faculty appointment, be a member of the Graduate Faculty with doctoral chairing privileges, and have familiarity with the academic requirements of the degree sought. Each doctoral committee must have at least one member of the Graduate Faculty from outside the student's major department. To view the roles and responsibilities associated with members of advisory committees, go to http://gradcollege.okstate.edu/faculty.

The student should consult the members of the advisory committee frequently and keep them informed on the progress of his or her work.

—Preliminary Conference. As soon as the student is notified that an advisory committee has been appointed, the student should arrange with the chairperson for a conference with the committee. During the conference, the preparation and qualifications of the student for graduate work will be discussed and appropriate plans made for future study.

—Plan of Study. After the preliminary conference, the student should complete the plan of study for the degree, have it approved by the advisory committee, and submit the original form to the Graduate College.

Because the acceptance of work which the student desires to use toward the degree rests with the advisory committee, it is important to plan a complete program and have it approved by the dean of the Graduate College as soon as possible. Forms for preparing the plan of study may be obtained at http://gradcollege.okstate.edu.

The plan of study must be submitted to the Graduate College prior to completion of the 28th credit hour of enrollment in the doctoral program.

The plan must include all the acceptable graduate work that has been completed and all that will be taken for the doctoral degree. The plan should include (1) at least 75 percent of courses taken at the 5000-6000 level, (2) a minimum of 60 hours beyond the master's degree, and (3) at least 15 hours and no more than 60 hours of dissertation credit. Courses used to earn a master's degree are not listed on the doctoral plan of study.

Credit for all courses on a graduate plan of study must have been awarded within 10 years of completion of all degree requirements.

Changes in the plan of study can be made with the approval of the advisory committee and the dean of the Graduate College. A final, accurate and approved plan must be filed before the end of the second week of the semester in which the degree is to be conferred.

—Minor Subject or Field. A minor may vary from six to 15 graduate credit hours, drawn from courses in, at most, two departments. After completing the courses required for the minor, the department head(s) or program chair(s) of each minor subject area should submit a memorandum to the Graduate College certifying the completion of the minor requirements and listing the courses completed. A notation of the minor will be added to the student's transcript after the conferral of a degree.

—Character of Work. The satisfactory completion of course work (see "General Regulations") is only one requirement for receiving the degree. The student must also: (1) pass a qualifying examination, (2) prepare an acceptable dissertation, (3) demonstrate the ability to do independent study, (4) pass a defense of dissertation, and (5) comply with any other requirements of the major department.

—Residence Requirements. A minimum of 30 credit hours must be taken at Oklahoma State University. While the Graduate College does not have a specific residence requirement that applies to all graduate

programs, departments may require a period of time in residence for students enrolled in departmental graduate programs. Departments must inform students of any residence requirements upon their admission to departmental graduate programs.

Courses taken at OSU-Tulsa are considered resident credit. Courses taken from the other cooperating universities in Tulsa are considered to be transfer credit. Up to 15 graduate credit hours may be transferred from OU in Tulsa to an OSU doctoral plan of study.

—Language Requirement. Foreign language or other proficiency requirements may be specified to meet the need for specific skills and areas of knowledge that facilitate research and contribute to wider understanding. Specific requirements are determined by departments or programs. In many fields, a reading knowledge of one or two modern foreign languages is an important part of scholarship and necessary for research. In other fields, proficiency in special and related disciplines may be required that will contribute to the needs of the individual program.

—Admission to Doctoral Candidacy. Admission to doctoral candidacy marks the transition into the research phase of a doctoral degree and indicates agreement that the student has demonstrated the ability to do acceptable graduate work and that satisfactory progress has been made toward a degree. Consideration for candidacy requires the presentation of a written research proposal for doctoral research to the doctoral advisory committee, who will assess the proposal and offer the student pertinent counsel, advice and feedback. The approval of the research proposal by the advisory committee is the basic requirement for admission to doctoral candidacy; individual programs will normally impose additional requirements, such as the successful completion of oral and/or written comprehensive or qualifying examinations. These additional requirements may occur in conjunction with the presentation of the research proposal, or they may occur at different times within the course of doctoral study. It is the responsibility of the chair of the advisory committee to notify the Graduate College when admission to candidacy is granted by submitting the Admission to Doctoral Candidacy form.

—Dissertation Hours Taken as a Doctoral Candidate. A doctoral student should be examined for doctoral candidacy prior to completion of one-third of the required dissertation research hours (respective 6000 course) for the degree sought. Admission to candidacy must occur at least one full semester prior to the date the degree is to be conferred. An PhD student must complete at least 10 hours of dissertation research (respective 6000 course) after formal admission to doctoral candidacy.

Since admission to candidacy may occur at various times related to the academic calendar, the following guidelines assist in defining enrollment counted toward the final hours of dissertation research taken as a doctoral candidate.

- If a student is admitted to candidacy prior to the first day of a given term, all dissertation hours taken that term and following may be included in the hours of dissertation research required as a doctoral candidate.
- If a student is admitted to candidacy during a given term, but before the end of the 8th week of a regular semester (4th week of the summer term), one-half of the dissertation hours taken that term may be included in the hours of dissertation research required as a doctoral candidate.

—Dissertation**.** A dissertation (doctoral thesis) is required of each doctoral candidate. The subject of the dissertation must be approved by the advisory committee and the dissertation is prepared under the direction of members of the committee or a special dissertation committee approved by the advisory committee chair.

The dissertation must follow specifications in the *Graduate College Thesis/ Dissertation Guidelines*, available at http://gradcollege.okstate.edu. All dissertation copies must have the necessary approval signatures before submission to the Graduate College.

After completing the research, the student prepares a draft copy of the proposed dissertation and submits a copy, along with the abstract, to each member of the committee and to the Graduate College the review of the format. The copy being submitted to the Graduate College must be approved by the student's dissertation advisor. The format review copy must be submitted to the Graduate College no later than the stated deadline date (see "Graduate College Calendar").

The student should submit an electronic copy of the dissertation through the OSU electronic submission Web site. Directions for the Web site submission are given to the student when he or she picks up the format-reviewed copy from the Graduate College. In addition, the student must submit to the Graduate College (a) one paper copy of the approval page with all original signatures and the student's name and CWID number entered at the top of the page; and (b) two signed abstracts on OSU thesis bond paper. Copies must be received no later than the stated final copy submission deadline date (see the Calendar at the front of the "Graduate College" section for dates). The student should then pay the submission fee at the Office of the Bursar.

All dissertations are microfilmed by University Microfilms, Inc. The student is required to pay a fee for microfilming the complete document and for publication of an abstract of about 350 words. The student must complete a University Microfilms Agreement Form after the dissertation has been accepted by the Graduate College. Copyrighting the dissertation is not required, but can be done at a small additional cost. OSU participates in the National Survey of Earned Doctorates. All students must complete and submit the survey.

—Final Examination. The final examination is primarily a defense of the dissertation. The examination is open to all members of the Graduate Faculty and may be attended by anyone else who obtains the permission of the committee. If the defense is judged inadequate, a pre-examination decision will be made by the advisory committee.

The committee will notify the Graduate College immediately of results of the final examination by submitting the Result of Final Examination form. Following satisfactory completion of the final examination, the candidate will make any changes required by the committee and by the Graduate College and submit the dissertation in final form signed by the committee to the Graduate College.

SUMMARY OF PROCEDURE FOR MASTER'S DEGREE

Dean-Dean of Graduate College; GCO-Graduate College Office; DH-Department Head; TA-Temporary Advisor; Advisor-Person designated by department head to advise; Comm-Committee

Procedure	Initiate through / Approved by	Time
1. Apply for admission. (Follow instruction sheet carefully. If relevant, see "Requirements for Admission to Professional Education" under College of Education.)	GCO Dean	Complete 30 days prior to enrollment or departmental deadline. (International students see section on International Admission for deadlines.)
2. Read "General Regulations" and Adviser "Master's Degree" sections, then secure registration materials in the Graduate College.	Advisor	
3. Secure assignment of a temporary advisor from major department head and enroll for the first semester.	DH & TA	
4. Plan program with advice of department head or designated Graduate Faculty member and submit plan of study.	Advisor Dean	Prior to completing the 17th credit hour.
5. Proceed with course work and research assignment.	Advisor	
6. Take comprehensive written examination if required by major department.	Advisor	See department for dates.
7. Complete the Diploma Application, make any corrections needed on plan of study, and complete the Graduation Clearance Form.	CH GCO	Within the first two weeks of the semester or session in which the degree is to be conferred. (Application is good for stated degree date only. File new diploma application if conferring of degree is delayed.)
8. Complete research, prepare final draft copy of thesis or report and submit it at least one week prior to the final examination, along with a copy of the abstract, to each member of the examining committee and to the Graduate College. The *Graduate College Thesis Handbook* is available for download from the Graduate College Internet site (http://graduatecollege.okstate.edu/student/thesis.htm) and lists specific requirements for formatting the document. The advisor must sign the copy submitted to the Graduate College.	Advisor Dean	Deadlines published yearly.
9. Take final examination or defense. The committee chair should notify the Graduate College of the examination results by submitting the Result of Final Examination form immediately following conclusion of the examination.	Advisor Dean	Deadlines published yearly.
10. Make any changes in thesis or report as required by examining committee and by the Graduate College. Advisory committee members sign final copies of thesis or report. The Graduate College makes the final decision on acceptance of the thesis or report. See the *Thesis/Dissertation Handbook* for submission options (paper or electronic).	Advisor Dean	Deadlines published yearly.
11. Pay thesis submission fee in the Office of the Bursar and return form to the Graduate College.	GCO	Form to be obtained from the Graduate College after the thesis has been formally accepted by that office.
12. Arrange for cap, gown and hood at Student Union Bookstore and attend Graduate Commencement.		

SUMMARY OF PROCEDURE FOR DOCTORAL DEGREE

Dean-Dean of Graduate College; GCO-Graduate College Office; DH-Department Head; TA-Temporary Advisor; Advisor-Person designated by department head to advise; Comm-Committee

Procedure	Initiate Through / Approved by	Time
1. Apply for admission. (Follow instruction sheet carefully.)	GCO / Dean	Complete 30 days prior to enrollment or departmental deadline. (International students see section on International Admission for deadlines.)
2. Secure assignment of a temporary advisor from major department head and enroll.	DH & TA / Dean	
3. Appoint advisory committee.	DH / Dean	
4. Prepare plan of study with assistance of committee. Submit one original approved copy to Graduate College.	Comm / Dean	Prior to completion of the 28th credit hour.
5. Fulfill foreign language requirement or attain other required proficiences.		Prior to qualifying examination.
6. Complete major portion of course work and plan dissertation program with committee.	Ch / Dean	As early in the research stage as possible.
7. Apply for and take qualifying examination.	Ch /	As determined by the department and not less than six months prior to the end of the semester in which the degree will be conferred.
8. Submit results of qualifying examination and/or application for admission to candidacy.	Comm / Dean	Not less than six months prior to the end of the semester in which degree will be conferred.
9. Verify accuracy of plan of study in Graduate College and revise if necessary. Secure committee approval for any necessary changes. Check on time limit for the degree.	Comm / Dean	Within the first two weeks of the semester or summer session in which degree is to be conferred.
10. Complete the Diploma Application and Graduation Clearance Form.	Ch / GCO	Within the first two weeks of the semester or session in which the degree is to be conferred. (Application is good for stated time only. File new diploma application if conferring of degree is delayed.)
11. Complete research, prepare final draft copy of dissertation and submit it at least one week prior to the examination, along with a copy of the abstract, to each member of the committee and to the Graduate College. The format must follow recommendations in the *Thesis/Dissertation Manual*; however, the style is to be determined by the advisory committee. The advisor must sign the paper copy submitted to the Graduate College.	Comm / Dean	Deadlines published yearly.
12. Schedule dissertation defense. The committee chair should notify the Graduate College of the results by submitting the Result of Final Examination form immediately following conclusion of the examination.	Ch / Dean	
13. Make any changes in dissertation required by examining committee and by the Graduate College. Advisory committee members sign final copies of dissertation. The Graduate College makes the final decision on acceptance of the dissertation. See the *Thesis/Dissertation Handbook* for submission option (paper or electronic).	Ch / Comm Dean	Deadlines published yearly.
14. Pay dissertation submission fee in the Office of the Bursar; complete survey of Earned Doctorate.		Form to be obtained from the Graduate College after dissertation has been formally accepted by that office.
15. Rent or buy cap, gown, and hood at Student Union Bookstore and attend Graduate Commencement.		

Graduate Faculty

Graduate Faculty is listed in two sections: Members and Members Emeriti. Degrees held and degree granting institutions are listed for each member. Dates following indicate: first, the year that the faculty member was appointed to his or her current faculty position; second, the year that the faculty member was initially appointed to a position at Oklahoma State University. A single date means that these two coincide.

Members

Abdolvand, Reza, B.S. (Sharif Univ. of Technology, Iran), M.S. (ibid.), Ph.D. (Georgia Institute of Technology); *Assistant Professor of Electrical and Computer Engineering*. 2009, 2008.

Abramson, Charles, B.A. (Boston Univ.), M.A. (ibid.), Ph.D. (ibid.); *Regents Professor of Psychology.* 1998, 1993.

Acken, John M., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Stanford); *Assistant Professor of Electrical and Computer Engineering*. 2001.

Ackerson, Bruce, B.S. (Univ. of Nebraska), M.S. (Univ. of Colorado), Ph.D. (ibid.); *Professor of Physics.* 2004, 1977.

Adam, Brian D., B.S. (Wheaton College), M.S. (Univ. of Nebraska, Lincoln), Ph.D. (Univ. of Illinois); *Professor of Agricultural Economics.* 1994, 1990.

Adams, Brant, B.M. (Capital Univ.), M.M. (Univ. of Cincinnati Coll. Conservatory of Music), Ph.D. (Univ. of Texas, Austin); *Professor of Music*. 1996.

Adams, Damian C., B.S. (Univ. of Florida), M.A. (ibid.), Ph.D. (Univ. of Florida); *Assistant Professor of Agricultural Economics*.

Adkins, Lee C., B.S. (Florida State Univ.), M.A. (Louisiana State Univ.), Ph.D. (ibid.); *Professor of Economics.* 1998, 1988.

Adkison, Danny M., B.A. (O.S.U.), M.A. (ibid.), Ed.D. (ibid.); *Associate Professor of Political Science.* 1989, 1976.

Adolphson, Alan C., B.A. (Western Washington Univ.), Ph.D. (Princeton Univ.); *Regents Professor of Mathematics.* 1987, 1983.

Agarwal, Girish Saran, B.S. (Univ. of Grakhpur), M.S. (Banaras Hindu Univ.), Ph.D. (Univ. of Rochester); *Regents Professor of Physics.* 2006, 2004.

Ahmad, Ibrahim Abe, B.Sc. (Univ. of Cairo), M.S. (Florida State Univ.), Ph.D. (ibid.); *Professor of Statistics.*

Ahmad, Salahuddin, B.Sc. (Dhaka Univ., Bangladesh), M.Sc. (ibid.), Ph.D. (Univ. of Victoria, B.C., Canada); *Adjunct Associate Professor of Physics.* 2008.

Ahmed, Mohamed Samir, B.S. (Cairo Univ.), M.S. (Ain-Shams Univ.), M.S. (McGill Univ.), Ph.D. (Univ. of Oklahoma); *Professor of Civil and Environmental Engineering.* 1991, 1980.

Aichele, Douglas B., B.A. (Univ. of Missouri), M.A. (ibid.), Ed.D. (ibid.); *Professor of Mathematics.* 1990, 1969.

Aime, Federico, B.S. (Univ. of Catolica, Argentina), M.B.A. (Univ. of North Carolina), Ph.D. (Michigan State Univ.); *Assistant Professor of Management.* 2006.

Akselrod, Mark, B.S. (Urals State Technical Univ.), Ph.D. (ibid.); *Adjunct Associate Professor of Physics.* 2008.

Alderson, Robert Matthew, B.A. (Auburn Univ.), M.S. (Univ. of South Alabama), Ph.D. (Univ. of Central Florida); *Assistant Professor of Psychology.* 2009.

Allday, Richard Allan, B.A. (Auburn Univ.), M.Ed. (ibid.), Ph.D. (ibid.); *Assistant Professor of Teaching and Curriculum Leadership.* 2007.

Allen, Kevin P., B.S. (Southwest Missouri State Univ.), M.S. (O.S.U.), Ph.D. (ibid.); *Assistant Professor of Natural Resource Ecology and Management.* 2006.

Allen, Randy Dale, B.S. (Southwestern Adventist College), M.A. (Univ. of Texas, Arlington), Ph.D. (Texas A&M Univ.); *Professor of Biochemistry and Molecular Biology.* 2009.

Allen, Robert W., B.S. (Univ. of Tulsa), Ph.D. (Purdue Univ.); *Associate Professor of CHS: Forensic Sciences.* 2001.

Allison, Robin W., A.A.S. (Columbus Technical Inst.), D.V.M. (Colorado State Univ.), Ph.D. (ibid.); *Assistant Professor of VBS: Pathobiology.* 2004.

Alspach, Dale E., B.S. (Univ. of Akron), Ph.D. (Ohio State Univ.); *Professor of Mathematics.* 1990, 1979.

Amiri, Ali, B.S. (IHEC, Tunisia), MBA (Ohio State Univ.), Ph.D. (ibid.); *Associate Professor of Management Science and Information Systems.* 2001, 1998.

Amos, Orley M., B.A. (Wichita State Univ.), M.S. (Iowa State Univ.), Ph.D. (ibid.); *Professor of Economics.* 1988, 1979.

Anderson, Jeffrey, B.A. (Rugers Univ.), Ph.D. (Univ. of Florida); *Professor of Horticulture and Landscape Architecture.* 1996, 1986.

Anderson, Kim B., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Professor of Agricultural Economics*. 1990, 1982.

Anderson, Michael P., B.S. (Brigham Young Univ.), M.S. (Univ. of Minnesota), Ph.D. (ibid.); *Associate Professor of Plant and Soil Sciences.* 1995, 1990.

Anderson, Todd Alan, B.S. (Peru State College), M.S. (Univ. of Tennessee), Ph.D. (Iowa State Univ.); *Adjunct Professor of Zoology.* 2007.

Anella, Louis, B.A. (Vassar College), M.S. (Cornell Univ.), Ph.D. (Cornell Univ.); *Associate Professor of Horticulture and Landscape Architecture.* 1998, 1997.

Antonenko, Pavlo D., B.S. (Nizhyn State Pedagogical Univ.), M.Ed. (ibid.), Ph.D. (Iowa State Univ.); *Assistant Professor of Educational Studies.* 2007.

Apblett, Allen W., B.S. (Univ. of New Brunswick), Ph.D. (Univ. of Calgary); *Associate Professor of Chemistry.* 2003, 1997.

Applegate, Michael, B.A. (Brigham Young Univ.), Ph.D. (Iowa State Univ.); *Professor of Economics.* 1990, 1974.

Arble, Jason B., B.S. (New Mexico State Univ), M.S. (Ohio State Univ.), D.V.M. (Louisiana State Univ.); *Assistant Professor of VBS: Veterinary Clinical Sciences.* 2008.

Arena, Andrew S., B.S. (Univ. of Arizona), M.S. (Univ. of Notre Dame), Ph.D. (ibid.); *Professor of Mechanical and Aerospace Engineering.* 2004, 1993.

Arjmandi, Bahram H., B.S. (N.S.& F.C. Tehran), M.S. (Pittsburgh State Univ.), Ph.D. (Kansas State Univ.), Post.D. (Univ. of Texas).; *Regents Professor of Nutritional Sciences.* 2001, 1998.

Arnall, Daryl Brian, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Assistant Professor of Plant and Soil Sciences.* 2009, 2008.

Arnold, Todd J., B.B.A. (Univ. of Texas), M.B.A. (Univ. of Wyoming), Ph.D. (Univ. of Missouri); *Assistant Professor of Marketing.* 2006.

Arrese, Estela Laura, B.S. (Univ. of La Plata), Ph.D. (ibid.); Research *Associate Professor of Biochemistry and Molecular Biology.* 2008.

Asgari, Mahdi, B.S. (Sharif Univ. of Tech.), M.S. (Purdue Univ.), Ph.D. (ibid.); *Assistant Professor of Mathematics.* 2008.

Atekwana, Eliot Anong, B.S. (Univ. of Maryland), M.S. (Howard Univ.), Ph.D. (Western Michigan Univ.); *Associate Professor of Geology.* 2006.

Atekwana, Estella Akweseh, B.S. (Howard Univ.), M.S. (ibid.), Ph.D. (Dalhousie Univ.); *Professor of Geology.* 2006.

Atiyeh, Hasan, B.S. (Jordan Univ. of Science & Tech.), M.S. (ibid.), Ph.D. (Univ. of Ottawa); *Assistant Professor of Biosystems and Agricultural Engineering*. 2009.

Ausburn, Lynna Joyce, B.S. (Univ. of Tulsa), M.A. (ibid.), Ph.D. (Univ. of Oklahoma); *Associate Professor of Teaching and Curriculum Leadership.* 2005, 2000.

Ausman, Kevin Douglas, B.A. (Rice Univ.), Ph.D. (ibid.); *Assistant Professor of Chemistry.* 2006.

Austin, Linda, B.A. (State Univ. of New York-Stony Brook), M.S. (Univ. of Illinois), M.A. (Univ. of Rochester), Ph.D. (ibid.); *Professor of English.* 2006, 1985.

Ayoubi, Patricia Jane, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Assistant Professor of Biochemistry and Molecular Biology.* 2005.

Babu, Kaladi S., B.Sc.Ed. (Univ. of Mysore, India), M.Sc.(I.I.T. Bombay, India), Ph.D. (Univ. of Hawaii); *Professor of Physics*. 2005, 1998.

Bahr, Robert J., B.S. (O.S.U.), D.V.M. (ibid.), ACVR (American College of Veterinary Radiology); *Associate Professor of VBS: Veterinary Clinical Sciences*. 2002.

Bailey, Lucy, B.A. (Univ. of Tennessee), M.A. (Ohio State Univ.), Ph.D. (ibid.); *Assistant Professor of Educational Studies.* 2005.

Balasundaram, Balabhaskar, B.T. (Indian Inst. of Tech.), Ph.D. (Texas A&M Univ.); *Assistant Professor of Industrial Engineering and Management*. 2007.

Bandy, Donna Kay, B.A. (Univ. of Iowa), M.A. (Drexel Univ.), Ph.D. (ibid.); *Professor of Physics.* 2004, 1987.

Banks, J. C., B.S. (O.S.U.),M.S. (ibid.), Ph.D. (ibid.); *Professor of Plant and Soil Sciences.* 1996, 1988.

Banschbach, Martin W., A.B. (Susquehanna Univ.), M.S. (Virginia Polytechnic Institute), Ph.D.(ibid.); *Professor of CHS: Biochemistry and Microbiology.* 1985, 1980.

Barbre, James O., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Visiting Assistant Professor of Educational Studies.* 2007.

Barchini, Leticia, B.A. (Univ. Nacional de Tucuman, Argentina),Ph.D. (Univ. Nacional de Cordoba,Argentina); *Professor of Mathematics.* 2004, 1997.

Barnes, Laura L.B., B.A. (Univ. of Nebraska, Lincoln), M.A. (ibid.), Ph.D. (ibid.); *Associate Professor of Educational Studies.* 1995, 1990.

Barney, David Clive, B.S. (Weber State Univ.), M.Ed. (Utah State Univ.), Ed.D. (Florida State Univ.); *Assistant Professor of Applied Health and Educational Psychology.* 2007.

Barrow, William W., B.S. (Midwestern State Univ.), M.S. (Univ. of Houston), Ph.D. (Colorado State Univ.); *Professor of VBS: Pathobiology.* 2001.

Bartels, Kenneth E., M.S. (Colorado State Univ.), D.V.M. (Iowa State Univ.); *Professor of VBS: Veterinary Clinical Sciences.* 1993, 1982.

Basu, Arpita, B.S. (Univ. of Calcutta, India), M.S. (ibid.), Ph.D. (Texas Woman's Univ.); Assistant Professor of Nutritional Sciences. 2007, 2006.

Basu, Raja, B.A. (Delhi Univ.), M.B.A. (Duke Univ.), Ph.D. (Purdue Univ.); *Associate Professor of Management*. 1996, 1991.

Batteiger, Richard P., B.A. (Ohio Univ.), M.A. (Univ. of Florida), Ph.D. (ibid.); *Associate Professor of English*. 1989, 1985.

Baum, Kristen, B.S. (The College of William and Mary), M.S. (Texas A&M Univ.), Ph.D. (ibid.); *Assistant Professor of Zoology.* 2008, 2006.

Bays, Brad, B.A. (O.S.U.), M.S. (Univ. of Tennessee), Ph.D. (Univ. of Nebraska); *Associate Professor of Geography*. 2001, 1995.

Beeby, Gary J., B.S. (Phillips Univ.), M.A. (Univ. of Illinois); *Assistant Professor of Communications Sciences and Disorders*. 1974.

Beier, Richard, B.S. (Kansas State Univ.), M.S. (ibid.), Ph.D. (Univ. of California); *Associate Professor of College of Engineering.* 2002.

Belden, Jason B., B.S. (Southwestern College), M.S. (Wichita State Univ.), Ph.D. (Iowa State Univ.); *Assistant Professor of Zoology.* 200.

Bell, Gregory E., B.S. (Ohio State Univ.), M.S. (ibid.), Ph.D. (ibid.); *Associate Professor of Horticulture and Landscape Architecture.* 2002, 1997.

Bell, Patricia A., B.S.(O.S.U.), M.S.(ibid.), Ph.D. (Univ. of Texas); *Professor of Sociology.* 1987, 1981.

Bell, Stephen S., B.S.E.E. (Univ. of Wisconsin), M.S.E.E. (ibid.), Ph.D. (ibid.); *Associate Professor of College of Engineering.* 1991, 1988.

Beller, Caroline, B.S. (Florida Atlantic Univ.), M.Ed. (Texas A&M Univ.), Ph.D. (ibid); *Assistant Professor of Teaching and Curriculum Leadership.* 2003, 2003.

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Belmonte, Laura, A.B. (Univ. of Georgia), M.A. (Univ. of Virginia), Ph.D. (ibid.); *Associate Professor of History.* 2005, 1996.

Belter, Babette, B.M. (Univ. of Wisconsin Stevens Point), B.M.E., M.M. (Michigan State Univ.); *Associate Professor of Music.* 1988.

Bement, Leland C., B.A. (Fort Lewis College), M.A. (Univ. of Texas), Ph.D. (ibid.); *Adjunct Professor of Plant and Soil Sciences*. 2007.

Bender, Carol L., B.S. (Texas Tech), M.S. (Oregon State), Ph.D. (Univ. of California); *Regents Professor of Entomology and Plant Pathology and Adjunct Professor Microbiology.* 1997, 1986.

Benjamin, Bruce A., B.A. (Westminster College), Ph.D. (Univ. of Oklahoma); *Associate Professor of CHS: Pharmacology and Physiology.* 1999, 1997.

Bensen-Cain, Rebecca, B.A. (Univ. of New Orleans), M.A. (Michigan State Univ.), Ph.D. (Univ. of California, Santa Barbara); *Assistant Professor of Philosophy*. 2007.

Benson, Stacy Douglas, B.S. (Georgia Institute of Technology), Ph.D. (Univ. of Pennsylvania); *Assistant Professor of Chemistry.* 2004.

Benton, Eric R., B.S. (Univ. of San Francisco), Ph.D. (Univ. College Dublin); *Assistant Professor of Physics.* 2006.

Berlin, Kenneth Darrell, B.A. (North Central College, Illinois), Ph.D. (Univ. of Illinois, Urbana); *Regents Professor of Chemistry*. 1971, 1960.

Betts, Nancy M., B.A. (Pennsylvania State Univ.), M.S. (The Ohio State Univ.), Ph.D. (ibid.); *Professor of Nutritional Sciences*. 2005.

Bidwell, Terrence G., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Professor of Natural Resource Ecology and Management and Adjunct in Zoology.* 1997, 1988.

Bidwell, Joseph R., B.S. (Siena College), M.S. (Virginia Tech), Ph.D. (ibid.); Associate Professor of Zoology. 2006, 2001.

Bilbeisi, Mohammed U., B.Arch (O.S.U.), M.Arch (ibid.); Associate Professor of Architecture. 1999.

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Billman, Jon Donald, B.A. (Iowa Wesleyan College), M.F.A. (Eastern Washington Univ.); *Assistant Professor of English*. 2007.

Binegar, Birne, B.S. (Univ. of California at Los Angeles), M.S. (ibid.), Ph.D. (ibid.); *Associate Professor of Mathematics.* 1993, 1988.

Biros, David P., B.A. (Flagler College), M.A. (The Troy State Univ.), M.S. (Air Force Institute of Technology), Ph.D. (Florida State Univ.); *Assistant Professor of Management Science and Information Systems.* 2006.

Bishop, Alexander J., B.A. (Benedictine College), M.A. (Western Illinois Univ.), Ph.D. (Iowa State Univ.); *Assistant Professor of Human Development and Family Science.* 2005.

Blackwell, Cindy Southard, B.J. (Univ. of Texas, Austin), M.U.P. (Texas A&M), Ph.D. (ibid.); *Assistant Professor of Agricultural Education.* 2004.

Blewett, Earl L., B.Sc. (Univ. of Saskatchewan), M.Sc. (ibid.), Ph.D. (ibid.); *Associate Professor of CHS: Biochemistry and Microbiology.* 2002, 1997.

Bliss, Timm J., B.S. (Texas Tech Univ.), M.S. (O.S.U.), Ed.D. (ibid.); *Associate Professor of Educational Studies.* 2006, 2001.

Blouin, Edmour F., B.S. (Suffolk Univ.), M.A. (Univ. of South Dakota, Vermillion), Ph.D. (O.S.U.); *Assistant Researcher of VBS: Pathobiology.* 1992, 1989.

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Boileau, Melanie Julie, M.S. (OSU), D.V.M. (Montreal Univ.); *Assistant Professor of VBS: Veterinary Clinical Sciences.* 2006.

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Borland, Jennifer Regan, B.A. (Univ. of Pennsylvania), M.A. (Stanford Univ.), Ph.D. (ibid.); *Assistant Professor of Art*. 2008.

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Boswell, Donald L., B.A. (Univ. of Central Florida), M.S. (Indiana State Univ.), Ph.D. (ibid.); *Associate Professor of Applied Health and Educational Psychology*. 1991.

Bourne, David W.A., B.Pharm. (Victorian College of Pharmacy), M.S. (Univ. of Kansas), Ph.D. (ibid.); *Adjunct Professor of VBS: Physiological Sciences.*

Bouton, Joseph H., B.S. (Mississippi State Univ.), M.S. (Univ. of Florida), Ph.D. (ibid.); *Adjunct Professor of Plant and Soil Sciences.* 2007.

Bovenschen, Wayne F., B.A. (Mich. State Univ.), M.M. (Michigan State Univ.); *Associate Professor of Music.* 1987.

Bowler, Wm. Matthew, B.S. (Southwest Missouri State Univ.), M.B.A. (ibid.), Ph.D. (Univ. of Kentucky); *Assistant Professor of Management.* 2006.

Bowser, Timothy J., B.S. (Pennsylvania State Univ.), M.S. (ibid.), Ph.D. (Univ. of Tenn.); *Associate Professor of Biosystems and Agricultural Engineering.* 2003, 1997.

Boyer, Tracy Ann, B.A. (Stanford Univ.), M.A. (Univ. of Minnesota), Ph.D. (ibid.); *Assistant Professor of Agricultural Economics*. 2003.

Bracy, R. Michael, B.A. (Univ. of Arkansas), M.A. (ibid.), Ph.D. (Univ. of Arkansas); *Assistant Professor of History*. 2005.

Brandenberger, Lynn, B.S. (O.S.U.), M.Ag. (Texas A&M Univ.), Ph.D. (Univ. of Arkansas); *Associate Professor of Horticulture and Landscape Architecture.* 2002.

Branson, Donna H., B.A. (Dominican Univ.), M.S. (Univ. of Rhode Island), Ph.D. (Michigan State Univ.); *Regents Professor of Design, Housing and Merchandising.* 2005, 1983.

Braun, Janet Kay, B.S. (Univ. of Memphis), M.S. (ibid.), Ph.D. (Univ. of Oklahoma); *Adjunct Assistant Professor of Zoology.*

Breazile, James E., B.S. (Univ. of Missouri), D.V.M. (ibid.), Ph.D. (Univ. of Minnesota); *Professor of VBS: Physiological Sciences*. 1986, 1978.

Brenner, George M., B.S. (Univ. of Kansas), M.S. (Baylor Univ.), Ph.D. (Univ. of Kansas); *Professor of CHS: Pharmacology and Physiology.* 1982, 1976.

Breshears, Melanie Ann, B.S. (O.S.U.), D.V.M. (ibid.), Ph.D. (ibid.); *Assistant Professor of VBS: Pathobiology.* 2005.

Brewer, Todd F., B.S. (N.E. State Univ.), M.S. (Univ. of Tulsa), Ph.D. (Univ. of Nevada, Reno); *Civil and Environmental Engineering*. 2007.

Brewster, Dennis R., B.A. (Southwestern O.S.U.), M.A. (Univ. of Oklahoma), Ph.D. (ibid.); *Assistant Professor of Sociology.* 2005.

Briggeman, Brian, B.S. (Kansas State Univ.), M.S. (Texas A&M Univ.), Ph.D. (Purdue Univ.); *Assistant Professor of Agricultural Economics.* 2006.

Brooks, Ronald Clark, B.S. (Old Dominion Univ.), M.F.A. (ibid.), Ph.D. (Univ. of Oklahoma); *Assistant Professor of English.* 2005.

Brorsen, B. Wade, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Texas A&M Univ.); *Regents Professor of Agricultural Economics.* 1992, 1991.

Brosi, Matthew William, B.S. (Univ. of Missouri, Northwest), M.S. (Univ. of Arkansas), Ph.D. (Michigan State Univ.); *Assistant Professor of Human Development and Family Science.* 2005.

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Brown, Anthony Edward, B.A. (Baylor Univ.), M.P.A. (Univ. of Tennessee), Ph.D. (ibid.); *Associate Professor of Political Science*. 2001, 1980.

Brown, Barbara Jean, B.S. (Kansas State Univ.), M.S. (ibid.), Ph.D. (O.S.U.); *Assistant Professor of Nutritional Sciences*. 2000.

Brown, Glenn Owen, B.S. (Arizona State Univ.), M.S. (Colorado State Univ.), Ph.D. (ibid.); *Professor of Biosystems and Agricultural Engineering.* 2001, 1987.

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Brown, Tom, B.S. (O.S.U.), M.B.A. (ibid.), Ph.D. (Univ. of Wisconsin, Madison); *Professor of Marketing*. 1997.

Brunker, Jill D., B.S. (O.S.U.), D.V.M. (ibid.), Diplomate (ibid.); *Assistant Professor of VBS: Veterinary Clinical Sciences.* 2009.

Brusewitz, Gerald Henry, B.S. (Univ. of Wisconsin), B.S.M.E. (ibid.), M.S. (ibid.), Ph.D. (Michigan State Univ.); *Regents Professor of Biosystems and Agricultural Engineering.* 1992, 1969.

Bruton, Benny D., B.S. (East Central O.S.U.), M.S. (O.S.U.), Ph.D. (Texas A&M Univ.); *Adjunct Professor of Entomology and Plant Pathology*. 1997.

Bryans, William S., B.A. (Colorado State Univ.), M.S. (ibid.), Ph.D. (Univ. of Wyoming); *Associate Professor of History*. 1993, 1988.

Bryant, Richard J., B.S. (O.S.U.), M.S. (Colorado State Univ.), Ph.D. (Univ. of Oklahoma); *Assistant Professor of Teaching and Curriculum Leadership*. 2002.

Buchheim, Mark Alan, B.A. (Wartburg College), M.S. (Iowa State Univ. of Science & Tech.), Ph.D. (Univ. of Illinois at Urbana, Champaign); *Associate Professor of Microbiology and Molecular Genetics.* 2007.

Buckner, David Lee, B.S.E. (Univ. of Arkansas), M.Ed. (ibid.), Ph.D. (ibid.); *Assistant Professor of Teaching and Curriculum Leadership*. 2006.

Bukkapatnam, Satish T.S., B.T. (S.V. Univ., India), M.S. (Pennsylvania State Univ.), Ph.D. (ibid.); *Associate Professor of Industrial Engineering and Management.* 2004.

Bulut, Rifat, B.S. (Middle East Technical Univ., Turkey), M.S. (Texas Tech Univ.), Ph.D. (Texas A&M Univ.); *Assistant Professor of Civil and Environmental Engineering*. 2006.

Bunce, Richard A., B.S. (Marietta College), Ph.D. (Univ. of Wisconsin, Madison); *Professor of Chemistry.* 1998, 1983.

Bunting, Charles F., B.S.E.E.T. (Old Dominion Univ.), M.S.E.E. (Virginia Tech.), Ph.D. (ibid.); *Associate Professor of Electrical and Computer Engineering.* 2001.

Burchard, Hermann G., Dipl.-Math. (Univ. of Hamburg), Ph.D. (Purdue Univ.); *Professor of Mathematics*. 1977, 1972.

Burkholder, Kristen M., B.A. (Scripps College), M.A. (Univ. of Minnesota), Ph.D. (ibid.); *Assistant Professor of History.* 2003.

Burkley, Melissa, B.S. (Southern Illinois Univ.), M.A. (ibid.), Ph.D. (Univ. of North Carolina); *Assistant Professor of Psychology.* 2006.

Burkley, Edward, B.S. (Southern Illinois Univ.), M.A. (ibid.), Ph.D. (Univ. of North Carolina); *Assistant Professor of Psychology*. 2006.

Burnap, Robert L., B.S. (Univ. of Michigan), M.A. (Univ. of California, Los Angeles), Ph.D. (Univ. of California, Santa Barbara); *Professor of Microbiology and Molecular Genetics*. 2001, 1991.

Burnham, David Kim, B.S. (Brigham Young Univ.), M.S. (ibid.), Ph.D. (Univ. of Texas Health Sciences Center); *Associate Professor of Microbiology and Molecular Genetics.* 1993, 1988.

Burrell, Anthony, B.S. (Univ. of California, Santa Barbara), M.S. (West Coast Univ.), Ph.D. (Univ. of Virginia); *Associate Professor of Computer Science.* 2002, 1999.

Butler, Twain Jason, B.S. (Texas A&M Univ.), M.S. (O.S.U.), Ph.D. (Texas Tech); *Adjunct Assistant Professor of Plant and Soil Sciences*. 2007.

Byrd-Craven, Jennifer, B.A. (Univ. of New Mexico), M.S. (Univ. of Texas, Tyler), Ph.D. (Univ. of Missouri); *Assistant Professor of Psychology*. 2008.

Byrnes, Joseph F., B.A., (De Montfort Seminary), M.A. (Univ. of Notre Dame), M.A., Ph.D. (Univ. of Chicago); *Professor of History.* 1988, 1976.

Byrnes, Jeffrey Myer, B.A. (Case Western Reserve Univ.), Ph.D. (Univ. of Pittsburgh); *Assistant Professor of Geology.* 2009, 2007.

Caddel, John L., B.S. (Texas A&I Univ.), Ph.D. (O.S.U.); *Professor of Plant and Soil Sciences.* 1986, 1977.

Cain, James W., B.A. (Univ. of Delaware), Ph.D. (Univ. of Pennsylvania); *Assistant Professor of Philosophy*. 1998.

Caldwell, Lloyd, B.A. (Univ. of Cinncinnati), M.F.A. (Virginia Commonwealth Univ.); *Assistant Professor of Theatre*. 2004.

Callahan, Jennifer L., B.A. (Jamestown College), M.S. (Univ. of Wisconsin, Milwaukee), Ph.D. (ibid.); *Assistant Professor of Psychology.* 2004.

Camara, Antonio, B.B.A. (Universidade Catolica Portugesa), M.S. (Universidade Tecnica de Lisboa), Ph.D. (Lancaster Univ.); *Associate Professor of Finance*. 2007.

Caneday, Lowell, B.A. (Le Tourneau College), M.A. (Univ. of Wyoming), Ph.D. (Univ. of Minnesota); *Professor of Applied Health and Educational Psychology*. 1992, 1981.

Caniglia, Beth Schaefer, B.A. (Univ. of Nebraska), M.A. (Univ. of Notre Dame), Ph.D. (ibid.); *Associate Professor of Sociology.* 2008, 2000.

Carlozzi, Alfred, B.A. (Iona College), M.A. (Trinity Univ.), Ed.D. (Univ. of Houston); *Professor of Applied Health and Educational Psychology.* 1983, 1979.

Carlozzi, Barbara L., B.A. (Michigan State University), M.Ed. (Univ. of Houston), Ph.D. (O.S.U.); *Assistant Professor of Applied Health and Educational Psychology.* 2001.

Carlson, John Douglas, B.S. (Michigan State Univ.), M.S. (Univ. of Wisconsin, Madison), Ph.D. (The Ohio State Univ.); *Research Associate of Biosystems and Agricultural Engineering.* 2002, 1991.

Carpenter, Nancy J., B.A. (Albion College), M.S. (Univ. of Michigan), Ph.D. (ibid.); *Adjunct Professor of CHS: Biochemistry and Microbiology.* 1995.

Carter, Brian J., B.S. (Rutgers Univ.), M.S. (Penn State Univ.), Ph.D. (ibid.); *Professor of Plant and Soil Sciences*. 1993, 1982.

Carter, David A., B.S. (Brigham Young Univ.), M.B.A. (Utah State Univ.), Ph.D. (Univ. of Georgia); *Associate Professor of Finance*. 2004, 1998.

Carter, Scott D., B.S. (O.S.U.), Ph.D. (Univ. of Kentucky); *Associate Professor of Animal Science.* 2005, 1997.

Cartinhour, John W., B.S. (Univ. of Arkansas, Little Rock), M.S. (O.S.U.), Ph.D. (ibid.); *Associate Professor of Engineering Technology Division.* 1992, 1987.

Cartmell II, David Dwayne, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Univ. of Missouri); *Assistant Professor of Agricultural Education*. 2001.

Carver, Brett F., B.S. (Univ. of Georgia), M.S. (North Carolina State Univ.), Ph.D. (ibid.); *Regents Professor of Plant and Soil Sciences.* 1992, 1985.

Castle, Kathryn, B.A. (Univ. of Oklahoma), M.A. (Emory Univ.), Ed.D. (Univ. of Virginia); *Professor of Teaching and Curriculum Leadership.* 1985, 1975.

Catlos, Elizabeth, B.S. (Univ. of California, San Diego), Phil. Cand. (Univ. of California, Los Angeles), Ph.D. (ibid.); *Associate Professor of Geology*. 2001.

Cavins, Todd, *Assistant Professor of Horticulture and Landscape Architecture*. 2007.

Cemen, Ibrahim, B.S. (Istanbul Univ.), M.S. (Ohio State Univ.), Ph.D. (Pennsylvania State Univ.); *Professor of Geology.* 1994, 1984.

Chakraborty, Goutam, B.Tech. (Indian Institute of Technology, Kharagpur), M.S. (Univ. of Iowa), Ph.D. (ibid.); *Associate Professor of Marketing.* 1991.

Chambers, Frank W., B.S.M.E. (Purdue Univ.), M.S.M.E. (Univ. of Pennsylvania), Ph.D. (Purdue Univ.); *Associate Professor of Mechanical and Aerospace Engineering.* 1993, 1989.

Champlin, Franklin Ross, B.S. (OSU), Ph.D. (OSU); *Associate Professor of CHS: Biochemistry and Microbiology.* 2006.

Chandler, Damon M., B.S. (The Johns Hopkins Univ.), M.S. (Cornell Univ.), Ph.D. (ibid.); *Assistant Professor of Electrical and Computer Engineering.* 2009, 2006.

Chandler, John P., B.S. (Lehigh Univ.), M.S. (Indiana Univ.), Ph.D. (ibid.); *Professor of Computer Science*. 1991, 1970.

Chaney, John M., B.A. (Univ. of Central Oklahoma), M.S. (Univ. of Missouri), Ph.D. (ibid.); *Professor of Psychology*. 1996, 1991.

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Chasteen, Lanny Gordon, B.B.A. (Univ. of Texas), M.B.A. (Univ. of Arkansas), Ph.D. (ibid.); *Professor of Accounting.* 1987, 1969.

Chen, Guangping, B.S. (Heilongjiang Univ., China), M.S. (Beijing Univ., China), Ph.D. (Univ. of Texas at Austin); *Associate Professor of VBS: Physiological Sciences.* 2001.

Chen, Rujin, B.S. (Lanzhou Univ., China), M.S. (Institute of Botany, Academia Sinica), Ph.D. (Michigan State Univ.); *Adjunct Assistant Professor of Botany.* 2005, 2004.

Cheng, An, B.A. (Hainan Normal Univ.), M.A. (Guangdong Univ. of Foreign Studies), Ph.D. (Pennsylvania State Univ.); *Assistant Professor of English.* 2005.

Cheng, Qi, B.E. (Shanghai Jiao Tong Univ.), M.S. (Syracuse Univ.), Ph.D. (ibid.); *Assistant Professor of Electrical and Computer Engineering.* 2009, 2006.

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Cho, YoonJung, B.A. (Seoul National Univ.), M.A. (ibid.), Ph.D. (Univ. of Texas at Austin); *Assistant Professor of Applied Health and Educational Psychology*. 2009.

Cho, Hira, B.A. (Sookmyung Univ.), M.S. (ibid.), Ph.D. (ibid.); *Assistant Professor of Design, Housing and Merchandising.* 2006.

Choike, James Richard, B.S. (Univ. of Detroit), M.S. (Purdue Univ.), Ph.D. (Wayne State Univ.); *Professor of Mathematics*. 1983, 1970.

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Christenson, Robert Stiles, B.A. (Queens College, Univ. of New York), M.S. (Univ. of Michigan), Ed.D. (Brigham Young Univ.); *Assistant Professor of Applied Health and Educational Psychology*. 2007.

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Coffey, Willliam Scott, B.S. (Valparaiso Univ.), M.S. (Univ. of Arkansas), Ph.D. (O.S.U.); *Adjunct Assistant Professor of Geology*.

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Collins, Frank, B.S. (Northwestern State Univ. of Louisiana), M.S. (ibid.), Ph.D. (Auburn Univ.); *Professor of Psychology*. 1989.

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Conway, Kenneth E., B.A. (State Univ. of New York College, Potsdam), M.S. (State Univ. of New York College, Syracuse), Ph.D. (Univ. of Florida); *Professor of Entomology and Plant Pathology*. 1987, 1978.

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Cooper, Steven R., B.S. (Texas Tech Univ.), M.S. (Univ. of Illinois), Ph.D. (O.S.U.); *Associate Professor of Animal Science*. 2005, 1999.

Cordova, Carlos E., B.A. (UNAM Natl. Autonomous Univ. of Mex.), M.A. (ibid.), Ph.D. (Univ. of Texas Austin); *Associate Professor of Geography.* 2003, 1997.

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Cox, Charles B., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Professor of Agricultural Education.* 1995, 1988.

Cox, Jr., Ronald B., B.A. (Harding Univ.), M.A. (Northeast Louisiana Univ.), Ph.D. (Michigan State Univ.); *Assistant Professor of Human Development and Family Science.* 2007.

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Curtis, Kathleen S., B.S. (Slippery Rock Univ.), M.S. (Univ. of Pittsburg), Ph.D. (ibid); *Assistant Professor of CHS: Pharmacology and Physiology.* 2006.

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Dabo, S. Mady, B.S. (New Mexico State Univ.), M.S. (ibid.), Ph.D. (O.S.U.); *Assistant Research Scientist of VBS: Pathobiology*. 2002.

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Dunford, Nurhan T., B.S. (Middle East Technical Univ.), M.S. (Univ. of Ankara), Ph.D. (Univ. of Alberta); *Associate Professor of Biosystems and Agricultural Engineering.* 2001.

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Epstein, Paul, B.A. (Trinity College-Univ. of Toronto), M.A. (Dalhousie), Ph.D. (ibid.); *Associate Professor of Foreign Languages and Literature.* 1990, 1981.

Escoubas, Joseph Roy, B.S. (McNeese State Univ.), M.S. (O.S.U.), Ph.D. (ibid.); *Professor of Animal Science*. 2002.

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Fain, James Robert, B.A. (Univ. of Texas, Austin), M.S. (Purdue Univ.), Ph.D. (ibid.); *Professor of Economics.* 1999, 1986.

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Fisher, Daniel E., B.A. (Carthage College), B.S. (Univ. of Illinois), M.S. (ibid.) Ph.D. (ibid.); *Professor of Mechanical and Aerospace Engineering.* 2007, 1999.

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Ghosh, Amit, B.Sc. (Imperial College, London), Ph.D. (Nottingham Univ.); *Professor of Mathematics.* 1993, 1983.

Giacobbe, Alice C., B.S.W. (Virginia Commonwealth Univ.), M.Ed. (ibid.), Ph.D. (College of William and Mary); *Assistant Professor of Teaching and Curriculum Leadership*. 2007.

Giddens, Cheryl LeAnn, B.S. (Univ. of Oklahoma), M.S. (Univ. of Oklahoma Health Sciences), Ph.D. (ibid.); *Assistant Professor of Communications Sciences and Disorders*. 2004.

Giles, Kristopher L., B.S. (Alma College), M.S. (Iowa State Univ.), Ph.D. (Iowa State Univ.); *Associate Professor of Entomology and Plant Pathology*. 2003, 1997.

Gilliam, Lyndi Liane, B.S. (O.S.U.), D.V.M. (ibid.), Diplomate (ibid.); *Assistant Professor of VBS: Veterinary Clinical Sciences.* 2009.

Gilliland, Stanley E., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (North Carolina State Univ.); *Regents Professor of Animal Science.* 1986, 1976.

Gilmour, Margi Ann, B.S. (Michigan State Univ.), D.V.M. (ibid.); *Associate Professor of VBS: Veterinary Clinical Sciences.* 2009.

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Glass, Richard T., B.S. (Emory Univ.), D.D.S. (ibid.), Ph.D. (Univ. of Chicago); *Professor of CHS: Forensic Sciences.* 1999.

Goad, Carla L., B.S. (Friends Univ.), M.S. (Kansas State Univ.), M.S. (ibid.), Ph.D. (ibid.); *Associate Professor of Statistics*. 1999, 1994.

Godsey, Chad, B.S. (Colorado State Univ.), M.S. (Kansas State Univ.), Ph.D. (ibid); *Assistant Professor of Plant and Soil Sciences.* 2006.

Goetsch, Arthur L., B.S. (Illinois State Univ.), M.S. (Univ. of Missouri), Ph.D. (New Mexico State Univ.); *Adjunct Assistant Professor of Animal Science*. 2003.

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Grubgeld, M. Elizabeth, B.A. (Lewis & Clark College), Ph.D. (Univ. of Iowa); *Professor of English.* 2003, 1986.

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Hobson, Dana E., B.S. (Baker Univ.), M.S. (Kansas State Univ.), M.S. (Kansas Univ.), Ph.D. (ibid.); *Professor of Construction Management Technology.* 1996.

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Horn, Gerald W., B.S. (Texas Tech Univ.), M.S. (Purdue Univ.), Ph.D. (ibid.); *Professor of Animal Science*. 1981, 1974.

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Hsu, Po-Siu Paul, B.S. (National Taiwan Univ.), M.L.A. (Cornell Univ.); *Associate Professor of Horticulture and Landscape Architecture*. 1990.

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Hubbard, Todd Phillip, B.A. (O.S.U.), M.S. (Embry-Riddle Aeronautical Univ.), Ph.D. (O.S.U.); *Associate Professor of Educational Studies.* 2005.

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Hughes, Patricia Lynn, B.S. (Texas Christian Univ.), M.A. (Texas Woman's Univ.), Ph.D. (ibid.); *Assistant Professor of Applied Health and Educational Psychology.* 2002.

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Jacobs, Sue C., B.A. (Antioch College), M.A. (Vermont College/Norwich Univ.), Ph.D. (Univ. of Southern Mississippi); *Associate Professor of Applied Health and Educational Psychology*. 2006, 2001.

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Kakani, Vijaya Gopal, B.S. (Andhra Pradesh Agricultural Univ., Hyderabad, India), M.S. (ibid.), Ph.D. (Univ. of Reading, Reading, United Kingdom); *Assistant Professor of Plant and Soil Sciences.* 2008.

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Kapil, Sanjay, B.V.Sc & A.H. (College of Veterinary Medicine, Hisar, India), M.V.Sc. (ibid.), Ph.D. (Univ. of Minnesota); *Professor of VBS: Pathobiology.* 2006.

Karaca, Igor, B.S. (Sarajevo Univ.), M.A. (Ohio State Univ.), Ph.D. (ibid.); *Assistant Professor of Music.* 2006.

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Kaul, Rashmi, B.S. (Government Women's College, India), M.S. (Kashmir Univ., India), Ph.D. (Delhi Univ., India); *Assistant Professor of CHS: Biochemistry and Microbiology.* 2003.

Kearney, Kerri S., B.S. (O.S.U.), M.B.A. (ibid.), Ed.D. (ibid.); *Assistant Professor of Educational Studies.* 2005, 2004.

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Kennedy, Tay S., B.S. (Cornell Univ.), M.S. (State Univ. of Albany), Ph.D. (Iowa State Univ.); *Associate Professor of Nutritional Sciences.* 2000.

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Li, Weiping, B.S. (Dalian Institute of Technology), Ph.D. (Michigan State Univ.); *Professor of Mathematics.* 1995.

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Lowery, John, B.A. (Univ. of Virginia), M.Ed. (Univ. of South Carolina), Ph.D. (Bowling Green State Univ.); *Associate Professor of Educational Studies.* 2008, 2006.

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Lucca, Don A., B.S. (Cornell Univ.), M.S.E. (Princeton Univ.), Ph.D. (Rensselaer Polytechnical Institute); *Regents Professor of Mechanical and Aerospace Engineering*. 1996, 1990.

Lusk, Jayson Lee, B.S. (Texas Tech Univ.), Ph.D. (Kansas State Univ.); *Professor of Agricultural Economics.* 2005.

Luttbeg, Bernard T., B.A. (Univ. of California), Ph.D. (ibid.); *Assistant Professor of Zoology.* 2009.

Lynch, Thomas B., B.S. (Virginia Polytech Inst. & S. Univ.), M.S. (ibid.), Ph.D. (Purdue Univ.); *Professor of Natural Resource Ecology and Management.* 2001, 1982.

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Pentz, Arthur L., B.S. (Bloomsburg State College), M.Ed. (ibid.), Ph.D. (Pennsylvania State Univ.); *Associate Professor of Communications Sciences and Disorders.* 1987, 1982.

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Rhinehart, R. Russell, B.S. (Univ. of Maryland), M.S. (ibid.), Ph.D. (North Carolina State Univ.); *Professor of Chemical Engineering.* 1997.

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Rickman, Dan S., B.S. (Univ. of Wyoming), M.P.A. (ibid.), Ph.D. (ibid.); *Regents Professor of Economics.* 1996.

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Rimmel, Lesley A., B.A. (Yale College), M.A. (Columbia Univ.), Ph.D. (Univ. of Pennsylvania); *Associate Professor of History.*

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Romans, John S. C., B.S. (Iowa State Univ.), M.A. (Univ. of Iowa), Ph.D. (Univ. of Kansas); *Associate Professor of Applied Health and Educational Psychology.* 1995, 1990.

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Singh, Raman Pal, B.Tech. (I.I.T, Kanpur), M.S. (Univ. of Rhode Island), Ph.D. (ibid.); *Associate Professor of Mechanical and Aerospace Engineering.* 2006.

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Teeter, Robert G., B.S. (O.S.U.), M.S. (Univ. of Illinois), Ph.D. (O.S.U.); *Professor of Animal Science*. 1988, 1980.

Temple, Darrel, B.S. (Oregon State Univ.), M.S. (Colorado State Univ.); *Adjunct Associate Professor of Biosystems and Agricultural Engineering.* 2002.

Thayer, James Steel, B.A. (Indiana Univ.), M.A. (ibid.), M.T.S. (Harvard Univ.), Ph.D. (Univ. of Michigan); *Professor of Religious Studies.* 1993, 1981.

Thomas, Cornell, B.A. (Univ. of Missouri, St. Louis), M.A. (Jackson State Univ.), Ed.D. (Texas A&M, Commerce); *Adjunct Professor of Educational Studies.*

Thomas, David G., B.A. (Albion College), M.A. (Univ. of Denver), Ph.D. (ibid.); *Professor of Psychology.* 1990, 1985.

Thomas, Johnson P., B.S. (Univ. of Wales), M.S. (Univ. of Edinburgh), Ph.D. (Univ. of Reading); *Assistant Professor of Computer Science.* 2001.

Thomas, Julie Ann, B.A. (Univ of Nebraska, Kearney), M.A. (ibid.), Ph.D. (Univ. of Nebraska, Lincoln); *Professor of Teaching and Curriculum Leadership.* 2008.

Thomason, Justin David, B.S. (O.S.U.), D.V.M. (ibid.); *Assistant Professor of VBS: Veterinary Clinical Sciences*. 2008.

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Tolk, Janice N., B.S. (Univ. of Kentucky), M.E. (Texas Tech Univ.), Ph.D. (ibid.); *Adjunct Assistant Professor of Engineering Technology Division.* 2009.

Tomlanovich, Matthew, B.G.S. (Oakland Univ.), M.A. (Central School of Speech and Drama), M.F.A. (California School of the Arts); *Assistant Professor of Theatre.* 2007.

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Van Delinder, Jean, B.A. (Univ. of Minnesota), M.A. (Univ. of Kansas), Ph.D. (ibid.); *Associate Professor of Sociology.* 2001, 1996.

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Wetzel, Thomas S., B.S. (Northern Illinois Univ.), M.B.A. (ibid.), Ph.D. (O.S.U.); *Professor of Accounting.* 1991, 1986.

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Whiteley, James Robert, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Professor of Chemical Engineering.* 2007, 1995.

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Will, Rodney Edward, B.S. (Cornell Univ.), M.S. (Virginia Tech), Ph.D. (Univ. of Georgia); *Associate Professor of Natural Resource Ecology and Management*. 2005.

Willett, Keith D., B.S. (Nebraska Wesleyan Univ.), M.S. (Univ. of Nebraska at Omaha), Ph.D. (Univ. of New Mexico); *Regents Service Professor of Economics*. 1991, 1981.

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Williams, Jeffrey K., B.Arch.State (O.S.U.), M.Arch (ibid.); *Professor of Architecture*. 1988, 1986.

Williams, Joseph E., B.S. (New Mexico State Univ.), M.S. (ibid.), Ph.D. (Iowa State); *Professor of Agricultural Economics.* 1986, 1975.

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Wilson, Stephan M., A.B. (Wabash College), M.S. (Univ. of Tennessee, Knoxville), Ph.D. (ibid.); *Professor of Human Development and Family Science.* 2009.

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Womack, John Calvin, B.A. (Univ. of Arkansas), B.Arch. (Univ. of Arkansas), M.Arch. (O.S.U.); *Associate Professor of Architecture.*

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Baumiller, George W., Diploma in Interior Architecture (State C. of Building, Warsaw Poland), M.S. (Warsaw Inst. of Technology); *Associate Professor Emeritus of Architecture.* 1988, 1972.

Bayles, D. Jack, B.S.M.E. (Univ. of Oklahoma), M.S.M.E. (ibid.), Ph.D. (O.S.U.); *Associate Professor of Engineering Technology Division.* 1979, 1974.

Beer, Ronald S., B.S. (Illinois State Univ.), M.A. (Michigan State Univ.), Ph.D. (Kent State Univ.); *Professor of Educational Studies.* 1980.

Bell, Kenneth John, B.S. (Case Inst. of Technology), M.Ch.E. (Univ. of Delaware), Ph.D. (ibid.); *Regents Professor Emeritus of Chemical Engineering*. 1996, 1961.

Berberet, Richard C., B.A. (Carroll College), Ph.D. (Univ. of Nebraska); *Professor of Entomology and Plant Pathology.* 1980, 1971.

Berkeley, David Shelley, A.B. (Juanita College), A.M. (Harvard Univ.), Ph.D. (ibid.); *Professor Emeritus of English.* 1987, 1948.

Berry, Joe G., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Kansas State Univ.); *Professor Emeritus of Animal Science.* 2004, 1980.

Bertholf, Dennis Earl, B.S. (Univ. of Kansas), M.A. (New Mexico State Univ.), Ph.D. (ibid.); *Professor Emeritus of Mathematics.* 1988, 1968.

Bice, Garry R., B.S. (Cornell Univ.), M.S. (ibid.), Ph.D. (Ohio State Univ.); *Professor Emeritus of Teaching and Curriculum Leadership.* 1990, 1985.

Bischoff, John Paul, B.A. (Univ. of Maryland), Ph.D. (Yale Univ.); *Assistant Professor of History.* 1984, 1976.

Blakley, Leo Vernon, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Univ. of Chicago); *Professor Emeritus of Agricultural Economics.* 1986, 1947.

Boggs, James H., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Purdue Univ.); *Professor Emeritus of Mechanical and Aerospace Engineering.* 1991, 1943.

Bokorney, George Baker, B.S. (O.S.U.), M.S. (ibid.), Ed.D. (Univ. of Oregon); *Professor Emeritus of Hotel and Restaurant Administration.* 1995, 1971.

Bosworth, John Richard, B.A. (Univ. of Illinois), M.A. (ibid.); *Assistant Professor Emeritus of Philosophy.* 1986, 1962.

Branson, Michael H., B.S. (Illinois Benedictine College), M.A. (Arizona State Univ.), Ph.D. (ibid.); *Associate Professor Emeritus of Industrial Engineering and Management.* 1985.

Brewster, Larry T., B.S.E.E. (New Mexico State Univ.), M.S. (Univ. of Missouri, Columbia), Ph.D. (Univ. of Missouri, Rolla); *Associate Professor of Educational Studies.* 2005, 1991.

Brown, Donald Nelson, B.A. (Harvard Univ.), M.A. (Univ. of Arizona), Ph.D. (ibid.); *Professor Emeritus of History.* 2007.

Bruneau, L. Herbert, B.S. (McGill Univ.), M.A. (Univ. of Texas), Ph.D. (ibid.); *Professor Emeritus of Zoology.* 1955, 1995.

Brunken, Alan W., B.Arch. (O.S.U.), M.Arch. (Massachusetts Inst. of Technology); *Professor Emeritus of Architecture*. 2004, 1973.

Bryant, John H., B.Arch. (O.S.U.), M.Arch. (Univ. of Illinois); *Professor of Architecture*. 1977.

Buchanan, David S., B.S. (North Dakota State Univ.), M.S. (Univ. of Nebraska), Ph.D. (ibid.); *Professor Emeritus of Animal Science.* 1988, 1980.

Bull, Kay Sather, B.S.B.A. (Roosevelt Univ.), M.B.A. (ibid.), Ph.D. (Univ. of Wisconsin); *Professor of Applied Health and Educational Psychology.* 1988, 1979.

Burns, Marilyn M., B.S. (Univ. of Colorado, Boulder), M.A. (Univ. of Northern Colorado, Greeley), Ph.D. (O.S.U.); *Associate Professor Emeritus of Design, Housing and Merchandising*. 1995, 1983.

Bush, Linville John, B.S. (Univ. of Kentucky), M.S. (Ohio State Univ.), Ph.D. (Iowa State Univ.); *Professor Emeritus of Animal Science.* 1987, 1958.

Campbell, Noma Jo, B.S. (O.S.U.), M.S. (Kansas State Univ.), Ed.D. (Virginia Polytechnic Inst. and State Univ.); *Professor of Educational Studies.* 1990, 1975.

Carter, Sally A., B.S. (Arkansas Tech Univ.), M.Ed. (Univ. of Arkansas), Ed.S. (ibid.), Ed.D.(ibid.); *Associate Professor Emeritus of Teaching and Curriculum Leadership*. 1995, 1990.

Case, Kenneth E., B.S.E.E. (O.S.U.), M.S.I.E. (ibid.), Ph.D. (ibid.); *Regents Professor Emeritus of Industrial Engineering and Management.* 1997, 1975.

Cashel, Christine M., B.S. (Russell Sage College), M.S. (ibid.), Ed.D. (Temple Univ.); *Professor of Applied Health and Educational Psychology.* 1990, 1985.

Cate, Robert L., B.E. (Vanderbilt Univ.), B.Div. (Southern Baptist Theological Seminary), Ph.D. (ibid.); *Professor of Religious Studies.* 1991.

Chambers, Billie J., B.S. (Western Illinois Univ.), M.S. (Purdue Univ.), Ed.D. (Univ. of Georgia); *Associate Professor Emeritus of Agricultural Education.* 1994, 1989.

Chase, Cida S., B.A. (Kansas State Teachers College), M.S. (ibid.), M.A. (Univ. of Oklahoma), Ph.D. (ibid.); *Professor Emeritus of Foreign Languages and Literature.* 1992, 1977.

Clary, Bobby L., B.S. (Univ. of Georgia), Ph.D. (O.S.U.); *Professor Emeritus of Biosystems and Agricultural Engineering*. 1992, 1966.

Claypool, P. Larry, B.S. (Southwest Missouri State College), M.A. (Univ. of Missouri at Columbia), Ph.D. (Texas A&M Univ.); *Professor Emeritus of Statistics*. 1979, 1967.

Collins, Thomas C., B.S. (Univ. of Georgia), M.S. (ibid.), Ph.D. (Univ. of Florida), M.S. (George Washington Univ.); *Professor Emeritus of Physics.* 2006, 1991.

Coonrad, Harold A., B.S. (O.S.U.), M.S. (ibid.), Ed.D. (Indiana Univ.); *Professor Emeritus of Business Education and Administrative Services.* 1979, 1948.

Cox, Kenneth, B.A. (Lindenwood College), M.A. (Univ. of Nebraska), Ph.D. (ibid.); Professor of Theatre. 1977, 1970.

Crockett, Jerry J., B.S. (Northwestern State College), M.S. (Fort Hays Kansas State College), Ph.D. (Univ. of Oklahoma); *Professor Emeritus of Botany*. 1988, 1962.

Croft, Jerry D., B.A. (O.S.U.), M.A. (Kansas State Univ.), Ed.D. (Univ. of Tulsa); *Associate Professor Emeritus of Geography*. 1991, 1966.

Cummins, Richard Lee, B.S. (Univ. of Illinois), M.S. (ibid.), Ph.D. (ibid.); *Associate Professor Emeritus of Electrical and Computer Engineering.* 1992, 1963.

Cuperus, Gerrit, B.S. (Univ. of Minnesota, Morris), M.S. (Univ. of Minnesota, State Paul), Ph.D. (ibid.); *Professor Emeritus of Entomology and Plant Pathology.* 1992, 1982.

Davis, Jerry L., B.S. (Kansas State College at Pittsburgh), M.A. (Univ. of Kansas), Ph.D. (ibid.); *Professor Emeritus of Theatre.* 1997, 1971.

Dawkins, William P., B.A. (Rice Institute), B.S.C.E. (ibid.), M.S. (ibid.), Ph.D. (Univ. of Illinois at Urbana); *Professor Emeritus of Civil and Environmental Engineering.* 1994, 1969.

Devlin, Joseph Paul, B.S. (Regis College), Ph.D. (Kansas State Univ.); *Professor Emeritus of Chemistry.* 1996, 1961.

Dixon, George Sumter, B.S. (Univ. of Georgia), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Physics.* 2007, 1970.

Dobson, John M., B.S. (Massachusetts Insitute of Technology), M.S. (Univ. of Wisconsin), Ph.D. (ibid.); *Professor of History.* 2000.

Dobson, Russell Lee, B.A. (Northeastern State College, Oklahoma), M.T.Ed. (ibid.), Ed.D. (Univ. of Oklahoma); *Professor Emeritus of Teaching and Curriculum Leadership.* 1993, 1967.

Drew, William A., A.B. (Marietta College), Ph.D. (Michigan State Univ.); *Professor Emeritus of Entomology and Plant Pathology.* 1990, 1958.

Dugger, Cecil W., B.S. (Texas A&M Univ.), M.Ed. (ibid.), Ed.D. (O.S.U.); *Professor Emeritus of Aviation and Space Education.* 1995, 1965.

Durham, Norman Nevill, B.S. (North Texas State Univ.), M.S. (ibid.), Ph.D. (Univ. of Texas); *Professor Emeritus of Microbiology and Molecular Genetics*. 1995, 1954.

Edwards, Lewis H., B.S. (O.S.U.), Ph.D. (North Dakota State Univ.); *Professor Emeritus of Plant and Soil Sciences.* 1976, 1967.

Eggerman, Richard, B.A. (Baylor Univ.), M.A. (Univ. of Illinois, Urbana), Ph.D. (ibid.); *Professor Emeritus of Philosophy.* 1998, 1970.

Eikenbary, Raymond D., B.S. (O.S.U), M.S. (Clemson Univ.), Ph.D. (ibid.); *Professor Emeritus of Entomology and Plant Pathology.* 1994, 1964.

Eisenbraun, Edmund Julius, B.S. (Univ. of Wisconsin), M.S. (ibid.), Ph.D. (ibid.); *Regents Professor Emeritus of Chemistry.* 1987, 1962.

Eissenstat, Bernard William, B.S. (Univ. of Rochester), M.S. (Univ. of Iowa), Ph.D. (Univ. of Kansas); *Professor Emeritus of History.* 1986, 1969.

Essenberg, Margaret K., B.A. (Oberlin College), Ph.D. (Brandeis Univ.); *Professor Emeritus of Biochemistry and Molecular Biology*. 2004, 1973.

Essenberg, Richard, B.S. (California Institute of Technology), Ph.D. (Harvard Univ.); *Professor of Biochemistry and Molecular Biology.* 1984, 1973.

Eubanks, I. Dwaine, B.S. (Univ. of Texas), Ph.D. (ibid.); *Professor Emeritus of Chemistry.* 1992, 1967.

Ewing, Margaret S., B.A. (Oberlin College), M.S. (O.S.U.), Ph.D. (ibid.); *Professor Emeritus of Zoology.* 2006, 1982.

Ferguson, Earl John, B.S. (Texas A&M Univ.), M.S. (O.S.U.), Ph.D. (ibid.); *Professor Emeritus of Industrial Engineering and Management.* 1986, 1956.

Filonow, Alexander B., B.S. (Univ. of Rhode Island), M.S. (Michigan State Univ.), Ph.D. (ibid.); *Professor Emeritus of Entomology and Plant Pathology.* 1998, 1984.

Fischer, Leroy Henry, B.A. (Univ. of Illinois), M.A. (ibid.), Ph.D. (ibid.); *Professor Emeritus of History.* 1984, 1946.

Fisher, Donald D., B.A. (Washington State Univ.), M.A. (ibid.), Ph.D. (Stanford Univ.); *Regents Service Professor of Computer Science.* 1988, 1969.

Fitch, Ernest Chester, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Univ. of Oklahoma); *Professor Emeritus of Mechanical and Aerospace Engineering.* 1984, 1953.

Fite, Robert Carl, B.A. (Central State College), M.S. (O.S.U.), Ph.D. (Northwestern Univ.); *Professor Emeritus of Geography.* 1946, 1946.

Fitz, Brewster E., B.A. (Univ. of Oklahoma), M.A. (Univ. of North Carolina, Chapel Hill), Ph.D. (Yale Univ.); *Associate Professor of English.* 1999, 1986.

Folks, John Leroy, B.A. (O.S.U.), M.S. (ibid.), Ph.D. (Iowa State Univ.); *Regents Service Professor Emeritus of Statistics.* 1998, 1961.

Forbes, Sheila H., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Associate Professor Emeritus of Agricultural Education.* 1995, 1983.

Foreman Sisler, Grovalynn, B.S. (O.S.U.), M.S. (ibid.), Ed.D. (ibid.); *Professor Emeritus of Design, Housing and Merchandising.* 1997, 1965.

Frank, Gerald D., B.A. (Valparaiso Univ.), S.M.M. (Union Theological Seminary), D.M.A. (Univ. of Cincinnati); *Professor Emeritus of Music.* 1987, 1972.

Franzmann, John Richard, B.S. (Univ. of Connecticut), M.S. (ibid.), Ph.D. (O.S.U.); *Professor Emeritus of Agricultural Economics.* 1987, 1964.

Freeman, Robert David, B.S. (North Georgia College), M.S. (Purdue Univ.), Ph.D. (ibid.); *Professor Emeritus of Chemistry.* 1988, 1955.

Gamble, Rondal Ross, B.S. (Central State College, Oklahoma), M.Ed. (Adams State College), Ph.D. (Univ. of Oklahoma); *Professor Emeritus of Applied Health and Educational Psychology.* 1997, 1996.

Garcia, Santiago, B.A. (Instituto No. 1, Havana, Cuba), M.A. (Univ. of Oriente), Ph.D. (Univ. of Pittsburgh); *Professor of Foreign Languages and Literature.* 1985, 1978.

Garner, J. Lloyd, B.S. (East Central State College, Oklahoma), Ed.M. (Univ. of Oklahoma); *Associate Professor Emeritus of Business Education and Administrative Services.* 1976, 1942.

Garton, James Elmer, B.S. (O.S.U.), M.S. (Utah State Univ.), Ph.D. (Univ. of Missouri); *Professor Emeritus of Biosystems and Agricultural Engineering.* 1985, 1949.

Gee, Lynn Lamarr, A.B. (Brigham Young Univ.), M.S. (Colorado A&M College), Ph.D. (Univ. of Wisconsin); *Professor Emeritus of Microbiology and Molecular Genetics.* 1977, 1954.

Gholson, Robert Karl, B.A. (Univ. of Chicago), B.S. (Univ. of Illinois), Ph.D. (ibid.); *Professor Emeritus of Biochemistry and Molecular Biology.* 1993, 1962.

Gilbert, C. Gorman, B.S. (Univ. of Oklahoma), M.S. (Univ. of Oklahoma Health Science Center), Ph.D. (ibid); *Professor Emeritus of Civil and Environmental Engineering.*

Gill, Donald R., B.S. (Montana Univ.), M.S. (ibid.), Ph.D. (Oregon State Univ.); *Professor Emeritus of Animal Science.* 2004, 1966.

Gladstone, Roy, B.S. (Univ. of Illinois), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Psychology.* 1980, 1949.

Glenn, Bertis Lamon, D.V.M. (O.S.U.), M.S. (ibid.), Ph.D. (Univ. of Oklahoma); *Professor Emeritus of VBS: Pathobiology.* 1984, 1953.

Grace, Donald W., B.S. (Carnegie Inst. of Technology), M.S. (ibid.), M.S. (Stanford Univ.), Ph.D. (ibid.); *Professor Emeritus of Computer Science.* 1987, 1970.

Greenwood, Kathryn Moore, B.S. (O.S.U.), M.S. (New York Univ.), Ed.D. (O.S.U.); *Professor Emeritus of Design, Housing and Merchandising.* 1985, 1955.

Gries, George A., A.B. (Miami Univ.), M.S. (Kansas State Univ.), Ph.D. (Univ. of Wisconsin); *Professor Emeritus of Botany.* 1982, 1968.

Guenther, John James, B.S. (Louisiana State Univ.), M.S. (ibid.), Ph.D. (Texas A&M Univ.); *Professor Emeritus of Animal Science.* 1987, 1958.

Haan, Charles Thomas, B.S. (Purdue Univ.), M.S. (ibid.), Ph.D. (Iowa State Univ.); *Regents Professor Emeritus of Biosystems and Agricultural Engineering.* 2001, 1978.

Habiby, Raymond N., B.A. (American Univ.), L.L.B. (Univ. of Jerusalem), M.A.P.A. (Univ. of Minnesota), Ph.D. (ibid.); *Professor Emeritus of Political Science.* 1988, 1965.

Hackett, Neil John, B.A. (Southern Illinois Univ.), M.A. (ibid.), Ph.D. (Univ. of Cincinnati); *Professor Emeritus of History.* 1981, 1969.

Hair, Jakie Alexander, B.S. (Clemson Univ.), M.S. (ibid.), Ph.D. (Virginia Polytechnic Inst.); *Regents Professor Emeritus of Entomology and Plant Pathology.* 1993, 1967.

Haire, William H., B.Arch. (Ohio State Univ.), M.S. (Rollins); *Professor of Architecture.* 1985, 1983.

Halligan, James E., B.S. (Iowa State Univ.), M.S. (ibid.), Ph.D. (Iowa State Univ.); *Professor of Educational Studies.* 1992.

Hamm, B. Curtis, B.S. (O.S.U.), M.B.A. (ibid.), Ph.D. (Univ. of Texas); *Professor Emeritus of Marketing.* 1990, 1966.

Hammer, Lawrence H., B.S. (Sam Houston State Univ.), M.B.A. (North Texas State Univ.), D.B.A. (Indiana Univ.); *Professor of Accounting.* 1989, 1977.

Hanson, Bertil Lennart, B.S. (Northwestern Univ.), M.A. (Univ. of Chicago), Ph.D. (ibid.); *Professor Emeritus of Political Science.* 1993, 1959.

Hardin, Mike L., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Agricultural Economics*. 1986, 1968.

Harper, Paul, B.A. (Kansas State College), M.A. (ibid.), Ph.D. (Univ. of Kansas); *Associate Professor Emeritus of Psychology.* 1989, 1974.

Harriman, Helga H., B.A. (Wells College), M.A. (O.S.U.), Ph.D. (ibid.); *Professor Emeritus of History.* 2000, 1975.

Harriman, Lynda C., B.S. (Colorado State Univ.), M.S. (Univ. of Illinois), Ph.D. (ibid.); *Professor of Human Development and Family Science*. 1987, 1984.

Heatly, Bob E., B.Arch. (O.S.U.), M.Arch. (Univ. of Illinois); *Professor of Architecture.* 1982, 1978.

Hecock, Richard Douglas, B.A. (Albion College), M.A. (Wayne State Univ.), Ph.D. (Clark Univ.); *Regents Service Professor Emeritus of Geography.* 1993, 1969.

Helm, Bob, B.A. (Wichita State Univ.), M.A. (ibid.), Ph.D. (State Univ. of New York, Albany); *Associate Professor Emeritus of Psychology.* 1995, 1972.

Henrickson, Robert L., B.S. (Kansas State Univ.), M.S. (ibid.), Ph.D. (Univ. of Missouri); *Professor Emeritus of Animal Science.* 1986, 1956.

Hodnett, Ernest M., B.S. (Univ. of Florida), M.S. (ibid.), Ph.D. (Purdue Univ.); *Professor Emeritus of Chemistry.* 1979, 1945.

Holley, Wesley, B.S. (O.S.U.), M.S. (ibid.), Ed.D. (ibid.); *Professor Emeritus of Agricultural Education.* 1992, 1980.

Holt, Smith L., B.S. (Northwestern Univ.), Ph.D. (Brown Univ.); *Professor of Chemistry.* 1980.

Homer, John Terry, B.A. (Thiel College), M.A. (California State Univ.-Sacramento), Ph.D. (Univ. of Oklahoma); *Associate Professor Emeritus of VBS: Pathobiology.* 1992, 1974.

Hounslow, Arthur W., B.Sc. (Univ. of Melbourne), M.Sc. (Carleton Univ.), Ph.D. (ibid.); *Professor Emeritus of Geology.* 1981, 1974.

Hughes, Robert K., B.S. (The Citadel), M.S. (O.S.U.), Ph.D. (ibid.); *Professor Emeritus of Civil and Environmental Engineering.* 1983.

Hughes, Joe H., B.S. (Clemson Univ.), M.S. (O.S.U.), Ph.D. (ibid.); *Professor Emeritus of Animal Science.*

Hughes, William L., B.S. (South Dakota School of Mines and Technology), M.S. (Iowa State Univ.), Ph.D. (ibid.); *Professor Emeritus of Electrical and Computer Engineering*. 1986, 1960.

Hummer, Paul Dwight, B.S. (Pennsylvania State Univ.), Ph.D. (ibid.); *Professor Emeritus of Agricultural Economics.* 1982, 1969.

Jackson, James A., B.A. (Southwestern College), M.S. (O.S.U.), Ph.D. (ibid.); *Assistant Professor Emeritus of VBS: Pathobiology*. 1986, 1968.

Jewsbury, George Frederick, B.A. (Mankato State College), M.A. (Univ. of Washington), Ph.D. (ibid.); *Professor Emeritus of History.* 1985, 1967.

Jobe, John, B.S. (Univ. of Tulsa), M.S. (O.S.U.), Ph.D. (ibid.); *Regents Professor Emeritus of Mathematics.* 1994, 1964.

Jobes, Raleigh A., B.S. (O.S.U.), M.S. (Univ. of Arizona), Ph.D. (O.S.U.); *Professor Emeritus of Agricultural Economics.* 1977, 1975.

Johnson, Gordon V., B.S. (North Dakota State Univ.), M.S. (Univ. of Nevada), Ph.D. (Univ. of Nebraska); *Professor Emeritus of Plant and Soil Sciences*. 2000, 1977.

Johnson, Becky L., B.S. (O.S.U.), M.S. (Univ. of Illinois-Urbana), Ph.D. (ibid.); *Professor of Botany.* 1988, 1969.

Johnson, Wilbur D. Deke, B.S. (Rocky Mountain College), M.Ed. (Univ. of Montana), Ed.D. (Western Michigan Univ.); *Associate Professor Emeritus of Educational Studies.* 2005, 1974.

Johnston, Thomas D., B.S. (Kansas State Teachers College), M.S. (Fort Hays Kansas State College), Ed.D. (Univ. of Neb.); *Professor Emeritus of Teaching and Curriculum Leadership.* 1973, 1969.

Johnston, William L., B.S. (Illinois State Univ.), M.S. (Univ. of Illinois), Ed.D. (ibid.); *Professor Emeritus of Design, Housing and Merchandising.* 1987, 1997.

Jordan, Helen Elaine, B.A. (Bridgewater College), M.S. (Virginia Polytechnic Inst.), D.V.M. (Univ. of Georgia), Ph.D. (ibid.); *Professor Emeritus of VBS: Pathobiology*. 1992, 1969.

Kamm, Robert B., B.A. (Univ. of Northern Iowa), M.A. (Univ. of Minnesota), Ph.D. (ibid.); *Professor Emeritus of Educational Studies.* 1988, 1958.

Kent, Douglas Charles, B.S. (Univ. of Nebraska), M.S. (ibid.), Ph.D. (Iowa State Univ.); *Professor Emeritus of Geology.* 1995, 1969.

Key, James P., B.S. (Univ. of Tennessee), M.Ed. (Virginia Polytechnic Institute), Ed.D. (North Carolina State Univ.); *Professor Emeritus of Agricultural Education.* 1998, 1969.

Kimbrell, Janet I., B.S. (Southeastern O.S.U.), M.P.A. (Univ. of Texas-Arlington), Ph.D. (O.S.U.); *Associate Professor of Accounting.* 1983, 1979.

Kincannon, Don F., B.A. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Regents Professor Emeritus of Civil and Environmental Engineering.* 1987, 1966.

Kirby, James S., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Iowa State Univ.); *Professor Emeritus of Plant and Soil Sciences.* 1983, 1969.

Kletke, Darrel Dean, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Agricultural Economics.* 1979, 1966.

Knaub, Patricia Kain, B.S. (Univ. of Nebraska-Lincoln), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Human Development and Family Science.* 1989.

Knight, Clyde B., B.S. (East Central State College, Oklahoma), M.S. (O.S.U.), Ed.D. (ibid.); *Professor Emeritus of Educational Studies.* 1996, 1966.

Knight, James F., B.Arch. (O.S.U.), M.Arch. (Univ. of Illinois); *Professor Emeritus of Architecture.* 1990, 1979.

Koeppe, Roger Erdman, A.B. (Hope College), M.S. (Univ. of Illinois), Ph.D. (ibid.); *Professor Emeritus of Biochemistry and Molecular Biology.* 1990, 1959.

Kopecky, Pauline W., B.B.A. (Southwestern Univ.), M.Ed. (Univ. of Texas), Ph.D. (Univ. of Houston); *Associate Professor Emeritus of Economics.* 1994, 1967.

Kotlarski, Ignacy I., Magister (M.S.), (Warsaw, Poland), Ph.D. (Univ. of Wroclaw, Poland), Docent in Mathematics (Tech. Univ. of Warsaw, Poland); *Professor Emeritus of Mathematics.* 1993, 1969.

Kranzler, Glenn A., B.S. (North Dakota State Univ.), M.S. (ibid.), Ph.D. (Iowa State Univ.); *Professor of Biosystems and Agricultural Engineering.* 1985, 1982.

Krenzer, Eugene G., B.S. (Cornell Univ.), M.S. (Univ. of Minnesota), Ph.D. (ibid.); *Professor Emeritus of Plant and Soil Sciences.* 1992, 1978.

Krieger, Ruth Haas, B.B.A. (Ohio Univ.), M.B.A. (Univ. of Cincinnati), Ph.D. (ibid.); *Associate Professor of Marketing*. 1987, 1982.

Kulling, Frank Allen, B.S. (Univ. of Tennessee), M.B.A. (Penn. State Univ.), Ed.D. (O.S.U.); *Associate Professor of Applied Health and Educational Psychology*. 1993, 1983.

Lange, James N., B.S. (Pennsylvania State Univ.), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Physics.* 1995, 1965.

Langwig, John Edward, B.S. (Univ. of Michigan), M.S. (State Univ. of New York, College of Forestry), Ph.D. (ibid.); *Professor Emeritus of Natural Resource Ecology and Management.* 1986, 1971.

Lawry, Edward G., B.A. (Fordham Univ.), M.A. (Univ. of Pittsburgh), Ph.D. (Univ. of Texas at Austin); *Professor of Philosophy.* 1990, 1971.

Leach, Franklin Rollin, B.A. (Hardin-Simmons Univ.), Ph.D. (Univ. of Texas); *Professor Emeritus of Biochemistry and Molecular Biology.* 1998, 1959.

Leff, Leonard J., B.B.A. (Univ. of Texas, Austin), M.A. (Univ. of Houston), Ph.D. (Northern Illinois Univ.); *Professor of English.* 1991, 1979.

Lingelbach, Daniel Dee, B.S. (Kansas State Univ.), M.S. (ibid.), Ph.D. (O.S.U.); *Professor Emeritus of Electrical and Computer Engineering.* 1987, 1955.

Lloyd, John P., B.S. (Univ. of Illinois), M.S. (ibid.), Ph.D. (ibid.); Professor *Emeritus of Civil and Environmental Engineering.* 1981, 1970.

Lowery, Richard L., B.S.M.E. (Texas Tech. College), M.S. (O.S.U.), Ph.D. (Purdue Univ.); *Professor Emeritus of Mechanical and Aerospace Engineering*. 1967, 1961.

Lu, Huizhu, B.S. (Fuden Univ.), M.S. (Univ. of Oklahoma), Ph.D. (ibid.); *Professor Emeritus of Computer Science.* 1992, 1989.

Luebke, Neil Robert, B.A. (Midland College), M.A. (Johns Hopkins Univ.), Ph.D. (ibid.); *Professor Emeritus of Philosophy.* 1998, 1961.

Lynd, Julian Q., B.S. (Univ. of Arkansas), M.S. (Michigan State Univ.), Ph.D. (ibid.); *Professor Emeritus of Plant and Soil Sciences.* 1992, 1951.

Mahoney, George W. A., B.S. (Univ. of Illinois), M.S. (O.S.U.), Ph.D. (ibid.); *Associate Professor Emeritus of Biosystems and Agricultural Engineering.* 1986, 1949.

Mains, Gilbert J., B.S. (Duquesne Univ.), Ph.D. (Univ. of California); *Professor Emeritus of Chemistry.* 1994, 1978.

Mandeville, David E., B.S.I.E. (General Motors Institute), M.S.I.E. (Purdue Univ.), Ph.D. (ibid.); *Associate Professor Emeritus of Industrial Engineering and Management.* 1985.

Manke, Phillip Gordon, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Texas A&M Univ.); *Professor Emeritus of Civil and Environmental Engineering.* 1988, 1959.

Martin, Joel Jerome, B.S. (South Dakota School of Mines and Tech.), M.S. (ibid.), Ph.D. (Iowa State Univ.); *Professor Emeritus of Physics*. 2000, 1969.

Max, Elizabeth, B.S. (Texas Woman's Univ.), M.L.S. (North Texas State Univ.), Ed.D. (O.S.U.); *Associate Professor Emeritus of Teaching and Curriculum Leadership.* 1978, 1970.

Maxwell, Charles V., B.S. (Univ. of Georgia), M.S. (ibid.), Ph.D. (Univ. of Wisconsin); *Professor Emeritus of Animal Science*. 1996, 1968.

McCraw, Bernard Dean, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Kansas State Univ.); *Professor of Horticulture and Landscape Architecture.* 1991, 1985.

McKinley, Kenneth H., B.A. (Tarkio College, Missouri), M.A. (Univ. of Iowa), Ph.D.(ibid.); *Professor Emeritus of Teaching and Curriculum Leadership.* 1990, 1973.

McMurphy, Wilfred E., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Kansas State Univ.); *Professor Emeritus of Plant and Soil Sciences.* 1991, 1964.

McQuiston, Faye C., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Purdue Univ.); Professor *Emeritus of Mechanical and Aerospace Engineering.* 1990, 1962.

Mills, Terence (Ted) John, B.S. (Western Illinois Univ.), M.S. (ibid.), Ed.D. (Indiana Univ.); *Professor Emeritus of Teaching and Curriculum Leadership.* 1996, 1970.

Mitchell, Earl Douglas, B.S. (Xavier Univ.), M.S. (Michigan State Univ.), Ph.D. (ibid.); *Professor Emeritus of Biochemistry and Molecular Biology.* 1978, 1967.

Mize, Joe H., B.S.I.E. (Texas Tech. Univ.), M.S.I.E. (Purdue Univ.), Ph.D. (ibid.); *Professor Emeritus of Industrial Engineering and Management.* 1994, 1972.

Monlux, Andrew W., D.V.M. (Iowa State Univ.), M.S. (ibid.), Ph.D. (George Washington Univ.); *Professor Emeritus of VBS: Pathobiology.* 1985, 1956.

Monroe, Nancy, B.A. (Univ. of Iowa), M.A. (ibid.), Ph.D. (Univ. of Kansas); *Associate Professor Emeritus of Communications Sciences and Disorders.* 1978, 1978.

Moretti, Peter M., B.S. (California Inst. of Technology), M.S. (ibid.), Ph.D. (Stanford Univ.); *Professor of Mechanical and Aerospace Engineering.* 1976, 1970.

Morgan, Patrick Monroe, D.V.M. (Univ. of Georgia), M.P.H. (Tulane Univ.), Dr.P.H. (ibid.); *Professor Emeritus of VBS: Pathobiology.* 1995, 1977.

Motes, James E., B.S. (Kansas State Univ.), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Horticulture and Landscape Architecture.* 1982, 1977.

Mottola, Horacio A., Licentiate (Univ. of Buenos Aires), Ph.D. (ibid.); *Regents Professor Emeritus of Chemistry.* 1998, 1967.

Murray, Jay C., B.S. (Utah State Univ.), M.S. (Colorado State Univ.), Ph.D. (Cornell Univ.); *Professor Emeritus of Plant and Soil Sciences.* 1992, 1959.

Nelson, Eldon Carl, B.S. (Ohio State Univ.), M.S. (ibid.), Ph.D. (ibid.); *Regents Professor of Biochemistry and Molecular Biology.* 2004, 1963.

Nelson, Margaret F., B.A. (Northwestern O.S.U.), M.A. (O.S.U.), Ph.D. (ibid.); *Associate Professor Emeritus of English.* 1990, 1970.

Nelson, Ted Richard, B.S. (Univ. of Nebraska), M.S. (ibid.), Ph.D. (O.S.U.); *Professor Emeritus of Agricultural Economics.* 1987, 1965.

Nofziger, David L., B.A. (Goshen College), M.S. (Purdue Univ.), Ph.D. (ibid.); *Regents Professor Emeritus of Plant and Soil Sciences.* 2004, 1974.

Norton, Joseph Randolph, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Univ. of Texas); *Professor Emeritus of College of Engineering.* 1978, 1946.

Noyes, Ronald T., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Univ. of Oklahoma); *Professor of Biosystems and Agricultural Engineering.* 1999.

Oaks, Audrey Eleanor, B.S. (State Univ. of New York-Buffalo), M.S. (Univ. of Wisconsin), Ed.D. (O.S.U.); *Associate Professor Emeritus of Teaching and Curriculum Leadership.* 1972, 1964.

Oehrtman, Robert Lee, B.S. (Ohio State Univ.), M.S. (Oregon State Univ.), Ph.D. (Iowa State Univ.); *Professor Emeritus of Agricultural Economics.* 1985, 1970.

Osborn, James E., B.S. (O.S.U.), Ph.D. (ibid.); *Professor Emeritus of Agricultural Economics.* 1977, .

Ospovat, Alexander Meir, B.S. (Univ. of Oklahoma), M.A. (ibid.), Ph.D. (ibid.); *Professor Emeritus of History.* 1988, 1962.

Owens, Frederic N., B.S. (Univ. of Minnesota), Ph.D. (ibid.); *Professor Emeritus of Animal Science.* 1998, 1974.

Ownby, James D., B.S. (Univ. of Tennessee), M.S. (ibid.), Ph.D. (Colorado State Univ.); *Professor Emeritus of Botany.* 2004, 1975.

Ownby, Charlotte L., B.S. (Univ. of Tennessee), M.S. (ibid.), Ph.D. (Colorado State Univ.); *Regents Professor Emeritus of VBS: Physiological Sciences.* 1990, 1974.

Ownby, Arnola C., B.S. (O.S.U.), M.S. (ibid.), Ed.D. (ibid.); *Professor Emeritus of Business Education and Administrative Services.* 1985, 1960.

Panciera, Roger J., D.V.M. (O.S.U.), M.S. (Cornell Univ.), Ph.D. (ibid.); *Professor of VBS: Pathobiology.* 1979, 1956.

Park, Janice, B.B.A. (Univ. of Oklahoma), B.S. (Univ. of Mississippi), M.A. (Ibid.), Ph.D. (O.S.U.); *Assistant Professor of Design, Housing and Merchandising.* 1985.

Parker, Jerald Dwain, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Purdue Univ.); *Professor Emeritus of Mechanical and Aerospace Engineering.* 1988, 1955.

Payne, Richard Newton, B.S. (O.S.U.), M.S. (Ohio State Univ.), Ph.D. (ibid.); *Professor Emeritus of Horticulture and Landscape Architecture.* 1987, 1957.

Pettyjohn, Wayne A., B.A. (Univ. of South Dakota), M.A. (ibid.), Ph.D. (Boston Univ.); *Professor Emeritus of Geology.* 1995, 1980.

Pinkston, Kenneth N., B.S. (O.S.U.), Ph.D. (ibid.); *Professor Emeritus of Entomology and Plant Pathology.* 1983, 1970.

Pixton, William H., A.B. (George Washington Univ.), M.A. (ibid.), Ph.D. (Univ. of North Carolina, Chapel Hill); *Associate Professor Emeritus of English.* 1994, 1977.

Plaxico, James Sam, B.S. (Clemson College), M.S. (ibid.), Ph.D. (Univ. of Minnesota); *Professor Emeritus of Agricultural Economics*. 1988, 1955.

Porterfield, Jay G., B.S. (Iowa State Univ.), M.S. (ibid.); *Professor Emeritus of Biosystems and Agricultural Engineering.* 1982, 1952.

Post, Gene L., B.A. (Bethany Nazarene College), M.Ed. (Univ. of Oklahoma), Ed.D. (O.S.U.); *Professor Emeritus of Teaching and Curriculum Leadership.* 1986, 1961.

Price, Richard Graydon, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Entomology and Plant Pathology.* 1990, 1965.

Pritchard, Jack W., B.S. (O.S.U.), M.S. (ibid.), Ed.D. (ibid.); *Professor Emeritus of Agricultural Education.* 1996, 1968.

Qualls, Charles W., B.S. (O.S.U.), D.V.M. (ibid.), Ph.D. (Univ. of California, Davis); *Professor of VBS: Pathobiology.* 1988, 1982.

Radford, Robert Thomas, B.A. (Baylor Univ.), M.A. (ibid.), Ph.D. (Univ. of Texas at Austin); *Associate Professor Emeritus of Philosophy*. 1994, 1963.

Ransom, Charles R., B.B.A. (Univ. of Wisconsin-Madison), M.B.A. (ibid.), Ph.D. (ibid.); *Associate Professor of Accounting*. 1986, 1981.

Ray, Frederick, B.S. (Ohio State Univ.), M.S. (ibid.), Ph.D. (Purdue Univ.); *Professor Emeritus of Animal Science.* 2004, 1978.

Ray, Darrel D., B.A. (Northwestern State College, Oklahoma), M.S. (O.S.U.), Ed.D. (ibid.); *Professor Emeritus of Teaching and Curriculum Leadership*. 1990, 1965.

Reed, Robert M., B.S. (Univ. of Illinois), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Plant and Soil Sciences.* 1987, 1950.

Reisbeck, Robert Fred, B.S. (Colorado State Univ.), M.S. (O.S.U.), Ed.D. (ibid.); *Associate Professor Emeritus of Agricultural Education*. 1997, 1966.

Rhoten, Ronald P., B.S. (Univ. of Texas), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Electrical and Computer Engineering.* 1995, 1969.

Richardson, Paul E., B.A. (Univ. of Kentucky), M.Ed. (Univ. of Cin.), M.A.T. (Un. of N.C.), M.S. (Univ. of Cin.), Ph.D. (ibid.); *Professor Emeritus of Botany.* 1992, 1968.

Roberts, David M., B.A. (Eastern Kentucky Univ.), M.F.A. (Univ. of Tennessee); *Associate Professor Emeritus of Art.* 1990.

Robinson, Robert Louis, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Regents Professor Emeritus of Chemical Engineering.* 2001, 1965.

Robinson, David W., B.S. (O.S.U.), M.F. (North Carolina State Univ.), Ed.D. (O.S.U.); *Professor Emeritus of Natural Resource Ecology and Management.* 1991, 1962.

Rollins, Peter Cushing, B.A. (Harvard Univ.), Ph.D. (ibid.); *Professor Emeritus of English.* 1989, 1972.

Rooney, John F., B.S. (Illinois State Univ.), M.S. (ibid.), Ph.D. (Clark Univ.); *Regents Professor Emeritus of Geography.* 1994, 1969.

Roszel, Jeffie Fisher, D.V.M. (Univ. of Pennsylvania), Ph.D. (O.S.U.); *Professor Emeritus of VBS: Pathobiology.* 1993, 1971.

Roth, Lawrence O., B.S. (Univ. of Wisconsin), M.S. (O.S.U.), Ph.D. (ibid.); *Professor Emeritus of Biosystems and Agricultural Engineering*. 1987, 1951.

Rouse, Roscoe, B.A. (Univ. of Oklahoma), M.A. (Univ. of Michigan), Ph.D. (ibid.); *Librarian Emeritus of Library.* 1987, 1967.

Sander, David A., B.S. (Univ. of Nebraska), M.S. (ibid.), Ph.D. (Purdue Univ.); *Professor Emeritus of Plant and Soil Sciences.* 1982, 1957.

Sandvold, Kenneth Douglas, B.S. (Concordia College), M.S. (Univ. of North Dakota), Ph.D. (Univ. of Illinois); *Professor Emeritus of Psychology.* 1990, 1965.

Santelmann, Paul W., B.S. (Univ. of Maryland), M.S. (Michigan State Univ.), Ph.D. (Ohio State Univ.); *Professor Emeritus of Plant and Soil Sciences.* 1991, 1962.

Sare, Harold Victor, B.A. (O.S.U.), M.A. (ibid.); *Regents Professor Emeritus of Political Science.* 1987, 1963.

Sauer, John R., B.S. (State John's Univ.), M.S. (New Mexico Highlands Univ.), Ph.D. (Tulane Univ.); *Professor Emeritus of Entomology and Plant Pathology.* 1989, 1969.

Savvides, Andreas, B.S./B.Com. (Univ. of Birmingham, Univ.K.), M.A. (Univ. of Florida), Ph.D. (ibid.); *Professor Emeritus of Economics.* 2002, 1985.

Schlottmann, Robert S., B.A. (Louisiana State Univ.), M.S. (Tulane Univ.), Ph.D. (Louisiana State Univ.); *Professor Emeritus of Psychology.* 1995, 1970.

Schreiner, Dean Frederick, B.S. (Colorado State Univ.), M.S. (Iowa State Univ.), Ph.D. (ibid.); *Professor Emeritus of Agricultural Economics.* 1974, 1968.

Schuermann, Allen Clark, B.A. (Univ. of Kansas), M.S. (Wichita State Univ.), Ph.D. (Univ. of Arkansas); *Professor Emeritus of Industrial Engineering and Management.* 1984, 1984.

Scott, Walter Gaylord, B.A. (Baylor Univ.), B.D. (Southwestern Baptist Theological Seminary), Th.M. (ibid.), M.A. (Baylor Univ.), Ph.D. (John Hopkins Univ.); *Associate Professor Emeritus of Philosophy.* 1970, 1960.

Seals, James M., B.S. (Abilene Christian College), M.A. (Southwest Texas State Univ.), Ph.D. (East Texas State Univ.); *Professor of Educational Studies.* 1975, 1968.

Segall, William E., B.A. (Yankton College), M.Ed. (Univ. of Texas at El Paso), Ed.D. (Univ. of Arkansas); *Professor Emeritus of Educational Studies.* 2006, 1969.

Self, Patricia A., B.A. (Univ. of Kansas), M.A. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Human Development and Family Science.* 1991, 1988.

Shamblin, James Earle, B.S. (Univ. of Texas, Austin), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Industrial Engineering and Management.* 1994, 1964.

Shawley, Richard V., B.S. (O.S.U.), M.S. (ibid.), D.V.M. (ibid.); *Professor of VBS: Veterinary Clinical Sciences.* 1988, 1973.

Sholar, James R., B.S. (Univ. of Tennessee-Martin), M.S. (O.S.U.), Ph.D. (ibid.); *Professor Emeritus of Plant and Soil Sciences.* 1991, 1975.

Shook, John Robert, B.A. (Case Western Reserv Univ.), M.A. (Univ. of Florida), Ph.D. (SUNY at Buffalo); *Associate Professor of Philosophy.* 2000.

Sim, Mui-Hwa (May), B.A. (Univ. of Iowa), Ph.D. (Vanderbilt Univ.); *Associate Professor of Philosophy.* 1991.

Singleton, Larry L., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Univ. of Minnesota); *Professor Emeritus of Entomology and Plant Pathology.* 1981, 1976.

Smallwood, James M., B.S. (East Texas State Univ.), M.A. (ibid.), Ph.D. (Texas Tech. Univ.); *Professor Emeritus of History.* 1992, 1975.

Smeyak, Paul, M.F.A. (Ohio Univ.), M.A. (Ohio State Univ.), Ph.D. (ibid.); *Professor of Journalism and Broadcasting.* 2000, 1996.

Smith, Edward L., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Univ. of Minnesota); *Regents Professor Emeritus of Plant and Soil Sciences.* 1989, 1966.

Smith, Robert A., B.S. (Kansas State Univ.), M.S. (Kansas State Univ.), D.V.M. (Kansas State Univ.); *Associate Professor Emeritus of VBS: Veterinary Clinical Sciences.*

Smith, Charles L., B.M. (Central Methodist College), M.A. (Univ. of Colorado), M.A. (Univ. of Northern Colorado), Ed.D. (ibid.); *Associate Professor Emeritus of Teaching and Curriculum Leadership.* 1986, 1972.

Spaulding, Robert M., A.B. (Univ. of Michigan), A.M. (ibid.), Ph.D. (ibid.); *Professor Emeritus of History.* 1987, 1971.

St. Clair, James Kenneth, B.A. (North Texas State Univ.), B.M. (ibid.), M.M.E. (ibid.), Ed.D. (Univ. of Texas); *Professor Emeritus of Educational Studies.* 1991, 1964.

Stair, Ernest L., D.V.M. (O.S.U.), M.S. (Univ. of Nebraska), Ph.D. (Texas A&M Univ.); *Professor Emeritus of VBS: Pathobiology.* 1997, 1975.

Stanners, Robert Francis, B.S. (Univ. of Wisconsin), Ph.D. (Univ. of Iowa); *Professor Emeritus of Psychology.* 1992, 1966.

Stewart, Gary F., B.S. (O.S.U.), M.S. (Univ. of Oklahoma), Ph.D. (Univ. of Kansas); *Professor Emeritus of Geology.* 1984, 1971.

Stiegler, James H., B.S. (Texas A&I Univ.), M.S. (O.S.U.), Ph.D. (Virginia Polytechnic Inst. and State Univ.); *Professor Emeritus of Plant and Soil Sciences*. 2007, 1973.

Stout, Joseph A., B.A. (Angelo State College), M.A. (Texas A&M Univ.), Ph.D. (O.S.U.); *Professor of History.* 1984, 1972.

Stritzke, Jimmy Franklin, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Univ. of Missouri); *Professor Emeritus of Plant and Soil Sciences.* 1980, 1970.

Susky, John Earle, B.A. (Univ. of Florida), M.A. (ibid.), Ed.D. (O.S.U.); *Professor Emeritus of Philosophy.* 1984, 1961.

Swaim, Robert L., B.S. (Purdue Univ.), M.S. (ibid.), Ph.D. (Ohio State Univ.); *Professor Emeritus of Mechanical and Aerospace Engineering.* 1992, 1978.

Swamy, Nyayapathi V.V.J., B.S. (Siddharth College), M.S. (Wilson College), Ph.D. (Florida State Univ.); *Professor Emeritus of Physics*. 1987, 1968.

Taliaferro, Charles M., B.S. (O.S.U.), M.S. (Texas A&M Univ.), Ph.D. (ibid.); *Regents Professor Emeritus of Plant and Soil Sciences*. 2006, 1968.

Taylor, Warren E., B.S. (O.S.U.), M.S. (ibid.); *Associate Professor Emeritus of Biosystems and Agricultural Engineering.* 1981, 1952.

Terrell, Marvin Palmer, B.S. (Univ. of Arkansas), M.S. (ibid.), Ph.D. (Univ. of Texas); *Professor Emeritus of Industrial Engineering and Management.* 1996, 1966.

Terry, H. Robert, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Ohio State Univ.); *Regents Service Professor of Agricultural Education.* 1994, 1969.

Thornton, John W., B.S. (O.S.U.), Ph.D. (Univ. of Washington); *Professor Emeritus of Zoology*. 1995, 1960.

Tilley, Marcia, B.S. (Iowa State Univ.), M.S. (Univ. of Florida), J.D. (ibid.); *Professor Emeritus of Agricultural Economics.* 1988, 1982.

Todd, Glenn W., A.B. (Univ. of Missouri), M.A. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Botany.* 1993, 1958.

Toetz, Dale William, B.S. (Univ. of Wisconsin), M.S. (ibid.), Ph.D. (Indiana Univ.); *Professor Emeritus of Zoology*. 1980, 1965.

Tonsing, Evan A., B.S. (Kansas Univ.), M.S. (ibid.); *Associate Professor Emeritus of Music.* 1982, 1968.

Totusek, Robert, B.S. (O.S.U.), M.S. (Purdue Univ.), Ph.D. (ibid.); *Professor Emeritus of Animal Science.* 1990, 1952.

Troxel, Vernon, B.S. (Illinois State Normal Univ.), M.Ed. (Univ. of Illinois), Ed.D. (ibid.); *Professor Emeritus of Teaching and Curriculum Leadership.* 1990, 1963.

Tucker, Billy B., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Univ. of Illinois); *Regents Professor Emeritus of Plant and Soil Sciences.* 1987, 1956.

Tweedie, Stephen W., B.A. (Cornell Univ.), M.Ed. (ibid.), Ph.D. (Syracuse Univ.); *Associate Professor Emeritus of Geography.* 1976, 1971.

Tweeten, Luther Gilbert, B.S. (Iowa State Univ.), M.S. (O.S.U.), Ph.D. (Iowa State Univ.); *Regents Professor Emeritus of Agricultural Economics.* 1987, 1962.

Usry, Milton F., B.B.A. (Baylor Univ.), M.B.A. (Univ. of Houston), Ph.D. (Univ. of Texas); *Regents Professor Emeritus of Accounting.* 1986, 1961.

Vishniac, Helen S., B.A. (Univ. of Michigan), M.A. (Radcliffe College), Ph.D. (Columbia Univ.); *Professor Emeritus of Microbiology and Molecular Genetics*. 1994, 1978.

Vitek, John D., B.S. (Wisconsin State Univ.), M.A. (Univ. of Iowa), Ph.D. (ibid.); *Professor Emeritus of Geology.* 1987, 1978.

von Broembsen, Sharon Lee, B.S. (Lock Haven Univ.), Ph.D. (Washington State Univ.); *Professor Emeritus of Entomology and Plant Pathology.* 1998, 1988.

Wagner, Donald G., B.S. (Ohio State Univ.), M.S. (Cornell Univ.), Ph.D. (ibid.); *Professor Emeritus of Animal Science.* 1990, 1965.

Walker, Odell Larry, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Iowa State Univ.); *Professor Emeritus of Agricultural Economics.* 1993, 1956.

Waller, George R., B.S. (North Carolina State College), M.S. (Univ. of Delaware), Ph.D. (O.S.U.); *Professor Emeritus of Biochemistry and Molecular Biology.* 1988, 1956.

Walters, Lowell Eugene, B.S. (O.S.U.), M.S. (Massachusetts State College), Ph.D. (O.S.U.); *Professor Emeritus of Animal Science.* 1984, 1946.

Warden, Paul George, B.A. (Baldwin-Wallace College), M.A. (Kent State Univ.), Ph.D. (ibid.); *Professor Emeritus of Applied Health and Educational Psychology*. 1978, 1970.

Weaver, Gordon A., B.A. (Univ. of Wisconsin-Milwaukee), M.A. (Univ. of Illinois), Ph.D. (Univ. of Denver); *Professor Emeritus of English*. 1995, 1975.

Weeks, David Lee, B.S. (O.S.U.), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Statistics*. 1994, 1957.

Whitney, Richard W., B.S.A.E. (Kansas State Univ.), M.S.A.E. (O.S.U.), Ph.D. (ibid.); *Professor of Biosystems and Agricultural Engineering.* 1999, 1975.

Wiebelt, John Albert, B.S. (Texas Technological College), M.S. (Southern Methodist Univ.), Ph.D. (O.S.U.); *Professor Emeritus of Mechanical and Aerospace Engineering*. 1985, 1958.

Wiggins, Kenneth Edward, B.S. (Troy State College), M.S. (Auburn Univ.), Ed.D. (ibid.); *Professor Emeritus of Aviation and Space Education.* 1987, 1962.

Wilguess, John H., B.S. (Indiana State Univ.), M.S. (ibid.), Ph.D. (Univ. of Arkansas); *Professor of Accounting.* 1989, 1979.

Wilhm, Jerry Leo, B.S. (Kansas State Teachers College), M.S. (ibid.), Ph.D. (O.S.U.); *Professor Emeritus of Zoology.* 1995, 1966.

Wilkinson, Janet Barbara, B.A. (Univ. of New Hampshire), M.S. (Purdue Univ.), Ph.D. (ibid.); *Associate Professor Emeritus of Teaching and Curriculum Leadership*. 1980, 1971.

Wittwer, Robert F., B.S. (State Univ. of New York), M.S. (ibid.), Ph.D. (ibid.); *Professor Emeritus of Natural Resource Ecology and Management.* 1998, 1982.

Wolfe, John E., B.A. (Bucknell Univ.), M.A. (Univ. of California), Ph.D. (ibid.); *Professor Emeritus of Mathematics.* 1991, 1974.

Wright, Russell E., B.S. (Iowa State Univ.), M.S. (ibid.), Ph.D. (Univ. of Wisconsin; *Professor Emeritus of Entomology and Plant Pathology.* 1982, 1976.

Yarlagadda, Radha K. Rao, B.E. (B.M.S. College of Engineering), M.S. (South Dakota State Univ.), Ph.D. (Michigan State Univ.); *Professor of Electrical and Computer Engineering.* 1990, 1966.

Zirkle, Larry D., B.S. (O.S.U.), M.S. (ibid.), Ph.D. (Univ. of Texas at Austin); *Professor Emeritus of Mechanical and Aerospace Engineering.* 1996, 1970.

Course Descriptions

For the most current course descriptions, view online at http://registrar.okstate.edu

This Catalog offers information about the academic programs and support services of the University. This Catalog is as accurate as possible, but the information may not remain current for all of the academic year. Circumstances may prompt changes in courses, course content, credit, fees, regulations, semester calendar, curriculum, degrees offered, and other University matters. Such changes authorized by the University apply both to prospective students and to those previously enrolled, unless the latter are specifically exempted.

Not all courses are offered each semester or session. Students should consult the current class schedule and the departmental office for specific details regarding frequency of offerings in specific courses.

Course descriptions are listed alphabetically by fields. (See the BIOM prefix and the *OSU Center for Health Sciences Catalog* for osteopathic medicine course descriptions.)

Explanation of Course Descriptions

A course description is comprised of the following elements, in order:

—Course Number. All courses are identified by numbers composed of four digits. The first digit indicates the class year in which the subject is ordinarily taken, although enrollment is not exclusive as to student classification, the second and third digits identify the course within the field and the last digit identifies the number of semester credit hours the course carries. A course number beginning with 0 indicates that the course does not carry University credit. A course number ending in 0 indicates that the course carries variable credit. An asterisk (*) following the four-digit number indicates the course is approved for graduate credit.

Those numbered 5000 and above are primarily for graduate students, and only graduate students and selected seniors with consent of the instructor may enroll in them. Courses numbered 3000 and 4000 may be taken for graduate credit if the course number is labeled with an asterisk. Extra work is required to receive graduate credit in 3000- or 4000-level courses that are labeled with an asterisk.

—General Education Requirement Codes. The capital letters in parentheses preceding some course titles designate courses fulfilling various undergraduate general education requirements. (See "Academic Regulations.") Not all courses that are approved for general education credit are offered each term. Please refer to the General Education course search on SIS to locate what courses are offered by term or for a complete list view the General Education Credit Course List on the Registrar Web site at http://registrar.okstate.edu/Course%20Listings/GECourseList.html.

—Course Title. The title of the course is printed in boldface letters.

—Statement of Variable Credit. Each course number ending in zero is followed by a statement of the credit that may be earned. Typical entries are 1-6 credits, maximum 6 and 1-3 credits, maximum 12, the first part of the entry indicating the permissible credit per enrollment, followed by a statement of the maximum credit which may be earned in the course through repeated enrollment.

—Laboratory Hours. If a course contains a laboratory, the number per week of laboratory hours are stated, e.g., Lab 3.

—Prerequisite(s). Prerequisites from the same department as the course being described are listed first, with no departmental abbreviation and in increasing numerical order. If from another department, that departmental abbreviation must precede the number of the prerequisite course. Those courses having prerequisites from both within and from outside the department bear combination entries such as 3303 and STAT 2012. Prerequisites are listed in the following manner:

Prerequisites: A or B or C
A or B or C is acceptable

Prerequisites: A or B, C
A or B is acceptable, and C is required

Prerequisites: A, B and C
A and B and C are required

Prerequisites: A, and B or C
A and either B or C

Prerequisites: A and B, or C
Both A and B, or C required

Prerequisites: A, or B and C
Either A or both B and C required

Prerequisites: A or equivalent and B
Both A, or the equivalent of A, and B are required

Prerequisites: A, and B or equivalent
Both A and B, or the equivalent of B, are required

Prerequisites: A and B, or equivalents
Equivalents of both A and B are acceptable.

Where no prerequisites are listed for courses numbered 3000 or 4000 level, it is understood that the prerequisite is approval of the student's adviser. The prerequisite for courses numbered 5000 or 6000 level is graduate standing in addition to any other prerequisites listed. Instructors may waive prerequisites when student background justifies. Prior approval of instructor may be required in problems courses, independent study, internships, thesis and dissertation courses, and courses taught in a professional school.

—Description of Course Content. The content of the course and its major emphases are described. Courses which are taught under another name and number are indicated by the statement same course as 0000. Credit may not be earned in both courses so cross-referenced.

Course Abbreviations

A&S	Arts and Sciences
ACCT	Accounting
AERO	Aerospace Studies--Air Force
AG	Agriculture
AGCM	Agricultural Communications
AGEC	Agricultural Economics
AGED	Agricultural Education
AGLE	Agricultural Leadership
AMST	American Studies
ANSI	Animal Science
ANTH	Anthropology
ARCH	Architecture
ART	Art
ASL	American Sign Language
ASTR	Astronomy
AVED	Aviation Education
BADM	Business Administration
BAE	Biosystems and Agricultural Engineering
BCOM	Business Communications
BHON	Business Honors
BIOC	Biochemistry
BIOL	Biological Science
BIOM	Biomedical Sciences
BOT	Botany
BSPR	Business Professions
CDIS	Communication Sciences and Disorders
CHE	Chemical Engineering
CHEM	Chemistry
CIED	Curriculum and Instruction Education
CIVE	Civil Engineering
CMT	Construction Management Technology
CPSY	Counseling Psychology
CS	Computer Science
CTED	Career and Technical Education
DHM	Design, Housing and Merchandising
ECEN	Electrical and Computer Engineering
ECON	Economics
EDLE	Educational Leadership
EDTC	Educational Technology
EDUC	Education
EEE	Entrepreneurship and Emerging Enterprise
EET	Electrical Engineering Technology
ENGL	English
ENGR	Engineering
ENSC	Engineering Science
ENTO	Entomology
ENVR	Environmental Science
EPSY	Educational Psychology
ETM	Engineering and Technology Management
FDSC	Food Science
FIN	Finance
FLL	Foreign Languages and Literatures
FPST	Fire Protection and Safety Technology
FREN	French
FRNS	Forensic Sciences
GENE	Genetics
GENG	General Engineering
GENT	General Technology
GEOG	Geography
GEOL	Geology
GRAD	Graduate
GREK	Greek
GRMN	German
GWST	Gender and Women's Studies
HCA	Health Care Administration
HDFS	Human Development and Family Science
HES	Human Environmental Sciences
HHP	Health and Human Performance
HIST	History
HONR	Honors College
HORT	Horticulture
HRAD	Hotel and Restaurant Administration
HRAE	Human Resources and Adult Education
IEM	Industrial Engineering and Management
INTL	International Studies
JAPN	Japanese
JB	Journalism and Broadcasting
LA	Landscape Architecture
LATN	Latin
LBSC	Library Science
LEIS	Leisure
LSB	Legal Studies in Business
MAE	Mechanical and Aerospace Engineering
MATH	Mathematics
MBA	Master of Business Administration
MC	Mass Communications
MCAG	Mechanized Agriculture
MET	Mechanical Engineering Technology
MGMT	Management
MICR	Microbiology
MKTG	Marketing
MLSC	Military Science
MSIS	Management Science and Information Systems
MUSI	Music
NATS	Natural Science
NREM	Natural Resource Ecology and Management
NSCI	Nutritional Sciences
OCED	Occupational Education
PHIL	Philosophy
PHYS	Physics
PLNT	Plant Science
PLP	Plant Pathology
POLS	Political Science
PSYC	Psychology
REL	Religious Studies
REMS	Research, Evaluation, Measurement, and Statistics
RUSS	Russian
SCFD	Social Foundations
SDEV	Student Development
SOC	Sociology
SOIL	Soil Science
SPAN	Spanish
SPCH	Speech Communication
SPED	Special Education
STAT	Statistics
TCOM	Telecommunications Management
TH	Theatre
UNIV	University
VBSC	Veterinary Biomedical Sciences
VCS	Veterinary Clinical Sciences
VMED	Veterinary Medicine
ZOOL	Zoology

ACCOUNTING (ACCT)

ACCT 2103
Financial Accounting. Prerequisite(s): 24 semester credit hours, including ENGL 1113 and MATH 1483 or equivalent. Financial accounting concepts and the use of financial accounting information in decision-making.

ACCT 2203
Managerial Accounting. Prerequisite(s): 2103. Managerial accounting concepts and objectives, planning and control of sales and costs, analysis of costs and profits.

ACCT 3013
Federal Income Taxation. Prerequisite(s): 2203; by permission only; satisfactory score on a qualifying exam covering basic accounting concepts. Federal income tax and its relationship to business decision-making; primary emphasis on recognition of the important tax consequences that attach to business transactions and the impact on business decision-making.

ACCT 3103
Financial Accounting and Reporting Concepts. Prerequisite(s): 2203; by permission only; satisfactory score on a qualifying exam covering basic accounting concepts. Theory and concepts underlying financial accounting and reporting.

ACCT 3113
Financial Accounting and Reporting Applications and Research. Prerequisite(s): 3103 with a grade of "C" or better. Developing financial research skills and applying them to accounting and reporting issues.

ACCT 3183
Agribusiness Accounting and Taxation. Prerequisite(s): 60 semester credit hours, including ENGL 1113 and MATH 1483 or equivalent. Development of the ability to read, analyze and use accounting information to improve decision-making and tax planning. (Same course as AGEC 3183)

ACCT 3203
Cost Accounting. Prerequisite(s): 2203, STAT 2023; by permission only; satisfactory score on a qualifying exam covering basic accounting concepts. Cost accumulation systems, allocating product costs, planning and controlling costs, standard costing, and profitability analysis.

ACCT 3603
Accounting Information Systems. Prerequisite(s): 2203; by permission only; satisfactory score on a qualifying exam covering basic accounting concepts. Accounting system design and installation.

ACCT 3990
Undergraduate Internship in Accounting. 1-3 credits, max 3. Prerequisite(s): Accounting major, nine hours of upper-division accounting, and consent of instructor. Supervised internship in public accounting, industry, or not-for-profit organizations. May be counted as elective hours only.

ACCT 4033
Advanced Federal Income Taxation. Prerequisite(s): 3013. Federal income tax law applicable to individuals, corporations, partnerships, trusts and estates, and other specialized topics.

ACCT 4133
Financial Accounting III. Prerequisite(s): 3113 with grade of "C" or better. Accounting for complex business transactions, emerging issues in financial accounting and reporting, accounting for consolidations and business combinations, accounting for governmental and not-for-profit entities.

ACCT 4233
Internal Auditing. Prerequisite(s): 3103 and 3603. Examination of theory and practices utilized by internal auditors in performing operational audits to assure an organization's operational effectiveness, efficiency, and control over resources.

ACCT 4503*
Operational Auditing and Controls. Prerequisite(s): 3103 and 3603. Examination of theory and practices utilized by internal auditors in performing operational audits to assure an organization's operational effectiveness, efficiency, and control over resources.

ACCT 4553
Ethical Issues in Accounting. Prerequisite(s): Admission to the MS/PPA or permission of department. Basic theories of ethics, including moral reasoning, moral values, relativity and objectivity, freedom and responsibility. Lecture and case approach for examination of issues such as independence, integrity, objectivity, client relationships, employee-employer relations, advertising, preferential treatment, core values and the corporation, and corporate governance, such as Sarbanes-Oxley Act, Foreign Corrupt Practices Act, and SEC regulations.

ACCT 4653
Contemporary Integrated Accounting and Business Systems. Prerequisite(s): 3603. Concepts and software applications underlying the design and use of databases for financial, managerial, and tax accounting measurement, compliance disclosure, and decision-related reporting in traditional and electronic commerce settings.

ACCT 4733
International Accounting. Prerequisite(s): 2103 and 2203. Diversity in financial reporting across countries and its effect on global capital flows. Using corporate financial information across borders. Accounting in emerging markets.

ACCT 4763
International Accounting Abroad. Prerequisite(s): 2103 or consent of instructor. A four-week visit to a European country or countries. An integrated approach to the cultural, economic, political, historical, and technological effects of the region on international accounting. Comparison of the accounting issues of the region to that of the U.S.

ACCT 4930
Accounting Projects. 1-9 credits, max 9. Prerequisite(s): 3113, 3203, and consent of instructor. Special topics, projects and independent study in accounting.

ACCT 5013*
Tax Research. Prerequisite(s): Admission to MS in accounting. Development and administration of federal tax law with emphasis on the development of tax research skills.

ACCT 5023*
Estate and Trust Taxation. Prerequisite(s): Admission to MS in accounting. Federal and Oklahoma wealth transfer tax systems, including estate, gift, and generation-skipping transfer taxation. Also, treatment of income taxation of estates and trusts and estate planning vehicles.

ACCT 5033*
Natural Resource Taxation. Prerequisite(s): Admission to MS in accounting. Federal income tax laws applicable to the acquisition, operation, and disposal of natural resource properties.

ACCT 5043*
Partnership Taxation. Prerequisite(s): Admission to MS in accounting. Federal income tax laws applicable to partners and partnerships.

ACCT 5053*
Corporate Taxation. Prerequisite(s): Admission to MS in accounting. Federal income tax law applicable to corporations and shareholders.

ACCT 5083*
MBA Tax Management. Prerequisite(s): Admission to MBA program or consent of MBA director. An introduction to the basic framework of the federal income tax system with an emphasis on recognition of the tax implications of business transactions and how taxes affect managerial decision-making. An exploration of the social and economic policy ramifications of the tax system.

ACCT 5103*
Seminar in Contemporary Accounting Theory I. Prerequisite(s): Admission to the MS in accounting. Origin and development of accounting and a critical study of modern accounting theory.

ACCT 5113*
Financial Accounting Research. Prerequisite(s): 3113 and admission to master's program. Research and presentation of solutions for complex issues in accounting practice using databases, SEC, FASB, AICPA, FARS, as well as other publicly available information.

ACCT 5123*
Enterprise Resource Planning. Prerequisite(s): Graduate standing, ACCT 5103 and 5113. Resource planning for global business organizations. Integrated data flow and computer software for enterprise resource planning. Integration of transactional analysis, fundamental accounting practice, financial planning, and supply chain analysis forming the basis for study in this integrated approach to enterprise resource planning.

ACCT 5133*
International Oil and Gas Accounting. Prerequisite(s): Admission to MS in accounting and 15 hours of accounting. Financial accounting and reporting for U.S. and international oil and gas operations. Domestic and international joint venture accounting. Accounting for international concession and profit sharing agreements.

ACCT 5153*
Financial Modeling and Statement Analysis. Prerequisite(s): Admission to the MS in accounting. A study of the demand and supply of financial data, properties of numbers derived from financial statements, the role of financial information in investment decisions, and features of the decision-making environment.

ACCT 5183*
MBA Financial Accounting and Analysis. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Development of the ability to read and to analyze financial statements and to use this information along with other types of information in decision-making.

ACCT 5203*
Seminar in Contemporary Accounting Theory I. Prerequisite(s): Permission of SSB Graduate Programs office. Origin and development of accounting and a critical study of modern accounting theory.

ACCT 5233*
Valuation and Business Risk Management. Prerequisite(s): Admission to MS in accounting. Valuation of assets using a variety of interdisciplinary business methods. Presentation of asset valuations in formats suitable for different audiences, attuned to different purposes. Application and understanding of the meaning of risk and its impact on valuation issues.

ACCT 5283*
MBA Managerial Accounting. Prerequisite(s): 5183 and admission to MBA program or consent of MBA director. Interpretation of accounting data in planning, controlling and decision-making.

ACCT 5503*
Auditing and Assurance Services. Prerequisite(s): Admission to professional program in accounting (PPA)/MS in accounting program. Auditing theory, procedures and practices.

ACCT 5513*
Advanced Auditing and Assurance Services. Prerequisite(s): 5503 or equivalent. Introduction to fraud examination and legal issues involved in investigative process. Advanced topics in statutory auditing, operational auditing and investigative services.

ACCT 5543*
Fraud Examination. Prerequisite(s): Permission of SSB Graduate Programs office. Schemes used in the commission of white-collar fraud, as well as causes, symptoms and prevention methods related to these crimes.

ACCT 5553*
Forensic Accounting Tools. Prerequisite(s): Permission of SSB Graduate Programs office. Provides in-depth study and practice with tools that are most critical in conducting proactive fraud detection and fraud investigations.

ACCT 5603*
Accounting-Based Information Systems. Prerequisite(s): Permission of SSB Graduate Programs office. Concepts underlying the design and use of an effective accounting information system.

ACCT 5613*
Business Systems Control and Risk Analysis. Prerequisite(s): Permission of SSB Graduate Programs office. Controlling and auditing business information systems, including management and applications controls, electronic commerce and Internet-related controls and evaluation of system.

ACCT 5753*
Seminar in International Accounting. Prerequisite(s): 3113 and admission to MS in accounting. Not available for students who have credit in 4733. Accounting issues faced by multinational enterprises and internationally listed companies, including diversity in financial reporting and harmonization.

ACCT 5783*
MBA International Accounting. Prerequisite(s): 5183 and admission to MBA program or consent of MBA director. Diversity in financial reporting across countries and its effect on global capital flows. Corporate financial information across borders. Accounting in emerging markets.

ACCT 5830*
Graduate Internship in Accounting. 1-3 credits, max 3. Prerequisite(s): Admission to MS/PPA in accounting; consent of graduate coordinator and either 5503 or 5013. Supervised internship in public accounting, industry, or not-for-profit organizations. May be counted as elective hours only.

ACCT 5840*
Special Topics and Individual Work in Accounting. 1-10 credits, max 10. Prerequisite(s): Consent of instructor. Individual work on special topics, projects or readings selected to acquaint students with significant accounting literature.

ACCT 5850*
Practicum in Professional Accounting. 1-6 credits, max 6. Prerequisite(s): Admission to MS/PPA in accounting program. Study of accounting policies, retirement policies, tax issues, and other relevant business issues associated with mergers, acquisitions, and divestures.

ACCT 5880*
MBA Special Topics in Accounting. 1-3 credits, max 3. Prerequisite(s): 5183 and admission to MBA program or consent of MBA director. Individual work on special topics, projects or readings to acquaint students with accounting literature.

ACCT 5932*
Research Report. Prerequisite(s): Consent of supervising professor and admission to MS in accounting. Restricted to candidates seeking the MS in accounting degree and not available to students who have credit in 5940. Methods used in research and report writing in accounting. Independent investigation and writing of an acceptable report on a topic approved by the student's supervising professor.

ACCT 5940*
Thesis. 1-6 credits, max 6. Prerequisite(s): Admission to MS in accounting. For students writing reports and theses in accounting.

ACCT 6000*
Research and Thesis. 1-18 credits, max 36. Prerequisite(s): Approval of advisory committee. For students working on the doctoral degree.

ACCT 6110*
Graduate Readings and Special Topics in Accounting. 1-3 credits, max 20. Prerequisite(s): Consent of supervising professor and coordinator of graduate programs in accounting. Supervised reading of significant literature and study of special topics not covered in regularly scheduled accounting courses.

ACCT 6703*
Seminar in Accounting Research. Prerequisite(s): Doctoral student status and consent of coordinator of graduate programs in accounting. The theoretical literature and research methodology in accounting.

AEROSPACE STUDIES - AIR FORCE (AERO)

AERO 1111
Foundations of the U.S. Air Force I. Lab 1. Doctrine, mission and organization of the United States Air Force through a study of the total force structure, strategic offensive and defensive forces, general purpose forces and aerospace support forces.

AERO 1211
Foundations of the U.S. Air Force II. Lab 1. Continuation of the doctrine, mission and organization of the United States Air Force; review of Army, Navy, and Marine general purpose forces.

AERO 2111
Evolution of U.S. Air Force Air and Space Power I. Lab 1. Growth and development of aerospace power through history beginning with first manned flights and continuing through World War II.

AERO 2211
Air Power History II. Lab 1. Development and growth of aerospace power from the period following World War II through the Vietnam conflict; concepts of peaceful deployment of U.S. air power.

AERO 3103
Air Force Leadership Studies I. Lab 2. The study of the fundamental leadership, management, and communication skills required of an Air Force junior officer. Basic managerial processes, management of forces in changing environments, organizational power, politics, and managerial strategy and tactics.

AERO 3203
Air Force Leadership Studies II. Lab 1. The application of leadership, management, and communication skills required of an Air Force junior officer. The individual as a leader in the Air Force environment, individual, motivational, and behavioral processes, group dynamics, leader and management ethics, counseling and evaluating are discussed.

AERO 3504
Field Training Encampment Program. Prerequisite(s): Consent of professor of aerospace studies. Practical training on an Air Force base. Junior officer training, familiarization training in most functional aspects of a typical Air Force base. Includes career orientation, small arms firing, flight orientation rides, and survival training.

AERO 4103
National Security Affairs I. Lab 2. The formulation, organization and context of national security; civil-military interaction and the evolution of strategy. Review of the military profession and officership.

AERO 4203
National Security Affairs II. Lab 1. Strategy and management of conflict; implementation of national security and regional world issues. Review of societal issues in the military profession and the military justice system.

AERO 4402
Summer Professional Development Training Program. Prerequisite(s): Consent of professor of aerospace studies. Students spend from two to three weeks on an Air Force base working in their intended specialty under supervision of experienced officer. Leadership and management principles applied to day-to-day experiences.

AERO 4554
Introductory Flight Training Program. Prerequisite(s): Consent of professor of aerospace studies. Academic and flying phase. Flight characteristics, meteorology, navigation, FAA regulations, and radio procedures.

AGRICULTURAL COMMUNICATIONS (AGCM)

AGCM 2113
Communications in Agriculture. Lab 2. Prerequisite(s): ENGL 1113 and major in AGCM or consent of instructor. Fundamentals of agricultural news writing and other communication methods. Careers in and the role of the media in agriculture and related fields.

AGCM 3101
Exploring Agricultural Communications. An exploration of career expectations and opportunities in agricultural communications.

AGCM 3103
Communicating Agriculture to the Public. Prerequisite(s): Junior standing in the College of Agricultural Sciences and Natural Resources or consent of the instructor. Understanding and application of writing principles and communications theory as related to public issues in agriculture and the environment. Practice in writing for a variety of media and preparation of other communications as part of a communications campaign strategy.

AGCM 3113
Writing and Editing for Agricultural Publications. Lab 2. Prerequisite(s): 2113 with a grade of "C" or better; major in agricultural communications; score of 3 or better on writing assessment; or consent of instructor. Interviewing, reporting, writing, and editing for agricultural publications.

AGCM 3123
Agricultural Broadcasting. Lab 2. Prerequisite(s): 3113 or JB 3263; major in agricultural communications or consent of instructor. Interviewing, reporting, writing and editing agricultural broadcast programs. Exploration of new technologies in broadcast equipment. Opportunity for service-learning experiences.

AGCM 3213
Layout and Design for Agricultural Publications. Lab 4. Prerequisite(s): 2113 or JB 2003; major in agricultural communications or consent of instructor. Fundamentals of layout and design as applied to agricultural publications. Practical application of design principles, typography, desktop-publishing software and printing practices. Opportunity for service-learning experiences.

AGCM 3223
Web Design for Agricultural Organizations. Lab 4. Prerequisite(s): 2113 or JB 2003; major in agricultural communications or consent of instructor. Development of World Wide Web sites for agricultural organizations. Practical application of theory and skills related to graphic design, computer software, writing, editing and project management. Opportunities for service-learning experiences.

AGCM 3233
Basic Photography and Photo Editing for Agriculture. Lab 4. Prerequisite(s): 2113 or JB 2003; major in agricultural communications or consent of instructor. Beginning course focusing on photographic equipment, related software and photo composition in an agricultural setting.

AGCM 4113*
Features Writing and Editing for Agricultural Publications. Prerequisite(s): 3113 with a grade of "C" or better; major in agricultural communications or consent of instructor. Brainstorming, researching, interviewing, developing, writing and editing feature stories for agricultural publications.

AGCM 4203*
Professional Development in Agricultural Communications. Prerequisite(s): 2113 or JB 2003; major in agricultural communications or consent of instructor. Professional preparation and development for careers in agricultural communications. Professional communications, resume and portfolio development, presentations, networking and job interviews. Introduction to event planning.

AGCM 4300
Internships in Agricultural Communications. 1-6 credits, max 6. Prerequisite(s): Consent of internship coordinator and adviser. Supervised work experience with approved employers in agricultural communications. Presentation required following the internship experience.

AGCM 4403*
Planning Campaigns for Agriculture and Natural Resources. Lab 4. Prerequisite(s): 3113 or JB 3263; AGCM 3213; major in agricultural communications or consent of instructor. Communications campaign development for agriculture and natural resources activities and issues, including development of materials, budgets and contracts.

AGCM 4413*
Agricultural Communications Capstone. Lab 4. Prerequisite(s): 3213, 3233; JB 3263 or AGCM 4113; senior or graduate standing and consent of instructor. The development of agricultural communications projects with focus in either broadcast or print media. Practical application of writing, editing and design skills as well as software applications.

AGCM 4990
Problems in Agricultural Communications. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Small group and individual study and research in problems relating to communications within the agricultural sector and from the agricultural sector to other constituencies.

AGCM 5000*
Research and Thesis. 1-6 credits, max 6. Prerequisite(s): Graduate standing. Independent research and thesis under the direction and supervision of a major professor.

AGCM 5100*
Issues in Agricultural Communications. 1-3 credits, max 6. Prerequisite(s): Graduate standing. Discussion of issues, problems and trends in agricultural communications.

AGCM 5103*
History and Philosophical Foundations of Agricultural Communications. Prerequisite(s): Graduate standing. Discussion of the history, philosophical foundations and current issues regarding agricultural communications and the land-grant system.

AGCM 5203*
Theory and Practice in Agricultural Communications. Prerequisite(s): Graduate standing. The study of major communication theories and theorists in the context of agricultural communications.

AGCM 5213*
Advanced Concepts in Agricultural Publishing. Prerequisite(s): Graduate standing. Analysis, redesign and creation of agricultural publications. Evaluation of audience, production, advertising and editorial content.

AGCM 5303*
Communicating Ethical Issues in Agriculture. Prerequisite(s): Graduate standing. An introduction to communicating ethical theories in the context of agriculture. Ethical theory and current research are used to critique contemporary issues in agriculture.

AGCM 5990*
Advanced Studies in Agricultural Communications. Prerequisite(s): Consent of supervising professor. Individual and small group study or research in agricultural communications topics and issues.

AGRICULTURAL ECONOMICS (AGEC)

AGEC 1114
(S)Introduction to Agricultural Economics. Prerequisite(s): MATH 1483 or 1513. Economic theory of production, marketing, and consumption of agricultural products. The role and structure of agriculture in the American economy. Policies to achieve efficiency and welfare goals in agriculture. *No general education credit for students also taking ECON 1113 or ECON 2103.*

AGEC 3010
Internship in Agricultural Economics. 1-3 credits, max 3. Prerequisite(s): Approval of internship committee and adviser. Supervised work experience with approved public and private employers in agricultural economics, including banks, farm credit services, agriculture chemical firms, Soil Conservation Service, congressional offices and other opportunities. *Credit will not substitute for required courses. Graded on a pass-fail basis.*

AGEC 3101
Professional Career Development. Prerequisite(s): Junior standing and agricultural economics or agribusiness major status. Overview of the various areas of specialization within agricultural economics and agribusiness and their associated career opportunities and obligations. Development and improvement of written communication, oral communication and leadership skills.

AGEC 3183
Agribusiness Accounting and Taxation. Prerequisite(s): 60 semester credit hours, including ENGL 1113 and MATH 1513 or equivalent. Development of the ability to read, analyze, and use accounting information to improve decision-making and tax planning. (Same course as ACCT 3183)

AGEC 3213
Quantitative Methods in Agricultural Economics. Lab 2. Prerequisite(s): 1114, STAT 2023 or equivalent and MSIS 2103, AG 2112 or equivalent. Indices, graphics, budgeting, discounting, basic statistical measures, use of microcomputers, and price analysis. Basic background methods for some courses involving analysis.

AGEC 3323
Agricultural Product Marketing and Sales. Prerequisite(s): 1114, ENGL 1113, SPCH 2713. Fundamentals of agricultural marketing management and planning applied to specific agricultural product (input and output) marketing problems. Institutional differences between agricultural and non-agricultural marketing environments. The role of the individual sales representative in a marketing and sales organization. *Written and oral presentations of marketing and sales information required of all students.*

AGEC 3333*
Agricultural Marketing and Price Analysis. Prerequisite(s): 3213 or concurrent enrollment. Supply, demand, and price determination within the institutional environment of agricultural commodity markets. The roles provided by government intervention, marketing agreements, and cooperatives in agricultural markets. Some graphical analysis of commodity market data. Fundamentals of futures markets applied to agriculture.

AGEC 3403
Agricultural Small Business Management. Prerequisite(s): 1114. The essentials of operating an agricultural small business. An introduction to the planning, organizing, marketing, managing, financing, controlling and operating an agricultural small business. *Not recommended for agricultural economics or agribusiness majors.*

AGEC 3423
Farm and Agribusiness Management. Prerequisite(s): 1114, ACCT 2103 or ACCT 3183 or AGEC 3183. Fundamentals of managerial functions as applied to agricultural firms. Organization and management of human, financial, and physical assets for the profitable operation of an agricultural business. An introduction to business planning, enterprise budgeting, financial statements and record keeping.

AGEC 3463
Agricultural Cooperatives. Prerequisite(s): 3423. An evaluation of the fundamental principles, objectives, structure, finance, and management associated with the cooperative organization. An analysis of the cooperative business organization within the modern economy: history, legislation and evolution. An examination of careers related to cooperatives.

AGEC 3503
Natural Resource Economics. Prerequisite(s): 1114 or ECON 2103. Framework for analyzing natural resource management decisions. Applications of microeconomic theory to the management of soil, water, and other resources, with special emphasis on the institutions having an impact on management opportunities. Supply of and demand for natural resources, resource allocation over time, rights of ownership, public issues of taxation, police power and eminent domain.

AGEC 3603
Agricultural Finance. Prerequisite(s): 3213 and 3423. Analyze farm and agribusiness financial statements. Understand the relationship between firm growth and financial leverage. Time value of money concepts and their application to capital budgeting. Discuss how agricultural lenders acquire and use funds.

AGEC 3703
Issues in Agricultural Policy. Prerequisite(s): 1114. Emerging issues related to agricultural policy in the United States.

AGEC 3713
Agricultural Law. Prerequisite(s): 1114. Survey of law with emphasis on agricultural problems, applications, and strategies for managing legal risk in the agribusiness setting. Contract law, tort law, property law, real estate transactions, business organization, estate planning, debtor/creditor law, environmental law, and water/resources law.

AGEC 3990
Special Problems in Agricultural Economics. 1-3 credits, max 3. Directed study of selected agricultural economics topics.

AGEC 4101
Agricultural Economics Seminar. Prerequisite(s): Senior standing and agricultural economics or agribusiness major status. Contemporary problems in agricultural economics.

AGEC 4213*
Advanced Quantitative Methods in Agricultural Economics. Prerequisite(s): 3213, 3333, MATH 2103, and ECON 3023 or 3113. Quantitative analysis of agricultural supply and demand in situations involving risk and uncertainty within the institutional setting of agricultural markets. Use of spreadsheets to perform regression analysis and simulation of potential market outcomes. Analysis of specific agricultural market cases with written and oral presentation of the results.

AGEC 4333*
Commodity Futures Markets. Prerequisite(s): 3213 and 3333. The economics of commodity futures markets. The vocabulary of futures markets and the mechanics of trading and hedging. Basis and producer marketing strategies. Fundamental analysis and statistical analysis of data. Technical analysis, behavioral finance, efficient market hypothesis, and basics of option pricing.

AGEC 4343
(I)International Agricultural Markets, Trade and Development. Prerequisite(s): 1114 or ECON 2103. Contemporary international agricultural trade theory and applications. Tools to identify, evaluate critically, and seek solutions to complex international trade and development problems, such as gains from trade, impacts of trade barriers on social welfare, export promotion effectiveness, trade impacts on environment and land degradation, social benefits and costs of free trade areas, and impacts of genetically modified crops on trade.

AGEC 4403*
Advanced Farm and Ranch Management. Prerequisite(s): 3213, 3333, 3603, MATH 2103, and ECON 3023 or 3113. The development of problem solving and risk management skills needed on the modern farm or ranch. Use of spreadsheets to perform production planning and analysis of farm and ranch problems with linear programming, simulations, and other tools. Analysis of the acquisition of resources and the use of information systems in managing the individual farm or ranch business.

AGEC 4423*
Advanced Agribusiness Management. Prerequisite(s): 3213, 3333, 3603, MATH 2103, and ECON 3023 or 3113. Application of modern decision theory in the uncertain environment that the agricultural business operates. Planning, organizing, implementing, coordinating, and controlling problems associated with establishing an agricultural business, achieving firm growth, and operating the firm through time. Use of spreadsheets to perform production planning and analysis related to agricultural business operation with linear programming, simulations, and other tools. Analysis of the interaction of resources, prices and production alternatives.

AGEC 4503*
Environmental Economics and Resource Development. Prerequisite(s): 3503 or ECON 3113 or consent of instructor. Economic, social, and political factors relating to conservation, natural resource development, and environmental quality. Valuation of priced and non-priced natural and environmental resources. Analysis of environmental and natural resource policy and the role of public and private agencies in conservation and development.

AGEC 4513*
Farm Appraisal. Lab 2. Prerequisite(s): 3423. Estimating the market value of agricultural real estate using the three approaches to value - sales comparison, cost, and income approaches. Analysis of sales to value the different characteristics of the farm.

AGEC 4703*
American Agricultural Policy. Prerequisite(s): 3213, 3333, MATH 2103, and ECON 3023 or 3113. Economic characteristics and problems of agriculture; evolution and significance of programs and policies.

AGEC 4723*
Rural Economics Development. Prerequisite(s): 1114. Concepts and theories of regional and community economics, including input-output, economic base, simulation, budget location and routing. Oklahoma applications.

AGEC 4803
(I)International Agricultural Economics Tour. Prerequisite(s): Consent of instructor. A two-three week international travel component. An integrated approach to the cultural, agricultural, historical, technological, political, economic, and religious backgrounds of the region. Comparison of the agricultural business environment of the region to that of the U.S.

AGEC 4990*
Problems in Agricultural Economics. 1-6 credits, max 6. Open to students with consent of instructor only. Research on special problems in agricultural economics.

AGEC 5000*
Thesis or Report in Agricultural Economics. 1-6 credits, max 6. For students working on an MS degree in agricultural economics. Independent research and thesis under the direction and supervision of a major professor.

AGEC 5010*
Professional Experience in Agricultural Economics. 1-6 credits, max 6. Prerequisite(s): Approval of internship committee and adviser. Supervised professional experience with approved public and private employers in agricultural economics, including banks, production credit associations, federal land banks, soil conservation service, and other agricultural related firms. *Credit will not substitute for required courses. Designed for Master of Agriculture program. Graded on pass-fail basis.*

AGEC 5101*
Research Methodology. Prerequisite(s): Selection of a thesis adviser and a thesis topic. Using the scientific method to solve problems related to agriculture. Preparation of a thesis proposal required.

AGEC 5103*
Mathematical Economics. Prerequisite(s): Differential calculus and ECON 3113. Mathematical tools necessary for formulation and application of economic theory and economic models.

AGEC 5113*
Applications of Mathematical Programming. The application of concepts and principles of existing linear and nonlinear programming techniques to agricultural problems.

AGEC 5203*
Advanced Agricultural Prices. Prerequisite(s): 5103, STAT 4043. Demand and price structures, price discovery, time series and agricultural price research methods.

AGEC 5213*
Econometric Methods. Prerequisite(s): 5103 and ECON 4213 or STAT 4043. Application of econometric techniques to agricultural economic problems, theory and estimation of structural economic parameters.

AGEC 5233*
Primary Data Analysis in Economic Research. Prerequisite(s): 5213 or ECON 5243 or concurrent enrollment. Development and analysis of surveys and experiments designed to collect primary data for economic research. Basics of survey and experimental design, survey delivery, and sampling. Methods, economics, and econometrics of valuation methods including contingent valuation, experimental auctions, factor analysis, cluster analysis, and structural equations modeling, including limited dependent variable models such as the logit, probit, ordered probit, multinomial logit, tobit and intervalcensored regression.

AGEC 5303*
Agricultural Market Policy and Organization. Marketing firm decisions; structure, conduct and performance of agricultural industries; interregional trade theory; and government policies that influence decisions.

AGEC 5343*
International Agricultural Markets and Trade. Contemporary international agricultural trade theory and applications. Broaden students' understanding of contemporary cultural and economic issues outside the U.S. that affect global demand. Gains from trade and the theory of comparative advantage. *No credit for students with credit in AGEC 4343. Not recommended for graduate students in Agricultural Economics.*

AGEC 5403*
Production Economics. Prerequisite(s): 5103. Analysis of micro-static production economics problems; factor-product, factor-factor and product-product relationships; functional forms for technical unit and aggregate production functions; maximizing and minimizing choice rules; firm cost structure; scale relationships.

AGEC 5423*
Agribusiness Management. Prerequisite(s): Consent of instructor. Application of quantitative analysis to the evaluation of business plans for agribusiness firms. Preparation of business plans, including mission statements, financial analyses, marketing plans, personnel, and organization requirements of the firm, production and operations plans as well as a contingency plan. Analysis of risk factors associated with agriculturally-based companies. *No credit for students with credit in AGEC 4423.*

AGEC 5463*
Advanced Agricultural Cooperatives. Prerequisite(s): 3463 or consent of instructor. Advanced understanding of cooperative business model and management skills. Advanced cooperative finance including profit center analysis, equity management, working capital management, budgeting, and capital budgeting.

AGEC 5503*
Economics of Natural and Environmental Resource Policy. Prerequisite(s): 4503 or ECON 3313 and MATH 2103. Economics of long term resource use with particular emphasis on agricultural and forestry problems. Methods for estimation of nonmarket prices. Cost benefits analysis of long term natural resource use and environmental policy. Elementary computer simulation of long term resource use and environmental policy.

AGEC 5603*
Advanced Agricultural Finance. Prerequisite(s): 3603 or FIN 3113, ECON 3023 or 3113 and ECON 4213 or STAT 4043. Financial management concepts applied to agricultural firms. Financial models that incorporate uncertainty and risk via stochastic simulation. Risk/return tradeoff for stocks and portfolio management.

AGEC 5703*
Economics of Agriculture and Food Policy. Prerequisite(s): 4703 and 5103. Application of welfare criteria and economic analysis to agricultural, food, and rural development problems and policies.

AGEC 5713*
Rural Regional Analysis. Prerequisite(s): 5103. Concepts of market and nonmarket based rural welfare; theories of regional growth as applied to rural areas; methods of regional analysis including computable general equilibrium; analysis of policies and programs for improving welfare of rural population groups.

AGEC 5723*
Planning and Policy for Development. Prerequisite(s): Master's-level microeconomics, macroeconomics, and regression analysis. Economics of market-based planning and policy analysis for developing countries, topics and tools in macro- and microeconomics of development, and social cost-benefit and project analysis with emphasis on agricultural and public policy. Hands-on application of econometrics, input-output analysis, and cost-benefit analysis using econometric software.

AGEC 5733*
International Agricultural Policy and Development. Review and evaluation of agricultural trade and development policies emphasizing developing countries. Objectives, constraints and instruments of national food and agricultural trade policy in an interdependent world. Efficiency, stability, distribution, equity, and market structure in commodity trade.

AGEC 5990*
Advanced Studies. 1-6 credits, max 6. Open to graduate students with consent of instructor only. Investigation in designated areas of agricultural economics.

AGEC 6000*
Research Problems. 1-15 credits, max 24. Open to students pursuing graduate study in agricultural economics beyond the requirements for a master's degree. Independent research and thesis under the direction and supervision of a major professor.

AGEC 6102*
Teaching Practicum in Agricultural Economics. Lab 4. Prerequisite(s): Two semesters of graduate study in agricultural economics. Philosophies of resident and nonresident teaching, general tasks performed, review, evaluation and lecture organization, preparation and presentation.

AGEC 6103*
Advanced Applications of Mathematical Programming. Prerequisite(s): 5103, 5113. General presentation of nonlinear optimization theory and methods followed by applications of nonlinear programming. Use of GAMS/MINOS optimization software package.

AGEC 6213*
Advanced Econometrics. Prerequisite(s): 5213 or ECON 5243; STAT 4203 and 4213 recommended. Using advanced econometric techniques in applied research. Linear and nonlinear hypothesis testing; non-nested hypothesis tests; Monte Carlo hypothesis testing; stochastic simulation; misspecification testing. Extensive use of SAS statistical software package.

AGEC 6300*
Agricultural Marketing Seminar. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Current developments in theory, techniques for evaluating marketing behavior, market legislation and market development.

AGEC 6303*
Advanced Agricultural Marketing. Prerequisite(s): 5303. Marketing theory, market structure and performance, governmental regulation and policy and bargaining in agricultural markets.

AGEC 6400*
Seminar in Farm Management and Production Economics. 1-6 credits, max 6. Prerequisite(s): 5403 or consent of instructor. Scientific research methodology applied to problems of resource efficiency.

AGEC 6403*
Advanced Production Economics. Prerequisite(s): 5403. Formulating and solving applied economic optimization problems in agricultural production economics. Expected profit maximization; analyzing data from agronomic experiments; credit scoring; risk models such as stochastic dominance and expected utility.

AGEC 6700*
Agricultural Policy and Rural Resource Development Seminar. 1-2 credits, max 2. Frontier issues in agricultural policy, natural resources and rural development.

AGRICULTURAL EDUCATION (AGED)

AGED 3101
Laboratory and Clinical Experiences in Agricultural Education. Pre-professional clinical experiences in agricultural education teaching and related careers. Requirement for admission to professional education, student teaching, and internships. *Graded on a pass-fail basis.*

AGED 3103
Foundations and Philosophies of Teaching Agricultural Education. Lab 2. Prerequisite(s): 21 semester credit hours of agriculture with a 2.50 GPA. Roles and responsibilities of the agricultural education teacher; types of program offerings; steps of the teaching-learning process; place of agricultural education in relation to other educational programs in school systems.

AGED 3203*
Planning the Community Program in Agricultural Education. Lab 2. Prerequisite(s): 3103. Determining resources and trends of local communities with respect to agricultural production and agribusiness. Emphasis on agricultural education program policies, FFA chapter advisement, planning and managing the instructional program, identification and completion of records and reports required of a teacher of agricultural education in Oklahoma.

AGED 4103*
Methods and Skills of Teaching and Management in Agricultural Education. Lab 2. Prerequisite(s): 3101 and 3203 and EPSY 3213 (or 3413) and SPED 3202 and concurrent enrollment in 4113 and 4200 and full admission to the University Professional Education program. Facets of the teaching-learning process including teaching methods, basic teaching skills, proper classroom management techniques, and motivational techniques and ideas. Preparation for student teaching which is to be completed during the same semester.

AGED 4113
Laboratory Instruction in Agricultural Education. Lab 2. Prerequisite(s): 3101 and 3203 and EPSY 3213 (or 3413) and SPED 3202 and concurrent enrollment in 4103 and 4200 and full admission to the University Professional Education program. Methods of teaching agricultural education in a laboratory setting. A study of laboratory safety instruction, methods of teaching, and application of technical agricultural skills to the secondary program.

AGED 4200
Student Teaching in Agricultural Education. 1-9 credits, max 9. Prerequisite(s): 3101 and 3203 and EPSY 3213 (or 3413) and SPED 3202 and concurrent enrollment in 4103 and 4113 and full admission to the University Professional Education program. Full-time directed experience in an approved agricultural education department. Applications of methods and skills in agricultural education as related to selecting, adapting, utilizing, and evaluating curriculum materials and experiences to meet educational goals and facilitate learning for individual students. Roles, responsibilities, and interactions of school personnel and parents. Study of professional education groups and organization and operation of school systems. *Graded on a pass-fail basis.*

AGED 4713
(I)International Programs in Agricultural Education and Extension. World hunger and its root causes. The function of international agencies, organizations, foundation and churches in improving the quality of life for people of the developing nations. Roles of agricultural education and extension at all levels for enhancing the effectiveness of indigenous programs of rural development and adult education.

AGED 4990*
Seminar and Problems in Agricultural Education. 1-3 credits, max 6. Small group and/or individual study and research in problems relating to programs of occupational education in agriculture.

AGED 5000*
Research and Seminar. 1-6 credits, max 6. Independent research and thesis under the direction and supervision of a major professor.

AGED 5100*
Organizing Curriculum and Programs of Agricultural Education. 1-3 credits, max 6. Studies of student and community agricultural needs as bases for localizing, personalizing and utilizing a basic core curriculum and other components essential to effective local agricultural education programs.

AGED 5102*
Creative Component in Agricultural Education. Prerequisite(s): 5983 or equivalent; consent of instructor. Independent research or project management under the direction and supervision of a major adviser.

AGED 5123*
Adult Programs in Agricultural and Extension Education. Determining adult needs, priorities, participation in educational activities, and adoption of new ideas and practices. Designing, organizing, conducting, and evaluating adult education programs in agricultural and extension education.

AGED 5202*
Grant Seeking. Prerequisite(s): Graduate standing or consent of instructor. Students become proficient in writing proposals to obtain external funding from private and government agencies. Skills such as conceptualizing projects that are worth funding, identifying sources of funding, developing a working narrative that follows the RFP guidelines, developing boiler-plate information, conducting a review of literature to demonstrate a need for the project and developing timelines and budgets.

AGED 5500*
Directing Programs of Supervised Experience. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Determining the supervised training needs and opportunities of individual students. Planning for supervision of agricultural education training programs and 4-H club projects. Analysis of training opportunities in production agriculture, agricultural businesses and individual career development.

AGED 5823*
Advanced Methods of Teaching Agriculture. Advanced concepts and methods relevant for both formal and informal presentations. Effects methods may have on individuals involved in the learning experience. Demonstrations of proficiency in use of various advanced methodologies, technologies and concepts.

AGED 5863*
Methods of Technological Change. Processes by which professional change agents influence the introduction, adoption, and diffusion of technological change. Applicable to persons who work closely with people in formal and non-formal educational settings.

AGED 5900*
Graduate Internship in Agriculture. 1-6 credits, max 6. Prerequisite(s): Admission to Master of Agriculture program; consent of graduate coordinator. Supervised internship in agricultural education, government agency, industry, Cooperative Extension, or not-for-profit organizations.

AGED 5983*
Research Methods in Agricultural Education. Prerequisite(s): Graduate standing. Research methods presented in support of decision-making in a scientifically literate world. Literature, logic, and research methodologies for quantitative and qualitative paradigms. Studies in the social sciences. Preparation of a proposal for their thesis, dissertation, or creative component.

AGED 5990*
Problems in Agricultural and Extension Education. 1-3 credits, max 8. Securing and analyzing data related to special problems or investigation in designated areas of agricultural education.

AGED 5993*
Data Analysis and Interpretation in Agricultural Education. Prerequisite(s): Graduate standing; 5983 or equivalent; REMS 5953 or equivalent. A course designed for Agricultural Education students, who have gathered or are gathering data for a research study, to analyze and interpret that data. Both quantitative and qualitative data analysis techniques will be studied. The discovery method will allow the students and instructor to work together to identify resources to analyze and interpret the data sets.

AGED 6000*
Research in Agricultural Education. 1-16 credits, max 16. Prerequisite(s): Approval of major adviser. Open to students pursuing graduate study beyond the requirements for a master's degree. Independent research and thesis under the direction and supervision of a major professor.

AGED 6100*
Developments in Agriculture and Extension Education. 1-3 credits, max 6. Developing trends in agricultural and extension education. Pending and anticipated organizational and structural changes and changing emphasis in goals and objectives. Functional relationships with other agencies.

AGED 6103*
History and Philosophical Foundations of Agricultural and Extension Education. Prerequisite(s): Graduate standing. History and philosophical foundations of agricultural and extension education. Philosophy and its role in life, rise of education in America, philosophical foundations of education in America, legislation having an impact on agricultural and extension education, education in agriculture and current issues in agricultural extension education.

AGED 6120*
Teaching Agriculture in Higher Education. 1-3 credits, max 6. The teaching-learning matrix functioning in both undergraduate and advanced study in the field of agriculture. Discriminate review and assessment of recently developed instructional methods and trends.

AGED 6200*
County Extension Program Development. 1-3 credits, max 6. A systematic study and use of methods of developing county extension programs, giving attention to sources of essential basic information, determination of problems and needs of people, functions of lay people and the various groups of extension workers. Uses of committees, step-by-step procedures, coordinated county and state plans and characteristics of effective programs.

AGED 6223*
Program Evaluation in Agriculture and Extension. Prerequisite(s): Graduate standing. Program evaluation theory and methodology (quantitative and qualitative) presented through a service learning framework. Problem-based approach having students submit a proposal that addresses an evaluation need presented by a community-based program.

AGED 6252*
Seminar in Advanced Qualitative Research Methods. Prerequisite(s): AGED 5983 or other graduate level social science research methods. Survey of interpretative data collection and analysis techniques, including participant observation, interviewing, and document analysis. Students will participate in collecting, analyzing, and reporting qualitative data.

AGRICULTURAL LEADERSHIP (AGLE)

AGLE 1511
Introduction to Leadership in Agricultural Sciences and Natural Resources. Introduction to the concept of leadership as a field of study. Emphasis placed on the application of acquired knowledge to practical problems.

AGLE 2303
Personal Leadership Development in Agricultural Sciences and Natural Resources. How leaders identify key attributes of leadership and link them to their own unique vision, values, and personal strengths.

AGLE 2403
Agricultural Leadership in a Multicultural Society. The study of leadership as it relates to a multicultural society. Cultural changes in the agricultural workplace and future impact on the industry. Personal barriers to fulfilling leadership roles in the agricultural sciences and natural resources. Skills related to managing teams in a diverse workplace specifically related to differences in gender, race and ethnicity.

AGLE 3101
Introduction to Agricultural Leadership. Prerequisite(s): Major in AGLE or consent of instructor. Exploring leadership in the context of agriculture. Specific topics will include authentic leadership, independent thinking, commitment to agriculture, open minds and professionalism. *Graded pass-fail.*

AGLE 3303
Agricultural Leadership: Theory and Practice. A study of the concepts and theories of leadership with emphasis on the development of leadership abilities in the individual for different group situations.

AGLE 3333
Contemporary Issues in Leadership. Prerequisite(s): 2303, 3303. Explore current issues in the study of leadership. Themes based on current leadership research and writings that reveal new understandings of the leader's role as a servant, facilitator and collaborator.

AGLE 3403
Facilitating Social and Technological Change in Agriculture. Examination of processes by which professional agriculturists influence the introduction, adoption, and diffusion of technological change.

AGLE 4101*
Seminar in Leadership Education. Prerequisite(s): 2303, 3303. In depth exploration of leadership topics related to agricultural sciences and natural resources.

AGLE 4203
Professional Development in Agriculture. Prerequisite(s): 3101; junior standing. Preparation of professionals in agricultural business and industry and related areas who have career goals directed toward service, leadership, management, communications, production, processing, marketing, and education outside the public school setting. Development of professionalism through relationship building, networking, interviews, community involvement, business correspondence, Web sites and the resume.

AGLE 4300
Agricultural Leadership Internship. 3-6 credits, max 6. Prerequisite(s): 3101 and 4203; consent of adviser/internship coordinator. Supervised full-time internships in approved county extension offices, agribusinesses, or governmental agencies for students preparing career paths in agriculture. *Maximum credit requires a 10-week internship in addition to a report and final seminar. Graded on a pass-fail basis.*

AGLE 4303*
Facilitating Leadership Education Program. Prerequisite(s): 2303, 3303. Identification and application of methods and techniques for teaching leadership education programs in formal and non-formal educational settings. Focus on using experiential methods of teaching leadership.

AGLE 4990
Problems in Agricultural Leadership. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Small group and/or individual study and research in problems related to agricultural leadership.

AGLE 5303*
Foundations of Leadership Theory. Study of leadership theory including definitions of leadership, a history of modern leadership theory, and current trends in leadership practice and research. Models of leadership including contingency models, situational leadership and transformational leadership.

AGLE 5353*
Leadership in Agriculture. Prerequisite(s): 5303 or consent of instructor. Concepts, principles, and philosophies of leadership applied to agricultural contexts. Importance of traits, perceptions, and behaviors to success of agricultural professionals in leadership roles. Dimensions and style of leadership for varying situations.

AGRICULTURE (AG)

AG 1011
Orientation. Required of all freshmen in the College of Agricultural Sciences and Natural Resources. Methods of study, advisement system, organization of curriculum and discussion of requirements and career opportunities in various fields of agriculture.

AG 1111
Career Exploration in Agricultural Sciences and Natural Resources. Application of the career planning cycle and detailed exploration of career opportunities in the agricultural industry and natural resources field.

AG 2112
Microcomputer Techniques in Agriculture. Lab 2. Operation and capabilities of microcomputers in agricultural applications. Simple programming, data analysis, graphical display, spread sheets, and word processing.

AG 3010
Internships in Agriculture. 1-3 credits, max 12. Prerequisite(s): Junior standing or consent of instructor. Supervised internships with business, industry or governmental agencies, including cooperating veterinarians. *Graded on pass-fail basis.*

AG 3080
International Experience. 1-18 credits, max 36. Prerequisite(s): Consent of the associate dean of the college. Participation in a formal or informal educational experience outside of the USA.

AG 3090
(I)Study Abroad. 1-18 credits, max 36. Prerequisite(s): Consent of the Study Abroad office and associate dean of the college. Participation in an OSU reciprocal exchange program.

AG 3111
Career Planning and Skill Development. In-depth application of career research and literature to the internship search, full-time job search, and graduate school application and decision-making processes, as related to the agricultural industry and natural resources field.

AG 4010
Honors Seminar. 1-6 credits, max 6. Role of agriculture in society and adjustments to change in the economy.

AG 4990
Special Problems in International Agriculture and Natural Resources. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Individual and/or small group study or research on specialized problems or issues in international agriculture.

AG 5010*
Seminar in International Agriculture. 1-3 credits, max 3. Prerequisite(s): Admission to Graduate College and consent of instructor. A critical review of the literature relative to trends and issues in international agriculture; written and oral reports and discussion of selected topics.

AG 5100*
Internship in International Agriculture and Natural Resources. 1-6 credits, max 6. Prerequisite(s): Admission to Graduate College and approval of instructor. Supervised internship with approved public or private employers in international agricultural settings, including federal agencies, community and service organizations, public or private development organizations, global agricultural companies, and other international agricultural related firms and organizations.

AG 5990*
Advanced Studies in International Agriculture and Natural Resources. 1-3 credits, max 6. Prerequisite(s): Admission to Graduate College and consent of instructor. Individual or small group study and/or research in international agriculture and natural resources.

AMERICAN SIGN LANGUAGE (ASL)

ASL 1115
American Sign Language I. Learners will use fingerspelling, signing, eye gazing, classifiers, mime, and facial expressions presented in context and through meaningful and experimental activities.

ASL 1225
American Sign Language II. Prerequisite(s): 1115. Continuation of 1115.

ASL 2113
American Sign Language III. Prerequisite(s): 1225 or equivalent. Intermediate level study of American Sign Language.

ASL 2233
American Sign Language IV. Prerequisite(s): 2113 or equivalent. Continuation of 2213.

AMERICAN STUDIES (AMST)

AMST 2103
(D,H)Introduction to American Studies. Interdisciplinary study of American civilization through case studies of four different time periods in order to understand the multiple roles of culture in American life.

AMST 3223
(H)Theory and Method of American Studies. Introduction to assumptions, methods, and theory of cultural analysis in American studies scholarship.

AMST 3253
(H)Globalization and American Culture. Transmission, reception, and influence of American culture in one or more of the following: Europe, Asia, Latin America, the Middle East. The cultural history of globalization and American culture.

AMST 3313
(H)Science, Technology and American Cultures. American science and technology as systems of cultural representation, as communities of cultural practices, as mutually determined by other forms of cultural representation such as religion, social thought, art, architecture, literature, and music.

AMST 3333
(S)Crime, Law and American Culture. Study of crime, law and the legal system from a cultural perspective. Examine how race, gender, and social class play different roles in issues related to crime, law and the legal system.

AMST 3423
(H)American Popular Culture. Emergence and development of American Popular culture forms, rituals, and consumerism. Parades and festival; circuses; minstrelsy; motion pictures; popular music; sports; comic books; the Internet and cyberspace. Specific attention to issues of race, class and gender.

AMST 3503
(H)Television and American Society. Examination of television within the social and cultural context of the U.S. Looks at the narrative and visual practices, genres, industrial regulations, and social effects of TV in relation to U.S. history and society.

AMST 3513
(H)Film and American Society. Examination of U.S. film in its social, political, economic, and cultural contexts. Topics may include the history of U.S. film production, distribution and consumption; Hollywood film genres; independent cinema; the star system; and/or representations of historical events, political issues, or social groups in U.S. film.

AMST 3550
The Arts and American Society. 3 credits, max 6. Interdisciplinary study of major figures, trends, themes, periods, and modes of representation in American thought and cultural expression. Emphasis on the relationship between the arts and social, political, and historical context. Examples include Realism, American Modernism, Regionalism, American Postmodernism, the City and the Country, the Other, Nationalism, Time, and Space. *Topics vary by semester.*

AMST 3653
(H,D)The Body in American Culture. The body and its impact on American culture examined through a survey of diverse cultural productions and social practices. Examine the intersections of ideas of embodiment with discourses of race, class, gender, sexuality, disability, and nationalism.

AMST 3813
(D,H)Readings in the American Experience. Life in the New World from the colonial to the postmodern era using a multiplicity of interdisciplinary texts that demonstrate the emergence and ongoing evolution of distinctive American identities. (Same course as ENGL 3813)

AMST 3950
Special Topics in American Studies. 3 credits, max 12. Particular topics (popular culture, regionalism, myth, subcultures, race, ethnicity) to illustrate the use of interdisciplinary methods in American studies.

AMST 4593
(H)America in International Perspective. Prerequisite(s): HIST 1103 or lower-division survey course in U.S. History, any period. A transnational interpretation of American history from the colonial era to the present day. Uses a variety of interdisciplinary sources to place the history of the United States within a comparative, global framework. (Same course as HIST 4593)

AMST 4633
(H)The Frontier and American Visual Culture. The frontier and its impact on American culture examined through a survey of paintings, sculpture, photography, film, television, and other forms of popular imagery. The frontier as a zone of cultural interaction that is seldom tied to a single culture. (Same course as ART 4633)

AMST 4910
American Period Seminar. 3 credits, max 12. In-depth study of a particular period or era in American historical experience. Examples include The Colonial Period, The 1890's, The Jazz Age, The Great Depression, The WWII Home front, The Civil Rights Movement, Cold War America, The Sixties, The 1970's, and Post Modern America. *Topics vary be semester.*

AMST 4973
Senior Seminar in American Studies. Writing of senior thesis based on original research and its analysis and evaluation or completion of independent project based on practical community experience.

AMST 4990
Internship. 1-3 credits, max 6. An internship opportunity which combines independent study and practical fieldwork experience focusing on a particular problem or topic related to America culture and experience. (Examples: Internship in Archival Fieldwork, Material Culture Fieldwork, Museum Management, Sound Recordings and Native American Heritage Site).

ANIMAL SCIENCE (ANSI)

ANSI 1111
Animal and Food Science Experience. Student development through connections among the student's major curriculum, career goals specific to animal or food science, and eventual careers and career development through resume building and networking.

ANSI 1124
Introduction to the Animal Sciences. Lab 2. Species adaptability, product standards and requirements, areas and types of production, processing and distribution of products, includes meat animals, dairy and poultry.

ANSI 1223
Exploring the Science of Animal Agriculture. Lab 2. An introductory course describing the principles, methods, applications and value of biological research with farm animals. *Course also offered for honors credit.*

ANSI 2112
Live Animal Evaluation. Lab 4. Prerequisite(s): 1124. Using tools for selection including performance records, pedigree information and visual appraisal, in the evaluation of cattle, swine, sheep, horses and poultry.

ANSI 2123
Livestock Feeding. Lab 2. Nutrients and their functions, nutrient requirements of the various classes of livestock; composition and classification of feed stuffs and ration formulation. *Not required of animal science majors.*

ANSI 2253
Meat Animal and Carcass Evaluation. Lab 2. Prerequisite(s): 1124. Evaluation of carcasses and wholesale cuts of beef, pork, and lamb. Factors influencing grades, yields and values in cattle, swine and sheep. (Same course as FDSC 2253)

ANSI 3182
Meat Grading and Selection. Lab 4. Prerequisite(s): 2253. Classifying and grading carcasses and wholesale cuts of beef, pork and lamb; factors influencing quality and value. (Same course as FDSC 3182)

ANSI 3202
Equine Training Methods. Basic techniques of equine training. Performance of various maneuvers including halter breaking, saddling, longing, driving, and riding.

ANSI 3210
Animal and Product Evaluation. 1-2 credits, max 4, Lab 3. Prerequisite(s): Consent of instructor. Advanced instruction in evaluating slaughter and breeding animals and grading and evaluating meat, poultry, and dairy products. (Same course as FDSC 3210)

ANSI 3242
Advanced Live Animal Evaluation. Lab 4. Prerequisite(s): 2112. Visual and objective appraisal of beef cattle, sheep, swine and horses.

ANSI 3333*
Meat Science. Lab 3. Prerequisite(s): 2253, CHEM 1215 or equivalent. Anatomical and basic chemical and physical characteristics of meat animals studied. The application of scientific principles to the processing and economical utilization of meat animals, as well as in the manufacture of meat products emphasized in the laboratory. (Same course as FDSC 3333)

ANSI 3422
Horse Management and Production. Nutrition, feeding, reproduction, and physical conditioning of horses. Current management concepts as they apply to the health and well being of horses.

ANSI 3423*
Animal Genetics. Prerequisite(s): Introductory biology. The basic principles of heredity including: kinds of gene action, random segregation, independent assortment, physical and chemical basis of heredity, mutations, sex-linkage, chromosome mapping, multiple alleles and chromosomal abnormalities. Also a brief introduction to quantitative inheritance and population genetics.

ANSI 3433*
Animal Breeding. Lab 2. Prerequisite(s): 3423. The application of genetic principles to livestock improvement; study of the genetic basis of selection and systems of mating; development of breeding programs based on principles of population genetics.

ANSI 3443*
Animal Reproduction. Lab 2. Prerequisite(s): Introductory biology. Physiological processes of reproduction in farm animals, gonad function, endocrine relationships, fertility, and factors affecting reproduction efficiency. Emphasis on principles of artificial insemination in the laboratory.

ANSI 3523
Pet and Companion Animal Management. Current concepts and management principles related to pet and companion animal species and their roles in society. Discussion of the human-animal bond, service animals, kennel and cattery management, anatomy, internal and external parasites, toxins, restraint and handling, training, reproduction, nutrition, genetics, and breeding.

ANSI 3543
Principles of Animal Nutrition. Prerequisite(s): CHEM 1215 or equivalent. Basic principles of animal nutrition including digestion, absorption, and metabolism of the various food nutrients; characteristics of the nutrients; measure of body needs; ration formulation.

ANSI 3653*
Applied Animal Nutrition. Lab 2. Prerequisite(s): 3543. Composition, characteristics and nutritive value of feeds and ration additives; qualitative and quantitative nutrient requirements of each of the classes of livestock; formulation of rations for each of the classes of livestock.

ANSI 3753
Basic Nutrition for Pets. Nutrients, nutrient requirements, feeding practices, food sources, and diet management for pets and companion animals as well as exotic animals and birds.

ANSI 3903
(I)Agricultural Animals of the World. The production and utilization of agricultural animals by human societies.

ANSI 4023
Poultry Science. Lab 2. Prerequisite(s): 1124 and 2123 or 3543. The relationship of the biological concepts and functions of poultry to management practices, incubation procedures, and economic factors utilized by poultry men in the commercial production of table and hatching eggs, broilers, turkeys, and other poultry meat.

ANSI 4203*
Rangeland and Pasture Utilization. Lab 2. Prerequisite(s): RLEM 3913 or 4613. Investigation of livestock and forage interactions that impact productivity in the utilization of rangeland and improved pastures.

ANSI 4333*
Processed Meat. Lab 3. Prerequisite(s): 3033 or 3333. Meat and meat product composition. Techniques in the molding and forming of meat; sausage formulation; curing; quality control; and cost analysis. (Same course as FDSC 4333*)

ANSI 4423
Horse Science. Lab 2. Prerequisite(s): 3433, 3443 and 3653. Current concepts and production principles related to the horse industry including nutrition, reproduction, herd health, functional anatomy and implications, social behavior, and applying principles of psychology in horse management and training.

ANSI 4543*
Dairy Cattle Science. Lab 2. Prerequisite(s): 3433, 3443 and 3653. Current concepts and production principles of the dairy cattle industry including value of milk products, milk marketing, physiology of lactation, reproduction, nutrition, mastitis, and housing. Analysis and active learning of dairy production systems using farm visits and field techniques laboratories.

ANSI 4553*
Sheep Science. Lab 2. Prerequisite(s): 3433, 3443 and 3653. Breeding, feeding, management, and marketing of commercial and purebred sheep.

ANSI 4613*
Cow-Calf and Purebred Beef Cattle Management. Lab 2. Prerequisite(s): 3433, 3443, and 3653. Application of scientific knowledge, management principles, and research advances to modern commercial cow-calf and purebred beef cattle production.

ANSI 4633*
Stocker and Feedlot Cattle Management. Lab 2. Prerequisite(s): 3612, 3653. Application of scientific knowledge, management principles, and research advances to modern stocker and feedlot cattle operations.

ANSI 4643*
Swine Science. Lab 2. Prerequisite(s): 3433, 3443 and 3653. Application of genetic, physiological, microbiological, nutritional, and engineering principles to the efficient production of swine.

ANSI 4712
Livestock Sales Management. Lab 2. Prerequisite(s): 3433. Advertising of purebred livestock; performance data and breeding values in the merchandising of purebred livestock; photography and ad copy layout; conduct of an actual livestock auction, including animal selection, advertising, catalog and animal preparation, clerking, receipt of payments, sales budgets, and transfer of registration papers.

ANSI 4803*
Animal Growth and Performance. Prerequisite(s): An upper-division course in animal science. Physiological and endocrine factors affecting growth and performance of domestic animals.

ANSI 4843
Applications of Biotechnology in Animal Science. Lab 3. Prerequisite(s): 3423 and BIOC 3653. Training in current biotechniques used in protein, hormone, and molecular genetic research in food and animal science. Theory and applications of the various techniques.

ANSI 4863
Capstone for Animal Agriculture. Lab 2. Prerequisite(s): Senior standing. Examination of the role of animal agriculture in society and the importance of research and current issues. *Oral and written reports.*

ANSI 4900
Special Problems. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. A detailed study of an assigned problem by a student wishing additional information on a special topic.

ANSI 4910*
Animal or Food Industry Internship. 3-12 credits, max 12. Prerequisite(s): Consent of instructor. Full-time internship at an approved production, processing or agribusiness unit or other agency serving animal agriculture. *Maximum credit requires a six-month internship in addition to a report and final examination. Graded on a pass-fail basis.*

ANSI 4973
Rangeland Resources Planning. Lab 3. Prerequisite(s): 3612 and AGRON 4954. Inventory or ranch resources, survey and evaluation of ranch practices, and economic analysis. Development of a comprehensive ranch management plan. Managing rangeland and ranch resources in a social context. Written and oral reports. Field trips required. (Same course as RLEM 4973 & 5973)

ANSI 5000*
Research and Thesis. 1-6 credits, max 6. Independent research planned, conducted, and reported in consultation with a major professor.

ANSI 5010*
Special Problems. 1-3 credits, max 6. Special problems in areas of animal science other than those covered by the individual graduate student as a part of his/her research and thesis program.

ANSI 5110*
Seminar. 1 credit, max 3. A critical review and study of the literature; written and oral reports and discussion on select subjects. (Same course as 6110*)

ANSI 5113*
Basic Reproductive Physiology. Prerequisite(s): 3443 or equivalent. Female and male reproductive processes, endocrine control of reproductive functions, and the application of reproductive physiology to animal production.

ANSI 5213*
Advances in Meat Science. Prerequisite(s): BIOC 4113 and ZOOL 3204 or equivalent. Development of muscle and its transformation to meat. Properties of meat and their influence on water-binding, pigment formation, texture and fiber characteristics. (Same course as FDSC 5213)

ANSI 5303*
Advanced Animal Breeding. Prerequisite(s): 3433 or equivalent and STAT 4013. Basic concepts of population genetics as related to theoretical animal breeding, including heritability, genetic correlations, selection methods, inbreeding and heterosis.

ANSI 5333*
Carcass Value Estimation Systems. Prerequisite(s): Graduate classification. Analysis of scientific literature regarding carcass composition, quality and palatability. Overview of technology used to evaluate carcass quality factors. (Same course as FDSC 5333*)

ANSI 5553*
Interpreting Animal and Food Science Research. Prerequisite(s): STAT 5013 or concurrent enrollment. Critical evaluation and knowledgeable communication on the design, analyses, and reporting of animal science and food science research. (Same course as FDSC 5553)

ANSI 5573*
Techniques in Animal Molecular Biology. Lab 4. Prerequisite(s): BIOC 4113. Principles of major basic animal molecular biology techniques in gene cloning and expression. Hands-on experience with basic molecular biology techniques, including DNA cloning and quantitative measurement of mRNA and protein expression in eukaryotic cells.

ANSI 5733*
Advanced Ruminant Nutrition. Lab 2. Prerequisite(s): 3653. Factors influencing nutrient requirements of ruminants for maintenance, growth, reproduction and lactation, and their implications with regard to husbandry practices and nutritional management of livestock. Application of current concepts of ruminant livestock nutrition; use of microcomputer programs in diet evaluation and formulation, beef gain simulation and problem solving.

ANSI 5743*
Rumenology. Prerequisite(s): 3653 or equivalent. Physiology of development of the ruminant digestive tract; the nature of, and factors controlling digestion and absorption from the tract to include the relative nature and roles of the rumen bacteria and protozoa.

ANSI 5753*
Animal Nutrition Techniques and Laboratory Methods. Lab 2. Prerequisite(s): CHEM 3015 or equivalent. Collection, handling, and processing of biological materials. Record keeping, pipetting, preparation of reagents, and conducting routine nutritional analysis. Theory of operation of major laboratory equipment. Application of current techniques to problem solving in animal nutrition research.

ANSI 5763*
Advanced Nonruminant Nutrition. Prerequisite(s): BIOC 3653. An in-depth study of the digestion, absorption, and metabolism of nutrients in nonruminant domesticated farm animals. Unique metabolic characteristics of nonruminant species contrasted with ruminant animals. Fundamentals of energetics as related to animal performance.

ANSI 5773*
Protein Nutrition. Prerequisite(s): BIOC 3653. Nutritional, biochemical and clinical aspects of protein metabolism as it relates to nutritional status.

ANSI 5782*
Vitamin and Mineral Nutrition. Prerequisite(s): BIOC 5753. Development of the concept of dietary essential minerals and vitamins. Individual minerals and vitamins discussed for animal species from the standpoint of chemical form, availability, requirements, biochemical systems, deficiencies and excesses and estimation in foods and feed.

ANSI 6000*
Research and Thesis. 1-10 credits, max 30. Prerequisite(s): MS degree. Independent research planned, conducted and reported in consultation with, and under the direction of, a major professor. *Open only to students continuing beyond the level of the MS degree.*

ANSI 6010*
Special Topics in Animal Breeding. 1-3 credits. Prerequisite(s): Consent of instructor. Advanced topics and new developments in animal breeding and population genetics.

ANSI 6110*
Seminar. 1 credit, max 3. A critical analysis of the objectives and methods of research in the area of animal science. Review of the literature, written and oral reports and discussion on select topics. (Same course as 5110*)

ANTHROPOLOGY (ANTH)

ANTH 2353
(S)Introduction to Biological Anthropology. Introduction to human biological evolution, including genetics, paleoanthropology, primatology, and osteology.

ANTH 3353
(S)Cultural Anthropology. Introduction to culture, various subdisciplines of cultural anthropology, anthropological concepts, and capsule ethnographies of assorted ethnic groups.

ANTH 3443
(I,S)Peoples of Mesoamerica. Modern indigenous peoples of Mexico and Central America. Examination of contemporary communities and modern social and cultural practices understood from a historical perspective, leading to an appreciation of regional similarities and diversity.

ANTH 3990
Fieldwork in Anthropology. 1-8 credits, max 8. Prerequisite(s): Consent of instructor. Instruction through ethnographic or archaeological field techniques by participation in a field program. Topics subject to change from year to year depending upon the type of field program offered or available.

ANTH 4223
(S)The Aztec Empire. Society and Culture of the Aztecs of Mesoamerica. Overview of preceding civilizations, analysis of imperial strategies, social organization, religion, and other topics culminating in the Spanish conquest.

ANTH 4883
(S)Comparative Cultures. Compares environments, economies, social and political organizations and other aspects of culture among selected literate and preliterate societies.

ANTH 4990*
Special Topics in Anthropology. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Directed readings or research on significant topics in anthropology.

ANTH 5243*
Globalization and Culture. Prerequisite(s): Admission to Graduate College and International Studies. Critical assessment of 20th century social scientific theories of development culminating in current theories of globalization. Exploration of capitalism's antecedents, origin, and proliferation. Evaluation of global inequality from a cross-culture perspective. Utility of anthropological theories of culture, ideology and hegemony in assessing local responses to globalization. *No credit for students with credit in INTL 5243*. (Same course as INTL 5243)

ANTH 5990*
Advanced Problems and Issues in Anthropology. 1-9 credits, max 9. Prerequisite(s): Consent of instructor. Group enrollment or individual research enrollment as needed. Graduate level analysis of special problems and issues in Anthropology not covered in other department offerings.

ARCHITECTURE (ARCH)

ARCH 1112
Introduction to Architecture. An introduction to the School of Architecture and OSU resources and how to use them. Introduction to the professions of architecture and architectural engineering and the issues facing these professions in the next century. Introduction to the educational processes and objectives required for becoming a professional architect or architectural engineer.

ARCH 1216
Architectural Design Studio I. Lab 16. Architectural graphics and design fundamentals. Students who have not received a grade for 1216 will be given first priority in enrollment. Students who have received a grade in this course will be admitted on a space available basis and at the discretion of the school head and architecture adviser.

ARCH 2003
(H,I)Architecture and Society. Design, planning, and building considered in their social and aesthetic contexts. *Some sections may be restricted to Architecture and Architectural Engineering majors, see course offerings.*

ARCH 2100
Architectural Studies. 2-4 credits, max 4, Lab 6-12. Beginning studies in graphics and design in architecture.

ARCH 2116
Architectural Design Studio II. Lab 16. Prerequisite(s): Grade of "C" or better in 1216. Students who have not received a grade for 2116 will be given first priority in enrollment. Students who have received a grade in this course will be admitted on a space available basis and at the discretion of the school head and architecture adviser. Problems in architectural design.

ARCH 2203 ***(effective Spring 2010)***
20th Century Issues in Architecture. Prerequisite(s): Grade of "C" or better in 2003. Study of the issues involved in contemporary architecture and architectural practice.

ARCH 2216
Architectural Design Studio III. Lab 16. Prerequisite(s): Grade of "C" or better in 1216 and 2116. Problems in architectural design. Students who have not received a grade for 2216 will be given first priority in enrollment. Students who have received a grade in this course will be admitted on a space available basis and at the discretion of the school head and architecture adviser.

ARCH 2263
Building Systems. Prerequisite(s): Grade of "C" or better in 1215 and 2115. Architectural, structural, and environmental control systems.

ARCH 3073
History and Theory of Greek and Roman Architecture. Prerequisite(s): 2003. History and theory of the ancient Greek and Roman periods of architecture.

ARCH 3083
(H)History and Theory of Baroque Architecture. Prerequisite(s): 2003. History and theory of renaissance architecture in the western world, particularly the later Baroque period.

ARCH 3100
Special Topics in Architecture. 1-6 credits, max 12. Subjects to be selected by the faculty in architecture from advances in state-of-the-art areas.

ARCH 3116
Architectural Design Studio IV. Lab 16. Prerequisite(s): Grade of "C" or better in 2216 and admission to third year. Problems in architectural design.

ARCH 3126
Structures: Steel, Timber and Concrete. Lab 4. Prerequisite(s): Grade of "C" or better in ENSC 2143. Analysis and design of steel, timber and concrete structures used in architecture.

ARCH 3134
Environmental Control: Thermal Systems and Life Safety. Lab 2. Prerequisite(s): MATH 1513 or 1715. A survey of the fundamentals of thermal comfort, energy concerns and mechanical systems for buildings as well as the basic principles of life safety.

ARCH 3143
Structures: Analysis I. Lab 2. Prerequisite(s): Grade of "C" or better in ENSC 2143. Structural theory for applications in architecture.

ARCH 3216
Architectural Design Studio V. Lab 16. Prerequisite(s): Grade of "C" or better in 3116, 3252. Problems in architectural design.

ARCH 3223
Structures: Timbers. Lab 2. Prerequisite(s): Grade of "C" or better in 3323. Analysis and design of timber structures used in architecture.

ARCH 3252
Computer Applications in Architecture I. Prerequisite(s): Grade of "C" or better in 2216 and admission to professional school. Introduction to 2D and 3D computer topics and their application in the design process. *No credit for students with credit in 3253.*

ARCH 3253
Computer Applications in Architecture. Lab 3. Prerequisite(s): Grade of "C" or better in 3116. Introduction to 2-D and 3-D computer CAD topics and their application in the design process.

ARCH 3262
Computer Applications in Architecture II. Prerequisite(s): Grade of "C" or better in 2216 and admission to professional school. Co-requisite enrollment in 3252. State-of-the-art applications of computers to the practice of architecture and architectural engineering.

ARCH 3263
Materials in Architecture. Prerequisite(s): Grade of "C" or better in 2263 and admission to third year. Introduction to the basic materials used in the construction of architecture and how such materials affect both the design and implementation of the systems that incorporate these materials.

ARCH 3323
Structures: Steel I. Prerequisite(s): Grade of "C" or better in ENSC 2113 and admission to the professional program, or permission of school head and adviser. Analysis and design of steel structures used in architecture.

ARCH 3433*
Environmental Control: Acoustics and Lighting. Lab 2. Prerequisite(s): MATH 1513 or 1715. A survey of architectural acoustics, electrical, and lighting systems for buildings.

ARCH 3442
Computer Applications in Architectural Engineering. Lab 2. Prerequisite(s): Admission to the professional program, co-requisite enrollment with 3252. Computer applications in architectural engineering introducing computer programming and the use of commercial analytical software.

ARCH 3462
Computer Applications in Architectural Engineering. Prerequisite(s): Admission to the professional program. Co-requisite(s): Enrollment with 3252 required. Computer applications in architectural engineering introducing AUTOCAD, computer programming, and the use of commercial analytical software.

ARCH 4073
(H)History and Theory of Early Modern Architecture. Prerequisite(s): 2003. History and theory of modern architecture in the western world from the industrial revolution to the early twentieth century.

ARCH 4083
History and Theory of English and Early American Architecture. Prerequisite(s): 2003. English renaissance architecture from 1483 to 1837 and its importance to developments in early American architecture.

ARCH 4100
Special Topics in Architecture. 1-6 credits, max 12. Prerequisite(s): Consent of instructor and head of the school. Subjects to be selected by the faculty in architecture from advances in state-of-the-art areas.

ARCH 4116
Architectural Design Studio V. Lab 6. Prerequisite(s): Grades of "C" or better in 3116 and 3253. Problems in architectural design.

ARCH 4123*
Structures: Concrete I. Lab 2. Prerequisite(s): Grade of "C" or better in 3223. Analysis and design applications in architectural problems using concrete structures.

ARCH 4143*
Structures: Foundations for Buildings. Lab 2. Prerequisite(s): Grade of "C" or better in 4123. Interaction of frames and supports for structures used in architecture. Subsurface conditions and design of foundation systems and retaining walls for buildings.

ARCH 4183*
History and Theory of Architecture: Cities. Prerequisite(s): 2003. The development of cities as an aspect of architecture from ancient times to the twentieth century.

ARCH 4216
Architectural Design Studio VI. Lab 16. Prerequisite(s): Grades of "C" or better in 3126, 3134, 3433, 4116. Enrollment in appropriate architectural seminar required. Problems in architectural design.

ARCH 4225*
Structures: Concrete II. Lab 4. Prerequisite(s): Grades of "C" or better in 3126, 3454, and 4143. Design and analysis of multi-story reinforced concrete frames and prestressed and post-stressed concrete structural components used in architecture applications.

ARCH 4233*
Sustainability Issues in Architecture. Prerequisite(s): Grade of "C" or better in 3134. Sustainability topics and their application to architecture.

ARCH 4244
Structures: Steel II. Lab 1. Prerequisite(s): Grades of "C" or better in 3126 and 3143. Design and analysis of multi-story steel frames, trusses, arches, and other architectural structure components.

ARCH 4263
Architecture Seminar. Prerequisite(s): Concurrent enrollment in 4226 or 5226. Topics in architecture and architectural engineering.

ARCH 4273*
History and Theory of Islamic Architecture. Prerequisite(s): 2003. Architecture of the Islamic World.

ARCH 4293
(H)The Ethics of the Built Environment. Prerequisite(s): Admission to the professional program or consent of instructor. Analysis of basic values that determine the form of the built environment.

ARCH 4373*
Field Study in Europe I. Prerequisite(s): Senior standing in architecture or consent of instructor. On-site analysis and study of European architecture, culture, and urban design.

ARCH 4443*
Structures: Analysis II. Lab 2. Prerequisite(s): Grades of "C" or better in 3454, and MATH 3263. Mathematical formulation of architectural structural behavior. Matrix applications, finite element, finite differences, stability considerations and three-dimensional structural modeling.

ARCH 4444 (*effective Spring 2010*)
Structures: Analysis III. Lab 2. Prerequisite(s): Grade of "C" or better in 3143, 3262 and MATH 3263. Mathematical formulation of architectural structural behavior. Matrix applications, finite element, finite differences, stability considerations and three dimensional structural modeling. *No credit for student with credits in 4443*.

ARCH 5023*
Masonry Design and Analysis. Prerequisite(s): Grade of "C" or better in 4123. Analysis and design of low-rise masonry structures and multi-story masonry shear walls, including code requirements, analysis techniques, design of components, and detailing of architectural engineering contract documents conforming to the relevant codes.

ARCH 5083*
History and Theory of Japanese Architecture. Prerequisite(s): Admission to the professional school or consent of instructor. Historical Japanese architecture from 200 BC to 1980; Shinto, Buddhist, Zen Sukiya, Zukuri, Minka and contemporary subjects.

ARCH 5100*
Special Topics in Architecture. 1-6 credits, max 12. Prerequisite(s): Consent of instructor and head of the school. Subjects to be selected by the faculty in architecture from advances in state-of-the-art areas.

ARCH 5116*
Architectural Design Studio VII. Lab 6. Prerequisite(s): Grade of "C" or better in 4216. Problems in architectural design.

ARCH 5117*
Design Studio VIII. Lab 16. Prerequisite(s): Grade of "C" or better in 4216 or permission of school head or advisor. Co-requisite enrollment in 5163 required. Problems in architectural design. *No credit for student with credits in 5116.*

ARCH 5143*
Structures: Special Loadings. Lab 2. Prerequisite(s): Grade of "C" or better in ARCH 4443. Mathematical formulations and modeling in architectural structures. Human response to vibrations. Seismic design in building. Design for extreme winds on buildings. Approximate methods for preliminary design of architectural structures.

ARCH 5193*
Management of Architectural Practice. Prerequisite(s): Fifth-year standing in architecture or architectural engineering or consent of instructor. Principles of management as applied to the private practice of architecture and architectural engineering.

ARCH 5217*
Architectural Design Studio VIII. Lab 16. Prerequisite(s): Grade of "C" or better in 5116 or consent of instructor. Problems in architectural design.

ARCH 5226*
Architectural Engineering Comprehensive Design Studio. Lab 6. Prerequisite(s): Grade of "C" or better in 3116, 3224, 3454, 4143, 4225, 4443. Problems in architectural and architectural engineering design.

ARCH 5247
Architectural Engineering Comprehensive Design Studio. Lab 16. Prerequisite(s): Grade of "C" or better in 3116, 3224, 3442, 4143, 4224, 4444. Co-requisite enrollment in 4262 and 5293 required. Problems in architecture and architectural engineering design. *No credit for student with credits in 5226.*

ARCH 5293*
Architectural Project Management. Prerequisite(s): Concurrent enrollment in 4226 or 5226 or consent of instructor. Principles of management as applied to architectural and architectural engineering projects.

ARCH 5373*
Field Study in Europe II. Prerequisite(s): Senior standing in architecture or consent of instructor. On-site analysis and study of European architecture, culture and urban design.

ARCH 6000*
Special Problems. 1-15 credits, max 15, Lab 3-18. Prerequisite(s): Consent of instructor and head of school. Theory, research or design investigation in specific areas of study in the field of architecture and its related disciplines. Plan of study determined jointly by student and graduate faculty.

ARCH 6073*
History and Theory of Non-Western Architecture. Prerequisite(s): Graduate standing or consent of instructor. Architecture in the non-Western and pre-Columbian world.

ARCH 6083*
History and Theory of Contemporary Architecture. Prerequisite(s): Graduate standing or consent of instructor. American architecture beginning in the 16th century through the 20th century.

ARCH 6113*
Creative Component Research. Prerequisite(s): Admission to graduate program. Data gathering, analysis and program formulation related to creative component.

ARCH 6117*
Graduate Design Studio I. Lab 20. Prerequisite(s): Admission to graduate program. Problems in architectural design.

ARCH 6193*
Financial Management for Architects and Engineers. Prerequisite(s): 3116. Financial aspects of design firm management, including fundamentals of finance, profit planning and control, cash management, and analysis of financial statements.

ARCH 6203*
Creative Component in Architectural Engineering. Lab 6. A design project based on a program previously developed by the student, to include a written report and supporting documents when appropriate. Must be approved by the project adviser and completed in the final semester of the graduate program.

ARCH 6207*
Creative Component in Architecture. Lab 20. Prerequisite(s): 6117. A design project based on a program previously developed by the student to include a written report and supportive documents when appropriate. Must be approved by the project adviser and completed in the final semester of the graduate program.

ARCH 6243*
Structures: Analysis III. Prerequisite(s): Grade of "C" or better in 4443 and admission to the graduate program. Analysis techniques for architectural structures including stability, space frames, computer applications, guyed towers and project research.

ARCH 6244*
Structures: Analysis III. Prerequisite(s): Grade of "C" or better in 4443. Analysis techniques for architectural structures including stability, space frames, computer applications, guyed towers and project research.

ARCH 6343*
Structures: Steel III. Prerequisite(s): Grade of "C" or better in 4144. Plastic analysis and design of structural steel frames utilizing load and resistance factor design.

ARCH 6543*
Structures: Concrete III. Prerequisite(s): Grade of "C" or better in 5244. Design of prestressed concrete structures, including pre- and post-tensioning.

ART (ART)

ART 1103
Drawing I. Lab 6. A freehand drawing experience designed to build basic skills and awareness of visual relationships. A sequence of problems dealing with composition, shape, volume, value, line, gesture, texture and perspective. A variety of media explored.

ART 1113
Drawing II. Lab 6. Prerequisite(s): 1103. Objective and subjective approaches to visual problem solving in a variety of black and white and color media. The analysis and manipulation of form, light, space, volume, and the formal aspects of perspective.

ART 1203
Two-dimensional Foundations. Lab 6. Introduction to visual problem solving and two-dimensional media. Organization to the two-dimensional plane; line, shape, value and texture. Color theory including hue, value and saturation.

ART 1303
Three-dimensional Foundations. Lab 6. Prerequisite(s): 1103. Exploration of three-dimensional form and space stressing organization of design elements, development of concepts, and manipulation of materials. Investigation of linear space, modular ordering, mass/volume and color through projects of a conceptual and applied nature.

ART 1603
(H)Introduction to Art. Introductory survey of art history from ancient times to the present. *No credit for those with prior credit in 2603 or 2613.*

ART 2003
Studio Methods and Preparation. Lab 6. Portfolio concept development including idea generation, sketchbook, analyzing and evaluating art criticism and select contemporary artists. Professional portfolio presentation, including matting, slide documentation, labeling and resume as a precursor to the sophomore review.

ART 2113
Life Drawing. Lab 6. Prerequisite(s): 1113. Introduction to life drawing with emphasis on preliminary linear construction and structural aspects of the figure, including the study of general body proportions, rapid visualization, and figure-ground relationships.

ART 2213
Color Theory. Lab 6. Prerequisite(s): 1103. Intensive, structured investigation into the nature and properties of color. Hue, value, chroma, and additive color mixing theory as well as the expressive qualities, symbolic potential, and psychological impact of pigment color.

ART 2223
Oil Painting I. Lab 6. Prerequisite(s): 1113, 1203, 1303, or consent of instructor. The development of skills in oil painting stressing form and content, visual perception, and individual expression. Technical instruction applicable to individual problems and needs.

ART 2233
Watercolor I. Lab 6. Prerequisite(s): 1103, 1203, 1303, or consent of instructor. The development of technical skills stressing color, form, and content. Assignments cover paper preparation and support, brush handling, pigment characteristics and mixing, and all basic dry surface and wet surface painting techniques.

ART 2243
Jewelry and Metals I. Lab 6. Prerequisite(s): 1113, 1303, or consent of instructor. Fabrication and forming techniques for non-ferrous metals. Cold joinery, silver soldering, surface treatment and elementary stone setting. Applications toward either wearable or small scale sculptural format.

ART 2253
Ceramics I. Lab 6. Prerequisite(s): 1113, 1303, or consent of instructor. Introduction to basic building techniques including wheel throwing, coiling, and slab construction, as well as slip and glaze application and a variety of firing processes. Exposure to historical and contemporary references. Emphasis on personal growth through technique and concept.

ART 2263
Sculpture I. Lab 6. Prerequisite(s): 1113, 1303. Studies in clay and plaster. Subtractive and additive processes. Emphasis on sculptural ideas, methods, and materials.

ART 2273
Introduction to Printmaking. Lab 6. Prerequisite(s): 1113, 1203, 1303 or consent of instructor. Varied print processes, including monotypes, relief printmaking, and intaglio. Fundamental techniques of each medium that include inking, printing, editioning multiples, and both additive and subtractive approaches.

ART 2403
Illustration I. Lab 6. Prerequisite(s): 1113 and 2.5 graduation/retention GPA. Introduction to historic and contemporary illustration and consideration of a wide range of illustrative styles. Required experiments with media and consideration of alternate ways of illustrating a message through conceptual and compositional variations.

ART 2413
Typography I. Lab 6. Prerequisite(s): 1113 and 2.5 graduation/retention GPA. An investigation of letter forms and their characteristics and a study of spacing, leading, type selection, layout alternatives, type specification, and copy fitting. Preliminary introduction to typography as a communication medium. An understanding of typographic terminology and measuring systems while developing hand skills and introducing computer technology.

ART 2423
Graphic Design I. Lab 6. Prerequisite(s): 1113 and 2.5 graduation/retention GPA. Exploration of basic design principles—line, form, and color, as visual communication. Problem solving, generation of ideas, development of concepts, and the integration of word and image. Technical and presentation skills.

ART 2603
(H)Art History Survey I. The arts, artists, and their cultures from prehistoric times through the Early Renaissance. *No credit for those with prior credit in 1603.*

ART 2613
(H)Art History Survey II. The arts, artists, and their cultures from the Early Renaissance to the present. No credit for those with prior credit in 1603.

ART 3110
Life Drawing Studio. 3 credits, max 9, Lab 6. Prerequisite(s): 2113 or consent of instructor. The development of formal and expressive aspects of drawing by direct observation of the figure and its environment. Emphasis on media experimentation, aesthetic considerations, personal concepts, and anatomy. (Same course as 4100)

ART 3223
Oil Painting II. Lab 6. Prerequisite(s): 2223 and proficiency review or consent of instructor. Oil Painting with emphasis on personal development of visual ideas and techniques.

ART 3233
Watercolor II. Lab 6. Prerequisite(s): 2233 and proficiency review or consent of instructor. Stresses continued growth of technical skills with an emphasis on the individual development of ideas and imagery.

ART 3243
Jewelry and Metals II. Lab 6. Prerequisite(s): 2243 and proficiency review or consent of instructor. Development of technical skills and ideas through assigned projects. Metalworking processes include casting, advanced stone setting, hinge making, and forming of metal.

ART 3253
Ceramics II. Lab 6. Prerequisite(s): 2253 and proficiency review or consent of instructor. Focus on either hand building or throwing techniques. Development of personal expression and technical proficiency with the material and advanced firing and glazing processes. Emphasizing contemporary ceramic issues as well as broader art concepts.

ART 3263
Sculpture II. Lab 6. Prerequisite(s): 2263 and proficiency review. Non-ferrous metal casting. Basic welding techniques using oxy-acetylene, electric arc, and T.I.G. methods. Emphasis on concepts, form, methods and materials.

ART 3270
Printmaking: Relief. 3 credits, max 9, Lab 6. Prerequisite(s): 2273 and proficiency review or consent of instructor. Understanding and control of carving, processing and creating prints from wood, linoleum, and plastic. Development of images utilizing both traditional and contemporary approaches to relief printmaking.

ART 3280
Printmaking: Intaglio. 3 credits, max 9, Lab 6. Prerequisite(s): 2273 and proficiency review or consent of instructor. Understanding and control of intaglio techniques; preparation, processing, and editioning of images from metal plates. Development of concepts and images through traditional and contemporary approaches to the intaglio process.

ART 3290
Printmaking: Lithography. 3 credits, max 9, Lab 6. Prerequisite(s): 2273 and proficiency review or consent of instructor. Understanding and control of the procedures of drawing, processing, and printing editions from stones and metal plates. Development of concepts and images through the medium of lithography.

ART 3403
Illustration II. Lab 6. Prerequisite(s): 2403, 2413, 2423 and portfolio review. Exploration of illustrative solutions to maximize visual interest via varied viewpoints, concepts and altered reality. Projects involving different career areas within the field of illustration. Requirements and advantages of each area. (Same course as 4430)

ART 3413
Typography II. Lab 6. Prerequisite(s): 2403, 2413, 2423 and portfolio review. Exploration of typographic communication through a variety of problems. Type as the visual solution with emphasis on its functional, decorative, and creative applications. Solution of more complex typographic problems, dealing with a large body of information via the development of grid systems.

ART 3423
Graphic Design II. Lab 6. Prerequisite(s): 2403, 2413, 2423 and portfolio review. Use of computer and traditional methods to enhance production skills and solution of design projects from concept to the comprehensive. Evaluation and design of symbols and logos and their various applications, leading to an understanding of system design. Introduction to graphic design production and the preparation of art for reproduction.

ART 3443
Computer Graphics I. Lab 6. Prerequisite(s): 2403, 2413 and 2423 and portfolio review. Use of computer software to capture, create and alter electronic images for use in graphic design and illustration applications with an emphasis on concept and thematic development.

ART 3600
Writing Methods in Art History. 1 credit, max 3. Prerequisite(s): Concurrent enrollment in upper-division art history course. Supervised research and writing experience to be taken in conjunction with another upper division art history course.

ART 3603
History of Classical Art. Stylistic, philosophical, and formal qualities of art in the Classical world. The creation of the Greek ideal and its dissemination in the Roman world through architecture, sculpture, and painting.

ART 3623
(H)History of Italian Renaissance Art. Architecture, sculpture, and painting in Italy, c.1300-1580. Major artists in their local contexts (e.g. Leonardo in Milan, Michelangelo in Florence, and Titian in Venice).

ART 3633
History of Baroque Art. Art in 17th century Europe. Architecture, sculpture and painting of the Catholic Reformation (e.g. Caravaggio and Bernini in Italy, Velasquez in Spain, Rubens in Flanders), concluding with painting in non-sectarian, Protestant Netherlands (Rembrandt and Vermeer).

ART 3643
History of Graphic Design. Evolution of graphic communication from prehistoric times to the present. Investigation of the origins of printing and typography in Europe leading to the design of the printed page, the impact of industrial technology upon visual communication and the study of the growth and development of modern graphic design.

ART 3653
(H)History of 19th Century Art. Art of 19th century Europe-ideals, conflicts, escapes, and triumphs, beginning with the French Revolution and ending in 1900.

ART 3663
(H)History of American Art. Visual arts in America from the Colonial period to the present. Major styles, ideas and uses of material in architecture, painting, sculpture, and design.

ART 3673
History of Northern Renaissance Art. Art in Northern Europe, c. 1200-1550. Emphasis on panel painting in the Netherlands (e.g. Van Eyck, Bosch), and book illustration in Germany (Durer).

ART 3683
(H,I)History of 20th Century Art. Beginning with the birth of "modernism" in the late 19th century, exploration of the fast-changing artistic styles of the 20th century: abstraction, expressionism, fantasy, realism, surrealism, and social protest. Emphasis on the relationship of art and 20th century society.

ART 3693
(H)Survey of Asian Art. Arts of India, China, Japan and related countries in their historical and cultural settings. Traditions of painting, sculpture and architecture from their beginnings to the modern period.

ART 3713
(H)Early Medieval Art: Saints, Martyrs, Pagans. Examination of the visual culture (sculpture, manuscripts, architecture, etc.) of the multicultural early Middle Ages in Europe and the wider Mediterranean world, from roughly 400 to 1050; includes Early Christian, Islamic, Byzantine, Germanic, Carolingian, Ottonian, and Anglo-Saxon artistic production.

ART 3723
(H)Court and Cloister: Medieval Art 1050-1400. Examination of the visual culture (sculpture, manuscripts, architecture, etc.) of the later Middle Ages in Europe and the wider Mediterranean world, from roughly 1050 through 1400; includes Islamic, Byzantine, Romanesque, and Gothic artistic production.

ART 3733
(H)History of Latin American Art I. Examination of the arts of Latin America, beginning with the Olmec, Maya, and Aztec, and continuing through the Early Modern period (until 1800) in Spanish America.

ART 3743
(H,I)History of Latin American Art II. Exploration of modern Latin American Art, beginning with academic painting and emerging nationalisms in the nineteenth century and continuing through Mexican Muralism, modern art movements in South America, and contemporary painting, film, video, performance, and installation.

ART 4100
Advanced Drawing. 3 credits, max 9, Lab 6. Prerequisite(s): 3110. Investigation of drawing stressing thematic development, abstract ideas, and individual imagery. (Same course as 3110)

ART 4213
Studio Capstone. Prerequisite(s): Concurrent enrollment in upper-division studio course and consent of instructor. Final presentation of the professional BFA portfolio in a gallery space, including support materials, exhibition advertising professionally prepared and presented, and the defense of exhibition.

ART 4220
Oil Painting Studio. 3 credits, max 9, Lab 6. Prerequisite(s): 3223. Oil painting with emphasis on continuing personal development of visual ideas and techniques.

ART 4230
Watercolor Studio. 3 credits, max 9, Lab 6. Prerequisite(s): 3233. Stresses continued growth of personal imagery with an emphasis on the development of a consistent body of work and professional portfolio.

ART 4240
Jewelry and Metals Studio. 3 credits, max 9, Lab 6. Prerequisite(s): 3243. Emphasis on further development of personal concepts and technical skills through assigned and individual oriented projects. Broad-based exploration of advanced metalworking processes with emphasis on individual students' direction and technical needs.

ART 4250
Ceramics Studio. 3 credits, max 9, Lab 6. Prerequisite(s): 3253. Intended for students who want to specialize in the ceramic field of art. Will include sophisticated techniques of clay, glaze and firing methods. Emphasis on creation of a unique, well researched, aesthetically concise, and technically successful body of work.

ART 4260
Sculpture Studio. 3 credits, max 9, Lab 6. Prerequisite(s): 3263. A broad-based course which allows students to pursue individual interests using a variety of materials and processes. Emphasis on further development of concepts, skills, and techniques.

ART 4420
Graphic Design Studio. 3 credits, max 9, Lab 6. Prerequisite(s): 3423, 3443 or consent of instructor. Design and production of projects suited to the professional portfolio. Discussion of practical issues including career options, resume and portfolio preparation, and interview techniques.

ART 4430
Illustration Studio. 3 credits, max 9, Lab 6. Prerequisite(s): 3403, 3443 or consent of instructor. Conceptual development and production of illustrations in series. Development of individual style and assembly of a professional and consistent portfolio. (Same course as 3403)

ART 4450
Computer Graphics Studio. 3 credits, max 9, Lab 6. Prerequisite(s): 3403 or 3423, 3443 or consent of instructor. Use of computer software to create three-dimensional objects in an artificial three-dimensional space leading to storyboard design, animation scripts, and the production of animation sequences to video.

ART 4493
Portfolio Capstone. Lab 6. Prerequisite(s): Senior standing and consent of instructor. Final preparation of a professional portfolio, culminating in an extensive design project and the design, organization and production of an exhibition of work. Professional study on setting fees, writing contracts, working with an agent and other business practices.

ART 4593
Art of Conversion: 16th Century Art in Mexico. Art and architecture of the sixteenth century, including mission architecture, early altar-screens, the effect of European imports on native art production, and the role of confraternities and public ceremonies on contact-period culture.

ART 4603
History of Ancient Egyptian Art. Broad survey of ancient Egyptian art and architecture from Pre-dynastic to the beginning of the Christian Era under Roman rule (4000 B.C.-320 A.D.) Discussion within the context of religious meaning and overall cultural development of ancient Egypt.

ART 4613
Art Since 1960. Art and art theory from 1960 to the present. Major trends of Minimalism, Pop Art, Photo Realism, Performance, and Conceptual Art. Theories and intellectual bases of each movement as well as major critical responses.

ART 4633
(H)The Frontier & American Visual Culture. The frontier and its impact on American culture examined through a survey of paintings, sculpture, photography, film, television, and other forms of popular imagery. The frontier as a zone of cultural interaction that is seldom tied to a single culture. (Same course as AMST 4633)

ART 4653
History of Indian Art. The history and culture of South Asia (India and Pakistan) are explored through its arts—architecture, sculpture, painting, and design.

ART 4663
(H)History of Chinese Art. The arts of China in their historical, cultural, religious, and social context. Painting, sculpture, architecture, porcelain, furniture, and decorative arts.

ART 4673
History of Japanese Art. The arts of Japan from the beginning to the modern period in their historical and cultural setting. Cross-cultural contacts with China and the West. Architecture, sculpture, painting, landscape architecture, prints, and decorative arts.

ART 4683
History of Contemporary South Asian Art. Continuation of 4653. History and culture of South Asia (India and Pakistan) explored through its art from 1800 to the present. The effects of colonialism and the nature of modernism in the art of South Asia.

ART 4693
Gender in Medieval Visual Culture. Explores the themes of gender in relation to the makers, viewers, and subjects of medieval art. Topics will include "Artists and Creators," "Patronage," "Sexuality and the Body," etc.

ART 4703
Art East and West: Biases and Borrowings. Prerequisite(s): 3673 or 4653 or 4663 or 4673. Explores the complicated interaction, cultural borrowings and responses on many levels of two major world systems, the "West" (Europe and America) and the "East" (South and East Asia). Beginning with the development of the sea trade in the 16th century, the course will study, through works of art, the effect of history, politics, religious struggles, economics, trade and ethnic biases on the cultures of East and West.

ART 4713
The Visual Culture of the Islamic World. Examines the visual culture, including art and architecture, of the Islamic world, dating from the inception of Islam in seventh-century Arabia through today.

ART 4800
Special Studies in Art. 1-3 credits, max 9. Prerequisite(s): Junior standing and consent of instructor. Courses in media exploration, special subjects and current issues. Offered on campus or through extension workshops.

ART 4810
Museum Internship. 1-3 credits, max 6. An on-site museum experience, including exhibition selection and preparation, collection cataloging and research, and museum administration. *Graded on pass/fail basis.*

ART 4820
Graphic Design Internship. 1-6 credits, max 6. Prerequisite(s): 3403 or 3423 and consent of instructor. An on-site graphic design work experience that provides professional practice under the supervision of a design professional.

ART 4830
Apprenticeship. 1-6 credits, max 6. Professional opportunity to work with artists of national and international reputation.

ART 4900*
Directed Study in Art. 1-3 credits, max 9, Lab 1-6. Prerequisite(s): Junior standing and written permission of department head. Self-designed special topics in studio art or graphic design. By contract only.

ART 4910*
Directed Study in Art History. 1-3 credits, max 9, Lab 1-6. Prerequisite(s): Junior standing and written consent of department head. Self-designed special topics in art history. By contract only.

ART 4933
Art in Context. Prerequisite(s): Two hours of ART 3600. Capstone course studying the role of visual arts in their historical, social and cultural context and in comparison to other disciplines of creative or performing arts, humanities, and science.

ART 4993
Senior Honors Project. Lab 3. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis or project under the direction of a faculty member. *Required for graduation with departmental honors in art.*

ART 5900*
Graduate Studies in Art. 1-6 credits, max 12. Prerequisite(s): BA, BFA or 15 upper-division hours in a discipline; consent of instructor. Projects in art with emphasis on portfolio preparation.

ART 5910*
Graduate Studies in Art History. 1-6 credits, max 12. Prerequisite(s): BA, BFA or 15 upper-division hours in art history; consent of instructor. Advanced research in art history.

ARTS AND SCIENCES (A&S)

A&S 1111
Freshman Orientation. Orientation for freshmen. Study techniques, evaluation of one's abilities and the making of proper educational and vocational choices.

A&S 1221
Honors Freshman Orientation. Prerequisite(s): Honors Program participation. Orientation for freshmen to Arts and Sciences Honors program, introduction to University academic expectations, techniques for achieving academic success, and substantive introduction to material in selected academic disciplines. *No credit for students with credit in A&S 1111.*

A&S 2000
Special Topics. 1-3 credits, max 6. Selected interdisciplinary topics presented in lecture or seminar format.

A&S 2001
Introduction to European Studies. Overview of the history, languages, and cultures of the nations currently constituting the European Union.

A&S 3080
International Experience. 1-18 credits, max 36. Prerequisite(s): Consent of the associate dean of the college. Participation in a formal or informal educational experience outside of the USA.

A&S 3090
(I)Study Abroad. 1-18 credits, max 36. Prerequisite(s): Consent of the Study Abroad office and associate dean of the college. Participation in an OSU reciprocal exchange program.

A&S 3111
New Student Seminar. Orientation to OSU for new transfer students. Topics include advanced study and writing skills, financial management, career development and the transition from college to work.

A&S 3710
Arts and Sciences Internship. 1-3 credits, max 6. Prerequisite(s): Junior standing. Practicum or internship experiences not included in departmental offerings. Before enrolling, students must have an individual contract approved by the sponsoring Arts and Sciences professor and the dean of Arts and Sciences (or administrative officer). For use in special circumstances by Arts and Sciences departments that do not have an internship course.

A&S 4000
Special Topics. 1-3 credits, max 6. Selected interdisciplinary topics presented in lecture or seminar format.

A&S 4013
Liberal Studies Senior Project. Prerequisite(s): Consent of instructor. Research report or other creative activity undertaken to satisfy capstone requirement for liberal studies degree.

A&S 4111
Job Search Strategies for Arts and Sciences Majors. Prerequisite(s): Junior standing. Identification of individual goals and transferable skills, exploration of career options, job market research, and development of employment search tools.

ASTRONOMY (ASTR)

ASTR 1014
(N)The Solar System. Recent discoveries about the sun, planets, moons, asteroids, meteoroids, and comets; formation and future of the solar system; interplanetary travel, colonization, terraforming, and the search for extraterrestrial life. *Offered in the fall semester. No credit for those with credit in 1104.*

ASTR 1024
(N)Stars, Galaxies and the Universe. Recent discoveries about the structure and life cycles of stars, galaxies and the universe; the search for extraterrestrial intelligence; interstellar travel, black holes, wormholes, and tachyons. *Offered in the spring semester. No credit for those with credit in 1104.*

ASTR 4010
Observatory Research. 1-2 credits, max 8. Prerequisite(s): PHYS 2114 and consent of instructor; ASTR 1014 or ASTR 1024 recommended. Team execution of multi-semester observing programs with electronic detectors at OSU's off-campus observatory. Introduction to digital image processing and analysis.

AVIATION EDUCATION (AVED)

AVED 1114
Theory of Flight. Private pilot ground school. Theory of flight, principles of navigation, meteorology and Federal Aviation Regulations. Preparation for FAA private pilot computer-based knowledge exam. *Special fee required.*

AVED 1222
Primary Flight Laboratory. Lab 4. Meets the flight requirements for the FAA Private Pilot Certificate. Flight instruction conducted under FAR Part 141. *Special fee required. Graded on a pass-fail basis.*

AVED 1403
Advanced Theory of Flight. Prerequisite(s): 1114 and passed FAA Private Pilot Examination. Advanced navigation, aircraft performance and meteorology, and introduction to crew resource management.

AVED 2113
History of Aviation. History of aviation from its early developments to the present. Historic events and the role of government as they relate to the evolution of the regulatory infrastructure of the aviation industry.

AVED 2122
Commercial Flight Laboratory I. Lab 4. Prerequisite(s): 1222. First of three flight laboratories required for FAA commercial flight certificate with instrument rating. Flight instruction conducted under FAR Part 141. *Special fee required.*

AVED 2132
Commercial Flight Laboratory II. Lab 4. Prerequisite(s): 2122. Dual instrument flight instruction to meet requirements for FAA instrument rating. Flight instruction conducted under FAR Part 141. *Special fee required.*

AVED 2142
Commercial Flight Laboratory III. Lab 4. Prerequisite(s): 2132. Final flight lab to meet requirements for the FAA commercial pilot certificate. Flight instruction conducted under FAR Part 141. *Special fee required.*

AVED 2213
Theory of Instrument Flight. Prerequisite(s): 1403. Instrument flight rules, the air traffic system and procedures, the elements of forecasting weather trends. Preparation for FAA instrument computer-based knowledge exam.

AVED 2313
Theory of Commercial Flight. Prerequisite(s): 2213. Advanced aircraft systems, aerodynamics, federal aviation regulations, airports and airspace, navigation, and performance. Preparation for FAA Commercial Pilot Written Examination. *Special fee required.*

AVED 2513
Aviation Career Planning and Development. Assessment of career interests and aviation job opportunities that match those interests. Development of an academic and career learning and development plan consistent with identified interests.

AVED 3231
Theory of Multi-engine Flight. Prerequisite(s): Private Pilot Certificate. Aeronautical theory and information required for operating the multi-engine airplane safely, efficiently and within its specified limitations. Emphasis on aerodynamics and multi-engine emergencies.

AVED 3243
Human Factors in Aviation. Prerequisite(s): PSYC 1113, PHIL 1213. The study of people interacting with the aviation environment. Individual and group performance, equipment design, physical environment and procedure development.

AVED 3333
Advanced Aircraft Systems. Prerequisite(s): 2313. Study of complex aircraft systems. Electronic flight instruments, inertial navigation, and aircraft monitoring systems.

AVED 3341
Multi-engine Flight Laboratory. Lab 2. Prerequisite(s): Private Pilot Certificate and FAA Third-class Medical Certificate. Dual flight instruction to meet requirements for the FAA multi-engine rating. Flight instruction conducted under FAR Part 141. *Special fee required.*

AVED 3433
Aviation/Aerospace Ethics. Prerequisite(s): PHIL 1213. Ethical decision-making as applied to the aviation and aerospace industry, an industry with narrow tolerance for error in terms of human life and economic impact. Awareness of aviation ethical issues and associated decision-making skills.

AVED 3443
Aviation Legal and Regulatory Issues. Prerequisite(s): PHIL 1213. Insight pertinent to federal governing bodies in addition to local and international laws forming the present structure of aviation law. Practices and pitfalls in aviation activities and a basic legal research capability.

AVED 3453
Aviation/Aerospace Security Issues. Analysis of the legal and regulatory responses to changing threats to aerospace security. Review of technological solutions for airports and aircraft.

AVED 3463
Aerospace Maintenance and Safety. Identification and management of the human errors encountered in all aspects of aircraft maintenance operations. Case studies of maintenance-related accidents: line, hangar, and overhaul maintenance. The role of quality control and quality assurance are also examined as tools in reducing maintenance error.

AVED 3473
OSHA for Aerospace Managers. Occupational safety and health requirements within the aerospace industry. History of OSHA, OSHA regulations relative to aerospace organizations along with recent inspection results and published violations.

AVED 3513
Aviation/Aerospace Management Principles. Managing the major elements of the aviation/aerospace industry, including aircraft manufacturing and air transportation system.

AVED 3523
Airport Planning and Management. Overview of the major functions of airport management, including master planning. Study of the socio-economic effects of airports on the communities they serve.

AVED 3533
Aircraft Turbine Engine Operation. Principles of physics and gas laws pertaining to turbine powered aircraft operation. Turbine power plant systems theory with emphasis on safe and efficient operation of turbine powered aircraft.

AVED 3543
Aerospace Organizational Communications. Aerospace communication to aid aviation students in proper use of written and verbal skills needed in various aerospace leadership roles.

AVED 3563
Aviation Marketing. Marketing aviation products for the major elements of the aviation industry.

AVED 3573
Aviation/Aerospace Finance. Financing the major elements of the aerospace industry, including general aviation, aircraft manufacturing and airports.

AVED 3663
Aerospace and Air Carrier Industry. Broad understanding of the air transportation industry and an in-depth knowledge of the organizational structures, managerial functions and operational aspects of today's major, national, and regional air carriers. Historical perspectives, regulators and associations, economic characteristics, labor relations and marketing of modern air carriers.

AVED 4100*
Specialized Studies in Aviation. 1-3 credits, max 6. Independent studies, seminars, and training within selected areas of aviation.

AVED 4103
Aerospace Distribution, Warehousing and Transportation. Aerospace logistics concepts and the management of aerospace distribution activities ranging from top management planning to warehousing and shipping.

AVED 4113*
Aviation Safety. Flight safety including studies in human factors, weather, aircraft crashworthiness, accident investigation, and aviation safety programs. Elements of aviation safety and flight operations (private flying, flight instruction, and business flying) and commercial aviation.

AVED 4123
Aerospace Depot Maintenance. Aerospace depot maintenance operational and budget issues related to Economic Order Quality, Materials Requirement Planning, Benefit Cost Analysis, repair expenditures, fleet flight hours, transport modules, handling, shipping and other activities.

AVED 4133
Principles of Flight Instruction. Prerequisite(s): 2142, 2313. Development of flight training lesson plans and syllabi. Application of learning theory and teaching fundamentals to flight maneuvers and performance evaluation. Preparation for the FAA Fundamentals of Instructing and Flight Instructor-Airplane Written Examinations.

AVED 4143
Government Operations and Interfaces in Aerospace Management. Government and its impact on aerospace management decisions related to logistics, inventory management, production, and operations.

AVED 4153
Aerospace Sustainment. Prerequisite(s): Senior standing. A capstone course requiring application of all elements of the supply-chain management process to an aerospace organizational problem or project.

AVED 4163
FAA and Aerospace Logistics Regulations and Requirements. Government regulations and requirements and the impact of those requirements on the aerospace supply chain management processes using case scenarios related to logistics, aviation, operations, procurement and the environment.

AVED 4173
Aerospace Logistics Quality Programs. Logistics quality programs, including TQM, Kaizen, Lean, Six Sigma, and ISO 9000 in aerospace organizations.

AVED 4193
Aerospace Human Resource Management and Aerospace Workforce Acquisition. Workforce planning techniques to strengthen knowledge retention practices within the aerospace industry.

AVED 4200
Internship in Aviation. 1-12 credits, max 12. Individually supervised internship in aviation career areas. Directed field experience related to the participant's area of concentration.

AVED 4232
Flight Instructor: Airplane Flight Laboratory. Lab 4. Prerequisite(s): 2142, 4133. Dual flight instruction to meet the requirements for the FAA flight instructor: airplane certificate. Flight instruction conducted under FAR Part 141. *Special fee required.*

AVED 4303*
Aviation Weather. Prerequisite(s): GEOG 3033. Familiarization with weather products needed to enhance flight safety.

AVED 4331
Flight Instructor: Instrument Flight Laboratory. Lab 2. Prerequisite(s): 4231. Dual flight instruction to meet the requirements of adding an instrument flight instructor rating to the flight instructor certificate. Flight instruction conducted under FAR Part 141. *Special fee required.*

AVED 4333*
Advanced Aircraft Performance. A study of advanced aircraft performance including appropriate physical laws, atmospheric properties and power plant technology.

AVED 4353*
Cockpit Automation. Prerequisite(s): 2213, 2132, 3333. A study of aircraft "glass cockpits", including performance management, navigation and guidance, automatic flight control, flight instrument displays, and crew advisory and warning.

AVED 4413*
Aviation Terrorism and Asymmetrical Warfare. Origins of modern terrorism and asymmetrical warfare as it related to current aviation security issues. A historical perspective to the headlines of today providing an understanding needed in making future security decisions.

AVED 4423*
Aviation Security Organizations and Law. Understanding how security systems and law are organized and managed. Problems facing security management, including recruiting, screening, and hiring of security personnel. Problems associated with 24/7 operations.

AVED 4433
Airport Safety Inspections. Safety requirements of U.S. general aviation airports. Elements of the 5010 airport inspection program, FAA advisory circulars, and other pertinent documents.

AVED 4643*
Aviation Navigation Global Positioning Systems. Overview of the theory and operation of the GPS in the private and public sector.

AVED 4653
(I)International Aerospace Issues. Fundamental knowledge, comprehension and abilities to apply, analyze, synthesize and evaluate international aerospace issues, including trends in security, safety, technology, and organizations.

AVED 4663
Aerospace Leadership. Leadership theories and practices applicable to the aerospace environment and the types of leadership skills required for 21st Century aerospace organizational leaders.

AVED 4703
Crew Resource Management. Prerequisite(s): 2142, 3243, PHIL 1213. Discovering how resource management applies to crew behavior in aviation. Special emphasis on decision-making, judgment, teamwork, stress management, situation awareness, leadership, and workload management. Ten hours in a dual flight control multi-engine simulator. *Special fee required.*

AVED 4771
Flight Instructor: Multi-engine Flight Laboratory. Lab 2. Prerequisite(s): 4231. Dual flight instruction to meet the requirement for adding a multi-engine flight instructor rating to the flight instructor certificate. Flight instruction conducted under FAR Part 141. *Special fee required.*

AVED 4943*
Basic Aircraft Accident Investigation. A study of statutes, regulations and regulatory agency requirements that influence aircraft accident investigation.

AVED 4953*
Corporate and General Aviation Management. Study of management principles and practices of corporate and general aviation. Equipment acquisition, legal requirements, government regulations, flight operations, aircraft maintenance, management and investment decision-making.

AVED 4963*
Airport Design. Overview of airport planning and development parameters, airport design considerations, economic impact of airport development, and a global examination of airport expansion projects.

AVED 4973
Aerospace Industry Hazardous Materials or Dangerous Goods. Regulatory requirements and compliance issues in managing aerospace industry hazardous materials and dangerous goods.

AVED 4990
Pilot Proficiency Flight. 1-2 credits, max 4, Lab 32. Required for students entering the aviation education program who possess all FAA certificates/ratings required for the aviation sciences degree.

AVED 4993
Aviation Labor Relations. Aviation industry laws, regulations, and procedures for management and organized labor from historical through current perspectives. Focus on economic, legal, political, and public policy factors in aviation.

AVED 5000*
Master's Report or Thesis. 1-6 credits, max 6. Prerequisite(s): Consent of adviser. Students studying for a master's degree enroll in this course for a total of 3 credit hours if writing a report or 6 hours if writing a thesis.

AVED 5020*
Seminar in Aerospace Education. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Individual research problems in aerospace education.

AVED 5053*
Guided Reading and Research. Prerequisite(s): Consent of instructor. Guidance in reading and research required for the MS in aviation and space program.

AVED 5103*
Aviation Career Development. Aviation career development in private and public aviation organizations.

AVED 5113*
Aviation Safety Program Development. Prerequisite(s): 4113. A detailed examination of risk management and accident prevention in the aviation industry. Organization and operation of safety programs including OSHA requirements, performance measurements, cost analysis, and systems safety analysis.

AVED 5200*
Graduate Internship in Aviation and Space. 1-6 credits, max 6. Directed field experiences in aerospace education for master's students.

AVED 5203*
Aeromedical Factors. Prerequisite(s): 3243. The study of aeromedical factors that influence pilot performance. The study of life support equipment designed to increase aviation safety.

AVED 5303*
Aviation and Space Quality Issues. A study of the practice and research involved in implementing aviation and space quality issues.

AVED 5333*
Aircraft Performance. Operational flight performance issues, especially transition from propeller-driven to jet aircraft. Use of flight simulation software to determine optimal speeds for climb, descent, range and maximum endurance of a specific aircraft model.

AVED 5363*
Aircraft Systems. Flight management systems, data exchange busses, computerized flight control systems, airframe environmental systems, electrical, pressurization, fuel and icing. Earlier generation aircraft systems contrasted with modern aircraft systems.

AVED 5403*
Passenger Screening Technology. Understanding of the technologies currently in use or being tested in airports. Passenger screening technologies and their role in establishing a layered security program.

AVED 5413*
Landside Security Technologies. Technologies available for protecting the landside of the airport. Access control systems, blast protection and mitigation planning, perimeter security technologies and biometric technologies.

AVED 5423*
Security Planning Audits and NIMS. The management of a security program. Written security plans, security audits, emergency management, and the National Incident Management System.

AVED 5433*
General Aviation and Cargo Security. Overview of airport operations: regulatory history of air transportation, aviation forecasting, capacity and delay issues at airports, environmental issues, airport emergency procedures and aircraft rescue and fire-fighting, and airport system and master planning.

AVED 5443*
International Aviation Security. Civil aviation security structure required of all airports and airlines engaged in international civil aviation operations. Focuses on the requirements of the International Civil Aviation Organization, specifically ICAO Annex 17.

AVED 5453*
Advanced Aviation Security. Prerequisite(s): Graduate standing. In-depth look at aviation security. Development of a greater understanding of problems associated with maintaining a secure aviation transportation industry. Familiarity with the history of attacks against aircraft, airports and other aviation facilities.

AVED 5543*
Advanced Aerospace Communications. Interdisciplinary area of study drawing from previous knowledge and experience in effective management and leadership communication to meet the unique demands of the field of aviation. A broad range of academic disciplines and technical experience guiding aviation professionals in the refinement of personal, team and organizational communications.

AVED 5553*
Aerospace Financial and Business Inventory Management. Aerospace logistics inventory planning and management and the methods for managing revenues and costs by selection of best carriers, setting logistics performance goals and planning logistics strategies for streamlining shipping and receiving.

AVED 5563
Aerospace Leadership and Management. Introductory course on leadership and management issues in the highly volatile aerospace environment. Introduction to management and leadership theory of the past, and exploration of the aviation environment of the future.

AVED 5663*
Issues in the Airline/Aerospace Industry. The components, participants, activities, characteristics, scope and economic significance of the air carrier industry and its major segments. The effects of regulation, competition, marketing, manufacturing and environmental control.

AVED 5720*
Current Issues in Aerospace Education. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Current issues in aerospace education.

AVED 5773*
Historical Significance of Aviation. Humankind's attempt to conquer the skies from the earliest accomplishments in aviation to the aircraft of tomorrow. Profiles the way people, technology, and events have shaped the modern world of aviation.

AVED 5813*
Earth Observation Systems. Prerequisite(s): GEOG 4333. A study of systems orbiting earth that collect data on the land and atmosphere.

AVED 5823*
Space Science. A study of the sun, inner and outer planets, asteroid belt, space probe exploration, orbital mechanics and missions.

AVED 5850*
Directed Readings in Aerospace Education. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Directed studies in aerospace education.

AVED 5883*
Aviation Economics. The economic significance of the air carrier industry and its major segments. The effects of regulation, competition, schedules, marketing and environmental control.

AVED 5910*
Practicum in Aerospace Education. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Directed observation and supervised clinical experiences in aerospace education.

AVED 5963*
Airport Operations. Prerequisite(s): Graduate standing. Extensive overview of airport operations. Familiarity with the regulatory history of air transportation, airports, the Federal Aviation Administration, and the Transportation Security Agency. Introduction to a wide variety of organizational structures found at U.S. airports.

AVED 5973*
Aerospace Law. Study of the legal system as it relates to aerospace law and governance of the aviation industry.

AVED 6000*
Doctoral Thesis. 1-15 credits, max 15. Required of all candidates for the EdD in applied educational studies. Credit awarded upon completion of the thesis.

AVED 6303*
Aviation and Space Safety Data Analysis. A doctoral seminar in the practical application and research of aerospace databases. Qualitative and mixed method tools common to research in the fields of aviation and aerospace are emphasized.

AVED 6313*
Administration of Aviation Institutions. A study of the organization and administration of public and private aviation institutions. Study of the impact of economic and governmental system on these institutions.

AVED 6413*
Development of Air and Space Flight. Specific air and space missions with emphasis on contributions to humankind.

AVED 6423*
Certification of Airplanes. A study of the practices and research involved in the certification of airplanes.

AVED 6443*
Certification of Rotorcraft. A study of the practices and research involved in the certification of rotorcraft.

AVED 6613*
Aviation Executive Development. A study of the styles of aviation executives in private and public aviation organizations.

AVED 6773*
Applied Aviation and Space Research. Prerequisite(s): Consent of instructor and approval of student's advisory committee. Action research topics in aviation and space identified by the aerospace industry with emphasis upon publications in aviation and space refereed journals and trade publications.

AVED 6883*
Doctoral Internship in Aviation and Space. Prerequisite(s): Consent and approval of student's advisory committee. Directed field experiences in aerospace education for doctoral students.

AVED 6943*
Aviation Regulatory Law. A study of the practical application and research of the FAA regulatory process and associated case law.

AVED 6963*
Advanced Aircraft Accident Investigation. Prerequisite(s): 4943. Application and practice of the different statutes, regulations, and regulatory agency requirements that influence aircraft accident investigations.

BIOCHEMISTRY (BIOC)

BIOC 1990
Freshman Research in Biochemistry. 1-2 credits, max 2, Lab 3. An introduction to biochemical research through guided work on a relevant experimental problem.

BIOC 2101
The Experiments Behind the Facts of Real Science. Prerequisite(s): BIOL 1114 and CHEM 1515. Introduction to research though the study of primary research papers.

BIOC 2200
Medicine and Molecules. 1-3 credits, max 6. Examination of specific diseases at all scales, from the biology of the causal agent to global impacts. The molecular biology of the agent, interactions with the human body, and the etiology, epidemiology, history and current state of the disease, ethical considerations, and prospects for cures.

BIOC 2344
Chemistry and Applications of Biomolecules. Lab 3. Prerequisite(s): CHEM 1225. A descriptive survey of organic functional groups and biomolecules. Mode of formation and function of these molecules in microorganisms, plants and animals as they relate to biotechnology, environmental sciences and health related issues. A terminal course for students in applied biological science education. *Not recommended for pre-professional students or students planning graduate study in biological sciences.*

BIOC 3653
Survey of Biochemistry. Prerequisite(s): CHEM 3015 or 3053. An introduction to the chemistry of living systems. Chemical properties of the constituents of living organisms. Modes of formation, reactions and function of these compounds in microorganisms, plants and animals. *Intended for non-majors.*

BIOC 3713
Biochemistry I. Prerequisite(s): CHEM 3153. Biochemistry of nucleic acids, proteins, amino acids, carbohydrates, and lipids with an emphasis on the kinetics, thermodynamics, catalytic and regulatory strategies of biochemical reactions and bioenergetics. *Designed for biochemistry majors.*

BIOC 3723
Biochemical Laboratory. Lab 6. Prerequisite(s): 3653 or 3713 or concurrent enrollment. Qualitative and quantitative examination of biochemical and molecular biology materials and reactions. Hands-on experience with contemporary aspects of biochemical and molecular biology techniques. *Designed for biochemistry majors and others desiring an extensive biochemical laboratory experience.*

BIOC 3813
Biochemistry II. Prerequisite(s): 3713. Continuation of Biochemistry I with focus on metabolic pathways, cycles, and control mechanisms. This course will cover bioenergetics and metabolism of carbohydrates, lipids, amino acids and nucleotides. *Designed for biochemistry majors.*

BIOC 4113*
Biochemistry. Prerequisite(s): 3653 and BIOL 3023 (or ANSI 3423 or PLNT 3554). An extension and expansion of 3653 emphasizing applications of biochemistry, molecular biology and genetic engineering to studies on protein structure and function, regulation of cell function, metabolism and disease processes.

BIOC 4224*
Physical Chemistry for Biologists. Prerequisite(s): CHEM 1515, MATH 2133, PHYS 1214 or consent of instructor. Classical and statistical thermodynamics with applications to pure systems, solutions and electrochemistry; transport; chemical and enzyme kinetics, quantum chemistry of structure and chemical bond; and spectroscopy all with emphasis on biological applications.

BIOC 4883
Senior Seminar in Biochemistry. Prerequisite(s): 3813 or consent of instructor. A senior capstone course for the development of scientific verbal and written communications and assessment of cumulative abilities. Focus is on problem solving, group discussion, primary literature review, oral presentation, and writing.

BIOC 4990*
Special Problems. 1-6 credits, max 10. Training in independent work, study of relevant literature and experimental investigation of an assigned problem.

BIOC 5000*
Research. 1-6 credits, max 6. For MS thesis.

BIOC 5002*
Biochemistry Graduate Colloquium. Prerequisite(s): Graduate standing. Introduction to graduate research. Policies for laboratory safety, research compliance, and ethical conduct of scientific research are presented.

BIOC 5102*
Molecular Genetics. Prerequisite(s): 3653 or MICR 3033 and one course in genetics or consent of instructor. An introduction to molecular genetics on the graduate level. (Same course as GENE 5102*)

BIOC 5753*
Biochemical Principles. Prerequisite(s): CHEM 3153 or equivalent. Chemistry of cellular constituents; introduction to the chemical processes in living systems. The first in a series of courses for graduate students in biochemistry and related fields.

BIOC 5824*
Biochemical Laboratory Methods. Lab 6. Prerequisite(s): 4113 or 5753. Lecture and laboratory course in basic biochemistry and molecular biology methods for separation and analysis of biological materials, including chromatography, electrophoresis, centrifugation, use of radioisotopes, molecular cloning and DNA sequencing.

BIOC 5853*
Metabolism. Prerequisite(s): 5753 or 4113. Reaction sequences and cycles in the enzymatic transformations of fats, proteins and carbohydrates; energy transfer, biosynthesis and integration in the metabolic pathways.

BIOC 5930*
Advanced Biochemical Techniques. 1-4 credits, max 10. Prerequisite(s): 5753, 5824 or concurrent registration, and consent of instructor. Lecture and laboratory course in advanced research techniques, designed to supplement 5824. In subsequent semesters, individual research problems pursued in laboratories of department faculty for six weeks and one credit hour each.

BIOC 6000*
Research. 1-15 credits, max 60. For PhD dissertation.

BIOC 6110*
Seminar. 1-2 credits, max 2 for PhD or 1 for MS candidates.

BIOC 6740*
Physical Biochemistry. 1-2 credits, max 2. Prerequisite(s): One semester each of biochemistry, calculus and physical chemistry. Two independent modules dealing with applications of physical chemistry and math to biological phenomena: 1) numerical analyses and selected spectroscopic methods, and 2) thermodynamics and transport properties. *Modules may be taken together as two credits or individually for one credit.*

BIOC 6763*
Nucleic Acids and Protein Synthesis. Prerequisite(s): 4113 or 5753. Structure and biological function of nucleic acid containing structures with emphasis on recombinant DNA methodologies, information content, nucleic acid-protein interaction, regulation and rearrangement.

BIOC 6773*
Protein Structure and Enzyme Function. Prerequisite(s): 4113 or 5753. Theory of and methods for studying the physical and chemical basis of protein structure and function; and the enzyme catalysis, including kinetics, chemical modification and model studies. Examples from current literature.

BIOC 6783*
Biomembranes and Bioenergetics. Prerequisite(s): 5853 or consent of instructor. Components, organization and biosynthesis of plasma, mitochondrial and photosynthetic membranes, emphasizing structure-function relationships. Mechanism of metabolites, protons and electrons transport. Energy conservation in bioenergetic apparatus such as mitochondria, chloroplasts or bacterial chromatophores.

BIOC 6792*
Plant Biochemistry. Prerequisite(s): 4113 or 5753. Biochemistry of processes and structures of special importance to plants, such as photosynthesis, cell walls, nitrogen fixation, secondary metabolites and storage proteins.

BIOC 6820*
Selected Topics in Biochemistry. 1-3 credits, max 15. Prerequisite(s): 5853. Recent developments in biochemistry. Subject matter varies from semester to semester; students should inquire at the department office before enrolling.

BIOLOGICAL SCIENCE (BIOL)

BIOL 1114
(L,N)Introductory Biology. Lab 3. Introduction to the integration between structure and function among all levels of biological organization. Application of principles of evolution, genetics, physiology and ecology to understanding the integrated and interdependent nature of living systems through discussions emphasizing the process of science. Current issues and local research and observation and investigation in both lecture and lab. *Recommended for non-science and science majors.*

BIOL 3023
General Genetics. Prerequisite(s): BOT 1404, or ZOOL 1604, or equivalent. Inheritance in plants, animals, and microorganisms; molecular and classical aspects.

BIOL 3034*
General Ecology. Lab 4. Prerequisite(s): BOT 1404, ZOOL 1604 or equivalent; MATH 1513 or 1715. Physical and biotic environment, responses of organisms to the environment, behavioral and community ecology, natural ecosystems and man's interaction with ecosystems.

BIOL 3223
(N)Survey of Human Diseases. Prerequisite(s): 1114 or equivalent. Types of diseases, such as metabolic, genetic, infectious. Biological processes involved in disease. Impact of disease on human activity and of human activity on disease patterns. For the non-biology major.

BIOL 3232
Human Reproduction. Prerequisite(s): 1114. Overview of human reproduction, including anatomy, physiology, embryology, genetics, evolution, birth control, teratogenic substances, pregnancy and childbirth. For the non-biology major. *No credit for students with credit in MICR 2123 and 2132 combined or ZOOL 3204.*

BIOL 3243
(N)Biological Rhythms in Humans and Other Organisms. Fundamental concepts and questions related to biological timing, its properties, mechanism, and adaptive value. The implications of rhythms in human behavior and medicine.

BIOL 3604
Biological Principles for Teachers. Lab 2. Prerequisite(s): 1114, CHEM 1314, ZOOL 3204. Capstone course in biology for potential science teachers. Review of biological phenomena and principles as related to the curriculum.

BIOL 4524
Biological Laboratory Instrumentation. Lab 4. Prerequisite(s): CHEM 1515 and BOT 1404 or MICR 2123 or ZOOL 1604 or equivalents or consent of instructor. Lecture and laboratory course in biological instrumentation use, theory, experimental design, maintenance, and troubleshooting. Topics include liquid handling systems, pH/ISE meters, electrophoresis, spectrophotometers, centrifuges, chromatography, thermocylers, and DNA sequencers. *No credit for students with credit in BIOL 5524.*

BIOL 5100*
Current Topics in Biology for Teachers. 1-4 credits, max 4. Prerequisite(s): Approval of instructor. Acquaints the primary or secondary teacher with recent advances in biology. May include lecture, laboratory or field work.

BIOL 5524*
Biological Laboratory Instrumentation. Lab 4. Prerequisite(s): CHEM 1515 and BOT 1404 or MICR 2123 or ZOOL 1604 or equivalents or consent of instructor. Lecture and laboratory course in biological instrumentation use, theory, experimental design, maintenance, and troubleshooting. Topics include liquid handling systems, pH/ISE meters, electrophoresis, spectrophotometers, centrifuges, chromatography, thermocylers, and DNA sequencers. *No credit for students with credit in BIOL 4524.*

BIOMEDICAL SCIENCES (BIOM)

BIOM 5000*
Research and Thesis. 1-6 credits, max 6, Lab 1-6. Prerequisite(s): Consent of major adviser. Research in biomedical sciences for MS degree.

BIOM 5013*
Biomedical Statistics. Prerequisite(s): Graduate standing. Fundamentals of biostatistics, including parametric and non-parametric statistical methods with applications to biomedical research, clinical epidemiology and clinical medicine.

BIOM 5020*
Biomedical Sciences Seminar. 1-4 credits, max 4. Prerequisite(s): Graduate standing. Literature and research problems in biomedical sciences.

BIOM 5117*
Gross and Developmental Anatomy. Lab 3. Prerequisite(s): Graduate standing in the biomedical sciences program. General and specific concepts of regional morphology through didactic presentations and laboratory dissections. Emphasis on the range of normal for the various organ systems and their interrelationships. Application of anatomical knowledge in clinical situations.

BIOM 5124*
Histology. Lab 4. Normal microscopic tissue architecture. Lecture and laboratory presentation for the histological concepts of the basic tissues and organ systems. Basis for pathological and physiological principles.

BIOM 5134*
Neuroanatomy. Lab 2. Prerequisite(s): Graduate standing in the biomedical sciences program. The study of structure and integrative function of the central nervous system. Lectures and laboratory demonstrations emphasizing the role of the brain and spinal cord in sensory perception and motor responses. Neuroanatomy presentations enhancing the students' understanding of the normal anatomy of the central nervous system.

BIOM 5215*
Medical Biochemistry. Broad survey of the chemical classes and metabolic processes that are consistent with the normal functions of biosystems. Functions and interrelationships of these processes in human metabolism to provide a foundation for understanding the chemistry of disease states when discussed in the second-year program.

BIOM 5316*
Medical Microbiology and Immunology. Lab 2. Prerequisite(s): 5215. Similarities and differences among pathogenic microorganisms. Characteristics, pathogenesis and control of medically important microorganisms and disorders of the immune system. Laboratory exercises on the basic serological and microbiological procedures used in the diagnosis of infectious diseases.

BIOM 5415*
General Pathology I. Prerequisite(s): Graduate standing. The reaction of the body to diseases and the description and identification of basic disease processes in terms of morphology, physiology, and chemistry. Major processes such as cell injury, cell death, healing, neoplasia, inflammation, and diseases of development and aging. Basic disease processes and ability to recognize and describe basic disease processes from gross and microscopic specimens.

BIOM 5425*
General Pathology II. Prerequisite(s): Graduate standing. Continuation of General Pathology I.

BIOM 5513*
Pharmacology I. Prerequisite(s): 5215, 5616. General principles of drug action, drugs acting on the autonomic nervous system, and drugs used in treating infectious diseases and cancer. The mode of action, pharmacogenetics, physiologic effects, therapeutic indications, and adverse reactions to these drugs.

BIOM 5523*
Pharmacology II. Prerequisite(s): 5513. Continuation of Pharmacology I.

BIOM 5616*
Medical Physiology. Prerequisite(s): 5215. The integration of structure and function of the human body with a functional analysis of the organ systems. Comprehension of the physiologic principles and control mechanisms that maintain homeostasis. Discussion of all systems of the body and analysis of various interrelationships. The fundamental dynamic view of physiology upon which subsequent clinical learning is dependent. Problem solving techniques utilized to develop and examine student understanding.

BIOM 6000*
Research and Dissertation. 1-15 credits, max 15, Lab 1-15. Prerequisite(s): Consent of major adviser. Research in biomedical sciences for PhD degree.

BIOM 6010*
Topics in Biomedical Sciences. 1-3 credits, max 3. Prerequisite(s): Consent of instructor. Tutorials in areas of biomedical sciences not addressed in other courses.

BIOM 6013*
Educational Methods in the Biomedical Sciences. Prerequisite(s): Graduate standing. Introduces graduate students to a full range of faculty roles and responsibilities related to instructional methods used at the health sciences center.

BIOM 6023*
Research Methods and Design. Prerequisite(s): Graduate standing. Introduction to concepts of research design, methodology, sampling techniques, internal and external validity, and the scientific method.

BIOM 6113*
Human Embryology. Lab 2. Prerequisite(s): 5117 or consent of instructor. Formation of the fetus from conception through development of the organs and organ systems with discussions of congenital malformations.

BIOM 6124*
Advanced Histology. Lab 4. Prerequisite(s): 5124. Histochemical techniques used in the identification of cells or tissues based on the localization of cell organelles or cell products using electron microscopy, immunofluorescence, cryosectioning and immunoperoxidase labeling.

BIOM 6143*
Biomedical Electron Microscopy. Lab 4. Prerequisite(s): Graduate standing. The theory and application of transmission and scanning electron microscopy in a biomedical setting.

BIOM 6163*
Cellular and Molecular Neurobiology. Prerequisite(s): 5215, 5616. Current aspects of cellular and molecular neurobiology, including cell biology of neurons and glia, communication between neurons and the molecular and cellular aspects of brain development and plasticity.

BIOM 6175*
Molecular and Cellular Biology. Prerequisite(s): Consent of course coordinator. Cell biology, including cellular macromolecules, energetics, metabolism, regulation, organization and function of cellular organelles, flow of genetic information, and the regulation of selected cell activities.

BIOM 6183*
Cellular and Molecular Biology of Pain. Prerequisite(s): 5133 or 5616. An understanding of the cellular and molecular events that occur in the initiation and transmission of nociceptive (painful) sensory signaling.

BIOM 6214*
Advanced Topics in Medical Biochemistry. Prerequisite(s): 5215 or concurrent enrollment. Chemical basis of protein, carbohydrate, lipid, nucleic acid, steroid and porphyrin structure, function, and metabolism as related to health and disease.

BIOM 6233*
Enzyme Analysis. Lab 2. Prerequisite(s): 6214. Characteristics, separation, detection, assays, kinetics, mechanisms of catalysis, inhibition or inactivation, and clinical applications of enzyme analysis.

BIOM 6243*
Human Nutrition. Lab 2. Prerequisite(s): 5215. Role of vitamins and minerals in maintaining normal metabolism, role of nutrients in providing athletic and immune system performance, and pathophysiology associated with nutrient deficits and nutrient excesses. Role of drugs in inducing cancer and increasing nutrient requirements.

BIOM 6263*
Techniques in Molecular Biology. Lab 4. Prerequisite(s): 5215, 5316, consent of instructor. Transformation of bacterial and mammalian cells; purification of nucleic acids; cloning of DNA fragments; labeling of nucleic acids with non-radioactive probes; analysis of DNA and RNA by electrophoresis and hybridization; DNA sequencing; design, synthesis and use of oligonucleotides; site-directed mutagenesis; detection of rare nucleic acids by the polymerase chain reaction and expression of proteins.

BIOM 6313*
Diagnostic Parasitology. Lab 2. Prerequisite(s): 5316. Animal parasites of humans with a focus on the laboratory identification of the medically important protozoan and helminthic diseases.

BIOM 6323*
Diagnostic Virology. Lab 4. Prerequisite(s): 5215, 5316. Viruses causing disease in humans with emphasis on the laboratory diagnosis, prevention, and treatment of viral diseases.

BIOM 6333*
Immunology. Prerequisite(s): 5215, 5316. The experimental basis of immunology and immunopathology.

BIOM 6343*
Microbial Physiology. Lab 2. Prerequisite(s): 5215, 5316. The chemical composition, growth and metabolism of prokaryotic organisms including regulation and control of metabolic pathways with emphasis on metabolism unique to microbes.

BIOM 6353*
Molecular Virology. Lab 2. Prerequisite(s): 5215, 5316, consent of instructor. The fundamental molecular biology of the virus life cycle using one virus as a model to examine penetration, gene regulation, replication, assembly and egress, as well as host immunological response and epidemiology.

BIOM 6413*
Graduate General Pathology. Prerequisite(s): Graduate standing and 5215; permission of the instructor is required; 5616 and 5316 are recommended. An introduction for biomedical researchers to disease processes, from etiologies to cell and tissue responses that manifest as diseases.

BIOM 6523*
Cardiovascular Physiology and Pharmacology. Prerequisite(s): 5513, 5523. Physiologic and pharmacologic mechanisms of cardiac and vascular smooth muscle function and control at the molecular, cellular, tissue and organ system levels.

BIOM 6533*
Principles of Drug Action. Prerequisite(s): 5513, 5523. The molecular basis of drug uptake, distribution, physiologic action, and elimination from the body including pharmacogenetics, drug allergy, drug resistance, drug tolerance and physical dependence, and chemical mutagenesis, carcinogenesis and teratogenesis.

BIOM 6543*
Neurochemical Toxicology. Prerequisite(s): 5215, 5616. The fundamental aspects of neurochemistry and neurotoxicology using both cellular and molecular approaches in neurotoxicology will be emphasized using the effects of exogenous toxins such as heavy metals, pesticides, solvents, and drugs of abuse and their role in the pathogenesis of neurological toxicity.

BIOM 6583*
Neuroinflammation. Prerequisite(s): Graduate standing. Provides an understanding of inflammation in the central nervous system through discussion of current and experimental pharmacologic strategies designed to modulate neuroinflammation.

BIOM 6613*
Environmental Physiology. Prerequisite(s): 5616. Environmental parameters, including barometric pressure, temperature, light, gravity, noise, and crowding, having an impact on homeostatic mechanisms in the normal human with special emphasis on acute and chronic adaptations in response to changes in environmental parameters.

BIOM 6643*
Neurophysiology. Prerequisite(s): 5616. Fundamental concepts of the motor and sensory components of the nervous system with emphasis on integrative mechanisms.

BIOM 6662*
Research Ethics and Survival Skills for the Biomedical Sciences. Prerequisite(s): Graduate standing. Provides a basic framework for scientific conduct and practice and the skills needed for a career in the biomedical sciences.

BIOM 6663*
Neuroethology. Prerequisite(s): Permission of instructor. This course is designed to provide an analysis of the neuroendocrine basis of behavior. Lectures will serve as the format of presentation to provide a sound understanding of the neuroethological concepts discussed.

BIOM 6673*
Genomics. Prerequisite(s): 6175. The course begins with a review of molecular biology and then proceeds to the structure and organization of eukaryotic, prokaryotic, and organelle genomes. Techniques in dividing, sequencing, annotating, and mapping genomes are studied as well as those of global gene expression profiling. The course finishes with a look at the many applications of genomics in biomedical science and disease.

BIOM 6683*
Receptors I. Overview of the structure and function of receptors, as well as the molecular pharmacology of signal transduction mechanisms in cells. The format of the course includes lectures on various receptors and their signaling mechanisms, a synopsis of receptor theory and data analysis, discussions of selected papers, and student presentations.

BIOM 6693*
Receptors II. Extension of Receptors I. Focus in more detail on the structure and function of selected receptor families.

BIOM 6705*
Advanced Gross Anatomy. Lab 4. Prerequisite(s): Consent of course coordinator. General and specific concepts of regional human anatomy. The primary focus is the range of normal for all organ systems and interrelationships. Provides an advanced descriptive basis for understanding human structure and function encountered in succeeding courses and in the practice of teaching gross anatomy to graduate and medical students.

BIOM 6713*
Applications of GIS in Evolutionary Biology. This course introduces students to the applications of Geographic Information Systems (GIS) in Evolutionary Biology. The course will emphasize applications of GIS in methods associated with vertebrate paleontology (e.g. tooth morphology and mapping). The lecture portion will introduce students to the appropriate literature and provide discussions on evolutionary theories and uses of GIS to test such theories, while the laboratory portion will provide hands-on exercises with GIS software.

BIOM 6723*
Field Techniques in Vertebrate Paleontology. This course introduces students to techniques and tools necessary to conduct field work in vertebrate paleontology. The primary techniques will include mapping, prospecting and collecting both micro- and macrofossil vertebrate remains. Processing of rock matrix with microvertebrates will be emphasized, but preparation of macrofossil remains for transportation to the research lab will be taught.

BIOSYSTEMS AND AGRICULTURAL ENGINEERING (BAE)

BAE 1012
Data Analysis in Biosystems Engineering. Lab 2. Prerequisite(s): Engineering major. Introduction to application of computer-based tools in bio-systems engineering. Introduction to the conduct, analysis and reporting of laboratory experiments.

BAE 1022
Experimental Methods in Biosystems Engineering. Lab 2. Prerequisite(s): 1012 or consent of instructor. An introduction to the basics of instrumentation, measurement techniques, and data analysis, with an emphasis on written communication skills. Lecture and laboratory exercises that address measurement principles, including accuracy, precision and error analysis.

BAE 2012
Introduction to Engineering in Biological Systems. Prerequisite(s): BIOL 1114, MATH 2144. Introduction to the engineering aspects of various biological systems. Case studies that emphasize the interface between engineering and biology in plant systems, mammalian systems, bioenvironmental systems and industrial biological processes.

BAE 2023
Physical Properties of Biological Materials. Lab 2. Prerequisite(s): 1022, BIOL 1114, PHYS 2014. Basic engineering fundamentals applied to characterization and determination of physical properties of biological materials, including water relations, rheological, thermal, and electromagnetic properties, materials drying concepts, fans, psychrometrics and refrigeration.

BAE 3013
Heat and Mass Transfer in Biological Systems. Prerequisite(s): ENSC 3233. Mechanisms of heat and mass transfer, with specific applications in transport processes of biological systems. Introduction to steady state and transient heat conduction and convection, radiation, diffusion, simultaneous heat and mass transfer, and generation and depletion of heat and mass in biological systems.

BAE 3023
Instruments and Controls. Lab 2. Prerequisite(s): ENSC 2613, MATH 2233. Design of control and instrumentation systems, including sensor and actuator principles, interface electronics, system identification, modeling, and performance specification. Applications in biological and agricultural systems. *Design project required.*

BAE 3113
Microbial Technologies in Biosystems Engineering. Prerequisite(s): 2012, ENSC 2213, 3233, MATH 2233. Introduction to engineering applications of industrial microbiology. Technologies covered include fermentation systems, enzyme kinetics, wastewater treatment and bioremediation.

BAE 3213
Energy and Power in Biosystems Engineering. Lab 2. Prerequisite(s): 1022, ENSC 2143, 2213, 2613. Analysis and design of energy generation, transmission, and utilization in the production and processing of biological materials.

BAE 3313
Natural Resources Engineering. Lab 3. Prerequisite(s): 2023 and ENSC 3233. Principles and practices of engineering analysis and design applied to hydrology, water quality, erosion and sedimentation, air quality, irrigation and animal waste management.

BAE 4001
Professional Practice in Biosystems Engineering. Prerequisite(s): Concurrent enrollment in 4012. Preparation for professional practice through case studies about ethics, legal liability, safety, and societal issues. Practical professional communications experience.

BAE 4012
Senior Engineering Design Project I. Lab 2. Prerequisite(s): 3013, 3023, 3113, 3213, 3313, 4001 and ENSC 2143. Team work on professional level design projects, using design procedures to develop specifications, propose alternative solutions, consider external constraints, develop drawings or plans, construct, test and evaluate designs.

BAE 4023
Senior Engineering Design Project II. Lab 4. Prerequisite(s): 4012. Second of two-semester sequence of senior design courses.

BAE 4213*
Precision Agriculture. Lab 2. Prerequisite(s): MATH 1513, senior standing. Introduction to the concepts of precision agriculture including analysis of spatial variability, relationships of fertility and crop response, geographical information systems, variable rate technology, optical sensing, global positioning systems, and yield monitoring. Case studies included for detailed analyses. (Same course as SOIL 4213)

BAE 4224*
Machinery for Production and Processing. Prerequisite(s): 3213. Analysis and design of machine components and machine systems for production and processing of biological materials. Soil dynamics with emphasis on traction and soil compaction. Interactions of machines with biological systems.

BAE 4283*
Bioprocess Engineering. Prerequisite(s): 3113 or consent of instructor, ENSC 3233. Application of fundamental engineering principles to biochemical and biological processes. Introduction to cellular processes, fermentation technology, biological mass transfer and kinetics, bioreactor design and scale-up and downstream processing. (Same course as CHE 4283)

BAE 4313*
Hydrology. Prerequisite(s): 3313, ENSC 3233. Basic principles of surface and groundwater hydrology and their application in engineering problems. The hydrologic cycle, weather and hydrology, precipitation, evaporation, transpiration, subsurface waters, stream flow hydrographs, hydrologic and hydraulic stream routing, probability of hydrologic events and application of hydrologic models.

BAE 4353*
Mechanical Design II. Prerequisite(s): ENSC 2013, ENSC 2122, MAE 3323. Design of power transmission systems, including belts, chains and gears. Selection of electric motors, actuators, encoders, and related electromechanical components. Selection and application of hydraulic and pneumatic components in machine design applications. Design practice in the form of short projects integrating the various segments covered in the course. (Same course as MAE 4353)

BAE 4400
Special Problems. 1-4 credits, max 8. Investigations in specialized areas of biosystems engineering.

BAE 4413*
Food Engineering. Prerequisite(s): 3013 and ENSC 3233, 2213. Analysis and design of various unit operations in food processing including thermal processing, drying, evaporation, freezing, processing non-Newtonian fluids and quality changes during processing.

BAE 5000*
Thesis and Research. 1-6 credits, max 6. Prerequisite(s): Consent of major professor.

BAE 5030*
Engineering Practice. 1-12 credits, max 12. Prerequisite(s): BS degree in biosystems and agricultural engineering. The identification, analysis and synthesis of an authentic problem in agricultural and biological engineering. Solution of the problem will involve making engineering decisions tempered by real-time restraints, economic realities, and limited data with due consideration for environmental and social implications.

BAE 5213*
Renewable Energy Engineering. Prerequisite(s): ENSC 2213, ENSC 3233 or consent of instructor. Renewable technologies such as solar, wind, geothermal, hydroelectric, and biomass to generate energy for electricity, heating, transportation, and other uses.

BAE 5283*
Advanced Bioprocess Engineering. Prerequisite(s): Consent of instructor. Application of fundamental engineering principles to biochemical and biological processes. Introduction to cellular processes, fermentation technology, biological mass transfer and kinetics, bioreactor design and scale-up and downstream processing. (Same course as CHE 5283)

BAE 5313*
Watershed Modeling and Water Quality. Lab 6. Prerequisite(s): 4313 or equivalent. A computer modeling course with an emphasis on chemical and physical processes governing nonpoint source pollution (nitrogen, phosphorus, sediment) at the basin scale. The laboratory use of state-of-the-art models applied to a variety of agricultural systems. "Hands on" use of comprehensive hydrologic water quality models that utilize spatial data in a geographic information system. Models and parameter uncertainty, digital data sources, parameter estimation and model testing, calibration and validation. For students with advanced personal computer skills.

BAE 5324*
Modeling and Design in Storm Water and Sediment Control. Lab 3. Prerequisite(s): 4313 or equivalent. Analysis and design of storm water, sediment and water quality systems with a focus on application to urban areas and developments in the urban-rural fringe. Advanced concepts in hydrologic modeling with kinematics, diffusion and dynamic modeling of flow; soil erosion, sediment transport and sediment control; storm water quality modeling and the impact of best management practices. In laboratories, use of hydrologic, sediment, and water quality models in analysis and design for real-world problems.

BAE 5333*
Applied Water Resources Statistics. Lab 3. Prerequisite(s): STAT 5013 or equivalent. Applied statistical methods for hydrologists, engineers, and environmental scientists for analysis of environmental data. Parametric and nonparametric methods and exploratory data analysis applied to observed environmental data sets. Laboratory exercises emphasize hands-on application of statistical problems to reinforce concepts.

BAE 5343*
Environmental Contaminant Transport. Prerequisite(s): 4313. Conceptual and mathematical models for the transport of contaminants in natural systems with an emphasis on agricultural pollutants. Basic transport processes relevant to the three environmental media - air, water, and soil. Common features underlying pollutant transport.

BAE 5413*
Instrumentation in Biological Process Control System. Prerequisite(s): 3023 or equivalent. Analysis of transducers for on-line measurement and control of biological processes. Emphasis on selection of measurement techniques and transducers to sense physical properties of biological materials. Application to agricultural and food processing industries.

BAE 5423*
Food Rheology. Lab 2. Prerequisite(s): ENSC 3233. Characterization and analysis of the rheological properties of food products. Focus on measurement techniques and equipment, including tube and rotational type instruments, with specific applications in food processing.

BAE 5433*
Biosensors. Prerequisite(s): PHYS 2114 and CHEM 3053 or equivalent. Principles and applications of biosensors in food analysis, disease diagnostics, and environmental monitoring. Emphasis on conceptual design and characterization of biosensors. Introduction to recent advances in biodetection using nanotechnology.

BAE 5501*
Seminar. Discussion of current literature with special emphasis on research and experimental techniques.

BAE 6000*
Research and Thesis. 1-10 credits, max 30. Prerequisite(s): approval by the student's advisory committee. Independent research and doctoral thesis preparation under the cognizance of a graduate faculty member in the student's field of specialization.

BAE 6100*
Teaching Practicum in Biosystems Engineering. 1-3 credits, max 3, Lab 2-6. Prerequisite(s): One semester of doctoral study in Biosystems Engineering, or consent of instructor. Philosophies and techniques of resident and non-resident teaching, including experiences in preparation, presentation, and evaluation of lectures, laboratories, extension or continuing education programs.

BAE 6313*
Stochastic Methods in Hydrology. Prerequisite(s): CIVE 5843, STAT 4033. Stochastic and statistical hydrologic analyses of surface water and groundwater systems. Analysis of urban and rural drainage and detention systems. (Same course as CIVE 6843)

BAE 6333*
Fluvial Hydraulics. Prerequisite(s): 3013 or equivalent. Principles of sediment detachment and transport in fluvial systems. Design of stable channels and flow resistance relationships for sediment-laden flows.

BAE 6343*
Ground Water Contaminant Transport. Prerequisite(s): SOIL 5583 or CIVE 5913 or GEOL 5453. Principles of solute and multiphase transport in soils and ground water. Effects of advection, diffusion, dispersion, degradation, volatilization and adsorption. Relationships between laboratory and field scale transport. Contamination by nonaqueous phase liquids.

BAE 6520*
Problems in Soil and Water Engineering. 2-6 credits, max 6. Prerequisite(s): Consent of instructor. Problems associated with erosion control, drainage, flood protection and irrigation.

BAE 6540*
Problems in Farm Power and Machinery. 2-6 credits, max 6. Prerequisite(s): consent of instructor. Literature review and analytical studies of selected farm power and machinery problems. *Written report required.*

BAE 6580*
Problems in Transport Processes. 2-6 credits, max 6. Prerequisite(s): Consent of instructor. Literature review and analysis of heat and mass transport and interval diffusion in biological materials. Transport phenomena at interfaces, thermal and cryogenic processing, drying, packed and fluidized bed systems. Thermal and moisture control processing affecting quality of food products. *Written report required.*

BAE 6610*
Advanced Research and Study. 1-10 credits, max 20. Prerequisite(s): Approval by the student's advisory committee. Research and study at the doctoral level on the topic related to the student's doctoral program and field of interest.

BOTANY (BOT)

BOT 1404
(N)Plant Biology. Lab 2. Prerequisite(s): BIOL 1114. Morphology and anatomy of plants. Plant functioning: photosynthesis, water relations, translocation, hormonal regulation, and photoperiodism. Survey of the plant divisions, algae and fungi.

BOT 3005
Field Botany. Lab 6. Prerequisite(s): BIOL 1114 or equivalent. Botanical field techniques, the vegetation of North America, and the flora of Oklahoma. Terminology of description, use of taxonomic keys, techniques of specimen preservation, field recognition of plant taxa and communities and controlling ecological factors, economic and wildlife significance of dominant taxa, principles of classification + and nomenclature. *Four weekend field trips required.*

BOT 3013*
Biological Microtechnique. Lab 3. Prerequisite(s): 1404 or ZOOL 1604. Techniques for preparation of biological materials for microscopic examination.

BOT 3024*
Plant Diversity. Lab 4. Prerequisite(s): 1404. Forms and life histories of selected plants with emphasis on some of the less familiar forms. The diversity of plant forms as well as basic similarities in life histories; importance of each form to man and his environment. *Field trips required.*

BOT 3114*
Plant Taxonomy. Lab 4. Prerequisite(s): 1404 or equivalent. Vocabulary and concepts of plant taxonomy: terminology, keys, nomenclature, documentation, classification, and biosystematics. Emphasis on angiosperm flora of Oklahoma. *Field trips required.*

BOT 3233*
Plant Anatomy. Lab 3. Prerequisite(s): 1404. Structure of cells, tissues and organs of plants. Consideration of structure as related to ontogeny, phylogeny and function.

BOT 3253
(N)Environment and Society. Prerequisite(s): BIOL 1114 or equivalent strongly recommended. The impact of human activities and population growth on the natural world. Analysis of the potential of technological and societal changes to have an impact on the environment. For the non-biology major.

BOT 3263
(N)Plants and People. Types of plants, form and function, history of uses of plants and plant products for food and beverages, fiber, medicinal purposes, and in people's surroundings. For the non-biology major.

BOT 3273
Plants and Human Health. Study of plants as a source of medicines, psychoactive compounds and poisons. These topics will be explored in the context of modern western medicine as well as traditional health systems and complementary alternative medicine.

BOT 3462
Plant Physiology Laboratory. Lab 4. Prerequisite(s): 3463 or concurrent enrollment. Skills in techniques for working with plants, experiments involving nutrition, respiration, photosynthesis, water relations, translocation, hormones, growth and development.

BOT 3463*
Plant Physiology. Prerequisite(s): 1404. Plant subcellular structure, water relations, water absorption and ascent of sap, translocation, gaseous exchange, nutrition, enzymes, respiration, photosynthesis, growth, development, reproduction, tropisms, hormones, dormancy and seed germination.

BOT 3553
Fungi: Myths and More. Lab 2. Prerequisite(s): BIOL 1114. Explores the impact of fungi on beliefs, culture and society via the colorful folklore and myths on fungi and their role in the environment and human affairs, including diseases of plants, animals and humans exemplified by the Great Bengal famine of 1943, The Irish potato famine, 1840's and the Salem witch trials 1692. Laboratory instruction on use of microscopes, mushroom identification, mechanisms of dispersal, and genetic recombination. (Same course as PLP 3553)

BOT 4023
Community Ecology. Prerequisite(s): BIOL 3034 or equivalent. Plant and animal communities, community theory, the role of competition, predation, and demography in structuring plant and animal communities, succession, current controversies in ecology, with emphasis on the primary literature. *No credit for students in 5023.*

BOT 4123*
Ethnobotany. Prerequisite(s): One course from 1404 or ZOOL 1604, HORT 1013, 3024, PLNT 1213, or consent of instructor. Uses of plants by past and present cultures for food, fiber, and medicinal purposes. The role of plants in traditional rituals and religious practices.

BOT 4214
Botanical Limnology. Lab 3. Prerequisite(s): 1404 or equivalent strongly recommended. Taxonomy, ecology, and physiology of freshwater algae and vascular aquatic plants, with special reference to their role in overall limnological dynamics. *Field trips required. No credit for students with credit in 5214.*

BOT 4400
Undergraduate Research. 1-3 credits, max 9. Prerequisite(s): Consent of instructor. Undergraduate research problems in botany.

BOT 4423
Plant Mineral Nutrition. Prerequisite(s): 3463 or equivalent. Uptake, translocation, metabolism, and biochemical function of mineral nutrients in higher plants. *No credit for students with credit in 5423.*

BOT 4993
Senior Honors Thesis. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A research project under the direction of a faculty member resulting in a written report to be judged by a second faculty member as well. An oral presentation made at a departmental seminar. *Required for graduation with departmental honors in botany.*

BOT 5000*
Research. 1-6 credits, max 6. Research for the MS degree.

BOT 5023*
Community Ecology. Prerequisite(s): BIOL 3034 or equivalent. Plant and animal communities, community theory, the role of competition, predation, and demography in structuring plant and animal communities, succession, current controversies in ecology, with emphasis on the primary literature. *No credit for students with credit in 4023.*

BOT 5104*
Mycology. Lab 4. Prerequisite(s): Graduate standing. A systematic study of the fungi, with emphasis on taxonomy, comparative morphology, and fungal biology. Taught in the Department of Plant Pathology. (Same course as PLP 5104)

BOT 5110*
Problems in Botany. 1-5 credits, max 12. Prerequisite(s): Consent of instructor. Special studies in any area of botany.

BOT 5214*
Botanical Limnology. Lab 3. Prerequisite(s): 1404 or equivalent strongly recommended. Taxonomy, ecology and physiology of freshwater algae and vascular aquatic plants, with special reference to their role in overall limnological dynamics. *Field trips required. No credit for students with credit in 4214.*

BOT 5423*
Plant Mineral Nutrition. Prerequisite(s): 3463 or equivalent. Uptake, translocation, metabolism, and biochemical function of mineral nutrients in higher plants. *No credit for students with credit in 4423.*

BOT 5533*
Multivariate Methods in Community Ecology. Prerequisite(s): 5023 or BIOL 3034 or other equivalent course work in ecology recommended. Basic knowledge of statistics desirable. Methods used by ecologists to analyze community data and community patterns, including ordination and modern regression techniques. *One weekend field trip required.*

BOT 5753*
Physiology of Plant Growth and Development. Prerequisite(s): 3463 or equivalent. Molecular mechanisms of growth and development, subcellular organization and function, plant hormones, photomorphogenesis, germination and dormancy, senescence and abscission, plant rhythms. Application of physiological principles to agriculture.

BOT 5813*
Plant Developmental Genetics. Prerequisite(s): BIOL 3023 or equivalent. Discussion of morphogenesis, embryogenesis, gametogenesis, and the regulation of gene expression during plant development. Emphasis on recent genetic, experimental, and molecular studies of development in higher plants.

BOT 5850*
Botany Seminar. 1 credit, max 6. Required of senior and graduate majors.

BOT 6000*
Research. 1-15 credits, max 60. Independent research for the doctoral dissertation.

BUSINESS ADMINISTRATION (BADM)

BADM 1111
Business Freshman Orientation. Prerequisite(s): Freshman standing only. Required of all first semester freshmen in the William S. Spears School of Business. An orientation to the SSB and OSU, survival skills, and a study of the career opportunities and curriculum in the various business departments.

BADM 2010
Special Topics. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Special topics and independent study in business.

BADM 3090
(I)Study Abroad. 1-18 credits, max 36. Prerequisite(s): Consent of the Study Abroad office and associate dean of the college. Participation in an OSU reciprocal exchange program.

BADM 3713
(I)International Business. Prerequisite(s): MGMT 3123. Development of international business strategy based on the integration of economic, accounting, financial, management and marketing concepts.

BADM 4010
Business Projects. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Special advanced topics, projects and independent study in business.

BADM 4050*
Business Colloquium. 3-9 credits, max 9. Prerequisite(s): Junior standing and consent of the instructor and the dean. Study of an interdepartmental and interdisciplinary nature of various important issues and aspects of the business and economic environment. Provides an intellectual challenge for the able student with a strong interest in scholarship.

BADM 4513*
Strategy and Integration in Organizations. Prerequisite(s): Senior standing or business core classes. Integration of concepts from the business core courses using tools such as simulation and case analysis. Planning models, policy models and strategy development.

BADM 5013*
Research Methods for Business. Prerequisite(s): STAT 2023, admission to MBA program or approval from MBA director. Role of Bayesian and inferential statistics in business research and management decision-making. Measurement, sealing, survey methods, and forecasting. Applications to marketing; managerial, human resource; financial and production planning; and other related business topics. Use of computers in statistical analysis.

BADM 5200*
Selected Master of Business Administration Topics. 3-6 credits, max 6. Prerequisite(s): Admission to the MBA program. Selected topics dealing with business decision-making and contemporary business issues.

BADM 5613*
The External Environment of Business. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Social, ethical, regulatory and political forces as they impact on the organization. Attention to organizational response to these forces through management policies and strategies.

BADM 5713*
Analysis of the Multinational Firm. Prerequisite(s): Admission to MBA program or consent of MBA director. Identification and analysis of the managerial, financial, and market problems facing the multinational firm. Focus is empirical and stressing application of ecological and quantitative tools to the study of the multidimensional nature of the international business environment.

BADM 6000*
Research and Thesis. 1-9 credits, max 30. Prerequisite(s): Approval of advisory committee.

BADM 6100*
Seminar in Business Administration. 3-6 credits, max 6. Prerequisite(s): Consent of instructor. Interdisciplinary in nature; focused on research methodology.

BADM 6713*
Theory Building and Scientific Research in Business. Prerequisite(s): Doctoral student status and consent of instructor. Examination of theory building and research methods from a business perspective. Understanding of theory and methods relevant to research in the business disciplines.

BUSINESS COMMUNICATIONS (BCOM)

BCOM 3113
Written Communication. Prerequisite(s): 50 semester credit hours. Analysis of business communication problems in terms of generally accepted communication principles. Practice in written messages; specifically, special goodwill letters, neutral and good-news, disappointing, persuasive and employment messages.

BCOM 3223
Organizational Communication. Prerequisite(s): 50 credit hours. Communication theory and process; common and special problems associated with interpersonal and organizational communication affecting business decisions and operations. Principles and methods of basic and applied research in business and communication; practice in administrative report writing. Analysis of selected business cases.

BCOM 3333
Business Report Writing. Prerequisite(s): 6 hours of English. Fundamentals of writing business reports, including coverage of mechanics, content, and structure of business reports. Practice in writing business reports as well as oral presentations of reports.

BCOM 5113*
Seminar in Administrative Communication. Understanding and application of valid and relevant communication principles and theories. Designed to develop management-level personnel who can effectively and efficiently use oral and written communications as administrative tools to organizational functioning.

BCOM 5210*
Business Communication Applications. 1-3 credits, max 3. Application of communication techniques to the business setting. Interpersonal communication skills necessary for the manager in a business organization. Problems and applications within the modern business setting.

BUSINESS HONORS (BHON)

BHON 4053
Critical Issues in Global Business. Prerequisite(s): Junior standing, admission to the Honors Program. Current critical issues facing business in a global environment. Social, political, economic, and technological sectors of the environment. Framework of study on geographical and political regions.

BHON 4063
Topics in Contemporary Business. Prerequisite(s): Junior standing, admission to the Honors Program. Topics of interest in the contemporary business and economic environment. The social role of the corporation; U.S. competitiveness and business and environmental issues.

BHON 4073
Literature in Business. Prerequisite(s): Junior standing, admission to the Honors Program. Foundations of American business through selected literary masterpieces.

BHON 4990
Business Honors Thesis. 1-5 credits, max 5. Prerequisite(s): Honors Program participation, senior standing, college approval. A guided reading and research program ending with an honors thesis under the direction of a faculty member, with second faculty reader and oral examination. *Required for graduation with college honors in business.*

BUSINESS PROFESSIONS (BSPR)

BSPR 3523
Office Problems in Keyboarding. Lab 2. Prerequisite(s): 2313 or equivalent. Problems in office situations requiring application of keyboarding knowledge and skills. Emphasis on quality work at high speeds.

CAREER AND TECHNICAL EDUCATION (CTED)

CTED 2000
Field Experience. 2-6 credits, max 16. Supervised work experience in student's proposed teaching area with special emphasis on occupational skill development. Written agreement between student, employer and department must be made prior to beginning of field experience program. *Graded on a pass-fail basis.*

CTED 3000
Occupational Experience. 1-24 credits, max 24. Credit to be determined by a special skill competency examination.

CTED 3203
Foundations of Career and Technical Education. Opportunities provided by career and technical education through the programmatic areas of trade and industrial, marketing, business and information technology, health occupations, and technology education. The relationship of CTED to other elements of the educational system, including legislative aspects, student guidance, and programs for students with special needs.

CTED 3903
Seminar in Professional Education. Procedures for completing certification and portfolio requirements and gaining admission to Professional Education and student teaching. Documentation of field experiences, professional development opportunities, and observations of at least 45 clock hours of master teachers in various school settings. *Graded on a pass-fail basis.*

CTED 4010*
Career and Technical Education Workshop. 1-3 credits, max 6. Professional workshops of various topics and lengths. Focus on a particular topic from such areas as the development, use, and evaluation of instructional methods and materials.

CTED 4103*
Instructional Procedures in Career and Technical Education. Methods and techniques for effective teaching and learning in career and technical classroom, laboratories, and technology-based environments.

CTED 4110*
Career and Technical Information. 1-6 credits, max 6. New developments in scientific and technical information and knowledge that are relevant to current career, technical and trade practices.

CTED 4113
Career and Technical Education in American Society. Characteristics of career and technical education and its development, role and function in a changing American society. Economic and sociological considerations of career and technical programs. Exploration of the interrelationship of career and technical and academic subject strategies for teaching multicultural and special needs in career and technical and adult education.

CTED 4123*
Coordinating Career and Technical Student Organizations and Activities. Student organizations and activities in career and technical education at local, state and national levels. Procedures for planning programs of work, incorporation of student organization activities into curriculum, adviser characteristics and responsibilities, fund-raising activities, and techniques for recognizing outstanding members and community supporters.

CTED 4213*
Safety, Organization and Management of Learning Facilities. Techniques and procedures for organizing and managing career and technical laboratory facilities and learner activities to enhance the quality of instruction and improve efficiency of equipment and space utilization, including all safety rules and procedures.

CTED 4223
Program Planning and Development in Career and Technical Education. Planning and designing programs for the development of human resources. Program goals and objectives, curriculum, facilities, teaching-learning theories, materials development, program resources, and program and instructional evaluation.

CTED 4313
Computers and Multimedia in Career and Technology Education. Lab 2. Review of current hardware systems and software applications and their uses in career and technology education. Current and emerging issues facing career and technology instructors using technology in the classroom. A wide range of Internet and multimedia tools and techniques and their functions in career and technical teaching and learning. Instructional technology usage issues and computer-based materials suitable in professional settings.

CTED 4333
(I)International Career and Technical Education. Comparison and analysis of international career and technical education.

CTED 4343*
Occupational Analysis and Curriculum Development. Analysis of occupational job activities; development of course objectives, course outlines, and specific instructional materials for occupational and technical courses.

CTED 4470
Teaching Practicum in Career and Technical Education. 1-12 credits, max 12. Prerequisite(s): Full admission to Professional Education. Organized teaching experiences under the guidance and direction of a local school cooperating professional and university professional educator. Participant assigned to a cooperating teacher with responsibility for planning, implementing, and evaluating the classroom, laboratory, or shop. *Graded on a pass-fail basis.*

CTED 4673
Current Issues in Career and Technical Education. Defining current issues, conducting action research and proposing possible solutions to current issues in CTED. Debating opposing views and giving logic and reasoning for each view.

CTED 4683
Legal Issues in Career and Technical Education. Overview of the law and the legal system, including how to perform legal research using library and Internet resources, issues involving student organizations, intellectual property, and distance education.

CHEMICAL ENGINEERING (CHE)

CHE 2033
Introduction to Chemical Process Engineering. Prerequisite(s): CHEM 1515, ENSC 2213. Co-requisite(s): MATH 2233 or 3263. Application of mathematics and scientific principles to solving chemical engineering problems. Simple material and energy balances applied to process design. The nature and application of unit operations and unit processes to the development of chemical processes.

CHE 3013
Rate Operations I. Prerequisite(s): Admission to CHE Professional School. Development and application of phenomenological and empirical models to the design and analysis of fluid processing and heat transfer unit operations.

CHE 3113
Rate Operations II. Prerequisite(s): 3013, 3333, 3473, admission to CHE Professional School. Development and application of phenomenological and empirical models to the design and analysis of mass transfer and separations unit operations.

CHE 3123
Chemical Reaction Engineering. Prerequisite(s): 3333, 3473, and admission to CHE Professional School. Principles of chemical kinetics rate concepts and data treatment. Elements of reactor design principles for homogeneous systems; introduction to heterogeneous systems.

CHE 3333
Introduction to Transport Phenomena. Prerequisite(s): Admission to CHE Professional School. Molecular concepts of mass, momentum, and thermal energy diffusion. Theories and correlations for transport properties of viscosity, thermal conductivity, and diffusivity. Shell balance techniques to derive differential equations of change. Application of ODEs to simple transport phenomena problems. Turbulent flow analysis. Use of CFD software for analysis.

CHE 3473
Chemical Engineering Thermodynamics. Prerequisite(s): Admission to CHE Professional School. Application of thermodynamics to chemical process calculations. Behavior of fluids, including estimation of properties by generalized methods. Study of chemical thermodynamics, including heats of reaction, chemical reaction, and phase equilibria.

CHE 4002*
Chemical Engineering Laboratory I. Lab 6. Prerequisite(s): 3013, 3333, 3473, admission to CHE Professional School. Application of CHE fundamentals and unit operation principles to the analysis of bench and pilot-scale equipment. Primarily fluid processing and heat exchange. Design of experiments on non-ideal units to generate credible data useful for validation of principles and for engineering decisions. Interpretation of experimental data and presentation of results.

CHE 4112*
Chemical Engineering Laboratory II. Lab 6. Prerequisite(s): 3113, 3123, 4002, admission to CHE Professional School. A continuation of 4002. Primary reaction and mass transfer processes.

CHE 4124*
Chemical Engineering Design I. Lab 2. Prerequisite(s): 3113, 3123, 4002, and admission to CHE Professional School. Economic analysis of process plants and systems of equipment; methods for estimating plant investment requirements and operating costs; economic evaluation and optimal design of chemical process systems; basic equipment and process design calculations.

CHE 4224*
Chemical Engineering Design II. Lab 2. Prerequisite(s): 4124 and admission to CHE Professional School. A continuation of CHE 4124. Economic analysis of process plants and equipment. Design of chemical processing equipment and chemical plants. Application of computer techniques to chemical engineering design.

CHE 4283*
Bioprocess Engineering. Prerequisite(s): Admission to CHE Professional School and CHE 3123 (or instructor consent). Application of fundamental engineering principles to biochemical and biological processes. Introduction to cellular processes, fermentation technology, biological mass transfer and kinetics, bioreactor design and scale-up and downstream processing. (Same course as BAE 4283)

CHE 4293
Biomedical Engineering. Prerequisite(s): ENSC 2213, 3233, MATH 2155. Introduction to engineering principles applied to biomedical applications. Biomaterials, drug delivery, artificial organs, transport in biological systems, tissue engineering and modeling of biological systems.

CHE 4343
Environmental Engineering. Prerequisite(s): 4123. Application of science and engineering principles to minimize the adverse effects of human activities on the environment. National and state environmental regulations. Predictive movement and fate of chemicals in the geospheres. Multi-media pollution assessment, analysis and control. Consideration of safety, health and environmental issues from a process standpoint.

CHE 4523
Introduction to Colloid Processing. Prerequisite(s): MATH 2153, CHEM 1515. The physics and chemistry governing the behavior of microscopic particles in dilute and concentrated suspensions. Interparticle interaction influence on viscosity, viscoelasticity, yield stress, and shear thinning. Practical application of colloids principles in industrial practice. *No credit for students with credit in 5523.*

CHE 4581*
Chemical Engineering Seminar. Prerequisite(s): Senior standing in the department. Through guest lectures and home assignments, provision of an awareness of aspects of career and personal success that are not normally covered in the technical curriculum.

CHE 4843*
Chemical Process Instrumentation and Control. Prerequisite(s): 4124, admission to CHE Professional School. Process instrumentation for measurement and control. Process dynamics and modeling. Linearization. Classical control system analysis and design. Tuning. Communication through block diagrams and P&IDs.

CHE 4990
Special Problems. 1-5 credits, max 5, Lab 3-15. Prerequisite(s): Senior standing. Training in independent work, study of relevant literature, and experimental investigation of an assigned problem.

CHE 5000*
Master's Thesis. 1-6 credits, max 6. Prerequisite(s): Approval of major professor. Methods used in research and thesis writing.

CHE 5030*
Professional Practice. 2-6 credits, max 8. Prerequisite(s): Senior standing and consent of instructor. Application of chemical engineering principles to the solution of real-life engineering problems in an actual or simulated industrial environment. Includes application of design and testing procedures, economic evaluation and reporting on one or more assigned projects.

CHE 5110*
Special Topics In Chemical Engineering. 2-3 credits, max 6, Lab 2-6. Prerequisite(s): Consent of instructor. Small group and individual projects in unit operations, unit procedures, chemical kinetics, computer applications, process modeling, or any of a wide range of chemical engineering topics. May be repeated for credit if subject matter varies.

CHE 5123*
Advanced Chemical Reaction Engineering. Prerequisite(s): 4473. Advanced principles and applications of chemical kinetics in catalysis, heterogeneous systems, non-ideal reactions, polymerization, and biological reactions.

CHE 5213*
Selected Diffusional Unit Operations. Mass transfer in fluids. Diffusion in liquids and gases. Equilibrium stage and transfer unit concepts. Mass transfer concepts of diffusional unit operations such as absorption, adsorption, crystallization, drying, humidification and liquid extraction.

CHE 5263*
Advanced Biomaterials Science and Engineering. Prerequisite(s): Graduate standing or consent of instructor. Engineering issue that are implicit in understanding the interactions of living tissue and processed materials will be introduced. Emphasis is on identifying the processes in which cells interact with surfaces and particulate matter and the outcome of these interactions. Highlighted biological responses will include inflammation and coagulation. Also, biomaterial issues related to drug delivery and tissue engineering will be discussed. (Same course as MAE 5003)

CHE 5273*
Basic Physiology and Physiological System Analysis for Engineers. Prerequisite(s): Graduate standing or consent of instructor. The goals of this class are: 1) to introduce the basic physiology concepts used widely in biomedical engineering research; 2) to introduce and develop engineering concepts and approaches for quantitative analysis of physiological systems. Engineering principles will be applied to study mechanical properties of various tissue and organ systems under normal and diseased conditions. Knowledge obtained from this class can help engineers to apply engineering principles to the design and development of medical devices for disease treatments. (Same course as MAE 5013)

CHE 5283*
Advanced Bioprocess Engineering. Prerequisite(s): Consent of instructor. Application of fundamental engineering principles to biochemical and biological processes. Introduction to cellular processes, fermentation technology, biological mass transfer and kinetics, bioreactor design and scale-up, and downstream processing. (Same course as BAE 5283)

CHE 5293*
Advanced Biomedical Engineering. Prerequisite(s): Consent of instructor. Principles and engineering analysis of biomedical processes. Artificial organs, biomaterials, tissue engineering, transport in biological systems, biomedical imaging and drug delivery systems. (Same course as MAE 5033*)

CHE 5343*
Advanced Environmental Engineering. Prerequisite(s): Consent of instructor. Science and engineering principles to minimize the adverse effects of human activities on the environment. National and state regulations. Predictive movement and fate of chemicals in the geospheres. Multi-media pollution assessment, analysis, and control. Consideration of safety, health, and environment issues from a process standpoint. *Special project required. Credit not allowed if CHE 4343 was taken.*

CHE 5523*
Colloid Processing. Prerequisite(s): Graduate standing in engineering, physics, or chemistry or consent of instructor. The physics and chemistry governing the behavior of microscopic particles in dilute and concentrated suspensions. Interparticle interaction influence on viscosity, viscoelasticity, yield stress, and shear thinning. Practical application of colloids principles in industrial practice.

CHE 5703*
Optimization Applications. Prerequisite(s): Graduate standing. A survey of various methods of unconstrained and constrained linear and non-linear optimization. Applications of these methodologies using hand-worked examples and available software packages. *Intended for engineering and science students.* (Same course as ECEN 5703, IEM 5023 & MAE 5703)

CHE 5733*
Neural Networks. Prerequisite(s): Graduate standing. Introduction to mathematical analysis of networks and learning rules and on the application of neural networks to certain engineering problems, image and signal processing and control systems. (Same course as ECEN 5733 & MAE 5733)

CHE 5743*
Chemical Engineering Process Modeling. Chemical engineering systems and process models. Analytical and numerical methods of solution of resulting equations with computer methods in a chemical engineering context.

CHE 5843*
Principles of Chemical Engineering Thermodynamics. Principles of thermodynamics. Properties of fluids and prediction of thermodynamic properties. Phase and chemical equilibrium. Thermodynamics in unit operations.

CHE 5853*
Advanced Chemical Process Control. Prerequisite(s): 4843 or equivalent. General concepts and approaches of model-based control. Studies in the application of process-model-based control and model-predictive control on multivariable, nonlinear, nonstationary, noisy processes.

CHE 5873*
Air Pollution Control Engineering. Causes, effects and control of atmosphere pollution. (Same course as CIVE 5873*)

CHE 5990*
Special Problems. 2-4 credits, max 9. Prerequisite(s): Consent of instructor. Individual report topics in chemical engineering involving operations, processes, equipment, experiments, literature search, theory, computer use or combinations of these.

CHE 6000*
Doctoral Thesis. 2-15 credits, max 54. Prerequisite(s): Consent of major professor. The doctoral candidate registers for a minimum of 2 semester credit hours to a maximum of 15 semester credit hours in each semester during which laboratory work is in process. Methods used in research and thesis writing. An original investigation of a problem in chemical engineering and its report in a dissertation.

CHE 6010*
Chemical Engineering Seminar. 1-3 credits, max 3. Advanced research and development topics.

CHE 6223*
Advanced Chemical Engineering Thermodynamics. Prerequisite(s): 5843. Phase equilibrium in multicomponent systems. Irreversible processes. Properties of fluids and the prediction of properties by statistical methods. Application of thermodynamics to unit operations.

CHE 6440*
Advanced Topics in Chemical Engineering. 3-6 credits, max 9. Topics in chemical engineering unit operations in design. Advanced mathematical techniques in chemical engineering problems. May be repeated for credit if subject matter varies.

CHE 6703*
Research Methods in Chemical Engineering. Prerequisite(s): MS or PhD candidacy in chemical engineering or consent of instructor. Methods and skills required to successfully conduct chemical engineering research projects. Maintaining research records, experiment design, data validation, results presentation and research ethics.

CHEMISTRY (CHEM)

CHEM 1014
(L,N)Chemistry in Civilization. Lab 2. Symbols, methods and contributions to society of the chemical sciences. Includes polymers, pollution, energy, consumer chemicals, drugs, nuclear science, and other topics. *No credit for students with credit in 1215, 1314.*

CHEM 1215
(L,N)General Chemistry. Lab 2. Prerequisite(s): MATH 0123 or high school equivalent. The beginning chemistry course recommended for students in the applied biological sciences. *No credit for students with credit in 1014, 1314.*

CHEM 1225
(L,N)General Chemistry. Lab 2. Prerequisite(s): 1215 or advanced placement. A continuation of general chemistry, recommended for students in the applied biological sciences. *No credit for students with credit in 1515.*

CHEM 1314
(L,N)General Chemistry. Lab 2. Prerequisite(s): MATH 1513 or concurrent enrollment in 1613, 1715 or a higher level math course. The beginning chemistry course recommended for students in basic biological sciences (including pre-medical science and pre-veterinary science), physical sciences and engineering. *No credit for students with credit in 1014, 1215.*

CHEM 1413
(L,N)Inquiry-based Chemistry. Lab 3. Prerequisite(s): PHYS 1313 recommended. Directed inquiry and hands on study of chemical reactions. Recommended for elementary education majors as model course to learn and teach science.

CHEM 1414
(L,N)General Chemistry for Engineers. Lab 2. Prerequisite(s): One year of high school chemistry or one semester of college chemistry and MATH 1513 or concurrent enrollment in 1613, 1715 or a higher level math course. Survey course for engineers needing only one semester of chemistry. Thermodynamics, atomic structure, solid state, materials, equilibria, acids and bases, and electrochemistry. *No credit for students in 1314.*

CHEM 1515
(L,N)General Chemistry. Lab 2. Prerequisite(s): 1314 or advanced placement. A continuation of general chemistry. *No credit for students with credit in 1225.*

CHEM 2113
Principles of Analytical Chemistry. Prerequisite(s): 1515 and MATH 1513 or 1715. Modern theories of solutions, separation techniques and methods of analysis.

CHEM 2122
Quantitative Analysis Laboratory. Lab 6. Prerequisite(s): 2113 or concurrent enrollment. Laboratory work related to material covered in CHEM 2113.

CHEM 2990
Special Problems in Chemistry for Non-majors. 1-2 credits, max 2. Prerequisite(s): 1515 or concurrent enrollment. Independent training in chemistry at the lower-division level.

CHEM 3015*
The Chemistry of Organic Compounds. Lab 4. Prerequisite(s): 1215 and 1225 or equivalent. Terminal, one-semester non-majors course in organic chemistry covering the general principles of nomenclature, structures, bonding, methods of preparation, reactions and uses of acyclic, cyclic, and aromatic compounds. *No credit for students with credit in 3053 or 3112.*

CHEM 3053
Organic Chemistry. Prerequisite(s): 1414 or 1515 or equivalent. Hydrocarbons and their derivatives, including specific compounds of theoretical, biological or industrial importance. *No credit for students with credit in 3015.*

CHEM 3112
Organic Chemistry Laboratory. Lab 6. Prerequisite(s): 3153 or concurrent enrollment. Laboratory exercises related to theoretical principles covered in CHEM 3053 and 3153. *No credit for students with credit in 3015.*

CHEM 3153*
Organic Chemistry. Prerequisite(s): 3053. A continuation of 3053.

CHEM 3353
Descriptive Inorganic Chemistry. Prerequisite(s): 1225 or 1515. Structures and properties of the elements and their many compounds in the broadest sense which includes the modern technologically important materials, organometallics, and inorganic substances of biological significance.

CHEM 3433*
Physical Chemistry I. Prerequisite(s): 2113, MATH 2163. Introductory theoretical analysis of molecular structure, chemical bonding and macroscopic chemical systems using quantum theory, classical and statistical thermodynamics, and kinetics. *Students who are not chemistry majors may receive graduate credit.*

CHEM 3532*
Physico-Chemical Measurements. Lab 6. Prerequisite(s): 2122 and 3433. Apparatus, experimental methods, and calculations employed in physico-chemical investigations.

CHEM 3553*
Physical Chemistry II. Prerequisite(s): 3433. A continuation of 3433. Students who are not chemistry majors may receive graduate credit.

CHEM 4020*
Modern Methods of Chemical Analysis. 1-5 credits, max 5. Prerequisite(s): 2122, 3433. Theoretical and laboratory study of modern techniques, reagents and instruments employed in analytical chemistry.

CHEM 4320*
Chemical and Spectrometric Identification of Organic Compounds. 1-3 credits, max 3, Lab 1-2. Prerequisite(s): 3112 and 3153. Theory and practice in separating mixtures of organic compounds and some theory and practice in identifying organic compounds by spectroscopic methods.

CHEM 4990*
Special Problems. 1-5 credits, max 6, Lab 3-15. Prerequisite(s): Senior standing. Training in independent work, study of relevant literature and experimental investigation of an assigned problem.

CHEM 5000*
Thesis. 1-6 credits, max 6. Investigations, chiefly experimental, with necessary conferences. Familiarizes the student with methods used in research in chemistry.

CHEM 5011*
Graduate Seminar. Preparation and presentation of seminars usually on subjects of current interest taken from the literature. *Completion of 1 credit hour required for MS degree.*

CHEM 5103*
Physical and Chemical Separations. Prerequisite(s): One year of physical chemistry. Principles of bulk and multi-stage separation methods: chromatography, liquid-liquid extraction, and zone melting.

CHEM 5113*
Equilibrium and Kinetics in Analytical Chemistry. Prerequisite(s): One year of physical chemistry. Physical and chemical principles of equilibrium and kinetics as applied to analytical problems.

CHEM 5220*
Modern Topics for Teachers. 1-9 credits, max 9. Prerequisite(s): Teaching experience. Designed to help elementary and secondary science teachers improve their subject matter competence in chemistry. Content varies depending on the needs of specific groups of teachers.

CHEM 5223*
Chemistry of High Polymers. Prerequisite(s): 3153 and 3433 or equivalent. Preparation and polymerization of organic monomers; properties and uses of resulting high polymers; theories of polymerization; inorganic and natural organic polymers.

CHEM 5260*
Inorganic Chemistry I. 1-3 credits, max 3. Prerequisite(s): 3353 or equivalent and 3 hours of physical chemistry. Bonding theory, molecular symmetry and structure, characterization of inorganic compounds, coordination chemistry, crystal field theory, solution chemistry, and mechanisms of inorganic reactions in solution.

CHEM 5283*
Solid-state Chemistry. Prerequisite(s): 5260. Structure, bonding, and properties of cyrstalline and amorphous inorganic solids. Emphasis on the characterization of inorganic solids and phase transitions in inorganic solids.

CHEM 5323*
Reactions of Organic Compounds. Prerequisite(s): 3153. Products and mechanisms of reactions of importance in organic synthesis.

CHEM 5373*
Spectrometric Identification of Organic Compounds. Lab 3. Prerequisite(s): 4320. Lectures on ultraviolet, circular dichroism, infrared, nuclear magnetic resonance (NMR) and mass spectrometry (MS). More advanced techniques in NMR and MS stressed. Hands-on training and use of modern spectroscopic instrumentation in laboratory.

CHEM 5443*
Mechanism and Structure in Organic Chemistry. Prerequisite(s): 3153 and 3553. Relationship of properties of organic compounds to their structure; mechanisms of organic reactions.

CHEM 5563*
Chemical Thermodynamics I. Prerequisite(s): 3553. Statistical and classical thermodynamics applied to chemical systems.

CHEM 5623*
Quantum Chemistry I. Prerequisite(s): 3553. Fundamentals of quantum mechanics, including classical mechanics, wave representation of matter, the Schroedinger equation, and atomic structure.

CHEM 5960*
Inorganic Chemistry II. 1-3 credits, max 3. Prerequisite(s): 5260. Chemistry of main group and transition metal organometallic compounds, metal clusters, and catalysis by organometallic polymers, bioinorganic chemistry, and materials chemistry. (Same course as 6650*)

CHEM 6000*
Research. 1-12 credits, max 60. Prerequisite(s): MS degree in chemistry or consent of instructor. Independent investigation under the direction and supervision of a major professor.

CHEM 6010*
Research Seminar. 1 credit, max 8. Prerequisite(s): Consent of instructor. Presentations of current research. *One credit hour per academic year required for MS and PhD candidates.*

CHEM 6011*
Advanced Seminar. Prerequisite(s): 5011 or MS degree. Preparation and oral presentation of critical reviews on chemical subjects. Usually related to the student's research area. *Completion of one credit hour required for the PhD degree.*

CHEM 6050*
Special Topics in Analytical Chemistry. 1-6 credits, max 6. Supervised study of topics and fields not otherwise covered.

CHEM 6103*
Electroanalytical Chemistry. Prerequisite(s): 4024. The theory, practice and instrumentation in various areas of modern electroanalytical chemistry.

CHEM 6113*
Analytical Spectroscopy. Prerequisite(s): 4024. Survey of selected topics in analytical applications of spectroscopic techniques. Fundamental concepts as well as current trends in research, including instrumentation.

CHEM 6420*
Special Topics in Organic Chemistry. 1-9 credits, max 9. Prerequisite(s): 3153. Deals with topics not covered in other courses.

CHEM 6453*
Chemical Kinetics. Prerequisite(s): 3553. The kinetics of chemical reactions and their theoretical interpretation.

CHEM 6553*
Molecular Spectroscopy. Prerequisite(s): 5623. Spectra and structure of molecules.

CHEM 6650*
Selected Topics in Advanced Physical and Inorganic Chemistry. 1-6 credits, max 12. Prerequisite(s): Consent of instructor. Supervised study of selected topics and fields not otherwise covered. (Same course as 5960*)

CHEM 6803*
Photonics I: Advanced Optics. Lab 9. Prerequisite(s): ECEN 3813 or PHYS 3213, or consent of instructor. Advanced optics, including spectral and time characteristics of detectors, characteristics of lasers, time, spectral and spatial parameters of laser emission, interferometric techniques, and nonlinear effects such as two-photon absorption and second and third harmonic generations. Ultra short laser pulses. (Same course as ECEN 6803 & PHYS 6803)

CHEM 6810*
Photonics II: THz Photonics and THz-TDS. 1 credit, max 4, Lab 1. Prerequisite(s): 6803. THz photonics and THz time-domain spectroscopy (THz-TDS). Concepts and techniques of driving electronic circuitry with ultra short laser pulses to generate and detect freely propagating pulses of THz electromagnetic radiation using several operational research systems. (Same course as ECEN 6810 & PHYS 6810)

CHEM 6820*
Photonics II: Spectroscopy II. 1 credit, max 4, Lab 1. Prerequisite(s): 6803. Operating principles and applications of laser spectroscopy of atoms, molecules, solids and complex fluids. Absorption, emission, photon correlation, coherence, time resolved Fourier transform. Raman spectroscopy and non-linear optical. (Same course as ECEN 6820 & PHYS 6820)

CHEM 6830*
Photonics II: Spectroscopy III. 1 credit, max 4, Lab 1. Prerequisite(s): 6803. Advanced spectroscopic instruments and methods used for investigation of semi-conductors and solid state material. Stimulated emission characterized both in wavelength and in time. Time-resolved fluorescence measurements. Multiphotonic excitations. Fast measuring techniques, including subnanosecond detectors, picosecond streak cameras, and ultra fast four-wave mixing and correlation techniques. Time-dependent photoconductivity measurements. (Same course as ECEN 6830 & PHYS 6830)

CHEM 6840*
Photonics III: Microscopy I. 1 credit, max 4, Lab 1. Prerequisite(s): 3553 or consent of instructor. The structure and imaging of solid surfaces. Basics of scanning probe microscopy (SPM). Contact and noncontact atomic force microscopy (AFM). Scanning tunneling microscopy (STM) in air. (Same course as ECEN 6840 & PHYS 6840)

CHEM 6850*
Photonics III: Microscopy II. 1 credit, max 4, Lab 1. Prerequisite(s): 3553 or consent of instructor. Advanced techniques of scanning probe microscopy (SPM). Magnetic force microscopy, Kelvin force microscopy, scanning tunneling microscopy (STM) in vacuum. Characterization of materials with SPM. Nanolithography with SPM. Device manufacturing and analysis. (Same course as ECEN 6850 & PHYS 6850)

CHEM 6860*
Photonics III: Microscopy III and Image Processing. 1 credit, max 4, Lab 1. Prerequisite(s): ECEN 5793. Digital image processing, including projects. Image acquisition and display, image enhancement, geometric operations, linear and nonlinear filtering, image restoration, edge detection, image analysis, morphology, segmentation, recognition, and coding/compression. (Same course as ECEN 6860 & PHYS 6860)

CHEM 6870*
Photonics IV: Synthesis and Devices I. 1 credit, max 4, Lab 1. Prerequisite(s): 6803 and 6840. Preparation of functional nanostructures and related optical and electronic devices. Physical and chemical methods of thin film deposition. Engineering of prototypes of light emitting diodes, sensors, optical limiting coatings, lithographic patterns. (Same course as ECEN 6870 & PHYS 6870)

CHEM 6880*
Photonics IV: Semiconductor Devices, Testing and Characterization. 1 credit, max 4, Lab 1. Prerequisite(s): 6803. Test and characterization of semiconductor and optoelectronic devices. Hall Effect, four point probe, CV and IV measurements, optical pump-probe, photoluminescence and electro-optics sampling. (Same course as ECEN 6880 & PHYS 6880)

CHEM 6890*
Photonics IV: Semiconductor Synthesis and Devices III. 1 credit, max 4, Lab 1. Prerequisite(s): 6803. Processing, fabrication and characterization of semiconductor optoelectronic devices in class 100/10000 clean rooms. Clean room operation, including general procedure for material processing and device fabrication. Device processing using a variety of processing such as mask aligner, vacuum evaporators and rapid thermal annealer. Testing using optical and electrical testing apparatus such as I-V, C-V, Hall and optical spectral measurement systems. (Same course as ECEN 6890 & PHYS 6890)

CIVIL ENGINEERING (CIVE)

CIVE 3413
Structural Analysis. Lab 3. Prerequisite(s): ENSC 2143. Analysis of internal forces and deflections of structures subjected to static loading. Beams, trusses, and framed structures analyzed by appropriate classical methods. Classical methods and modern computer procedures for the analysis of statically indeterminate structures.

CIVE 3513
Structural Steel Design. Lab 3. Prerequisite(s): 3413. Introduction to the design of structural steel members and connections in accordance with AISC specifications.

CIVE 3523
Reinforced Concrete Design. Lab 3. Prerequisite(s): 3413. Introduction to the design of reinforced concrete elements in accordance with the strength design requirements of the ACI Building Code.

CIVE 3614
Engineering Surveying. Lab 3. Prerequisite(s): MATH 1613 or 1715. Principles and techniques of vertical and horizontal measurements related to engineering and construction projects. Linear and angular measurements, differential leveling, traverses, topographic surveys, construction surveying, horizontal and vertical curves, earthwork quantities and design of route systems.

CIVE 3623
Engineering Materials Laboratory. Lab 3. Prerequisite(s): 3713 or concurrent. Basic construction materials including Portland cement concrete, asphalt concrete, aggregates, and composite materials. Behavioral characteristics, use, and quality control of these materials. Basic statistical procedures used for material specifications. Laboratory sessions provide "hands on" experience in performing standard tests.

CIVE 3633
Transportation Engineering. Prerequisite(s): 3614 or consent of instructor. Planning, design and operations of transportation facilities. Vehicle characteristics and human factors in design. Traffic stream variables and their measurement techniques. Basic traffic flow models. Highway and street intersection capacity and level of service. Traffic control concepts. Transportation systems management. Application of statistical analysis and operations research to analyze transportation problems.

CIVE 3713
Geotechnical Engineering. Prerequisite(s): ENSC 2143. Physical and mechanical properties of soils, including specific gravity, grain size distribution, plasticity, permeability, consolidation, and shear strength. Use of physical and mechanical properties to calculate stresses in a soil mass, lateral earth pressures, bearing capacity, and slope stability. Application of physical and mechanical properties to design of foundations, retaining structures and slopes.

CIVE 3813
Environmental Engineering Science. Prerequisite(s): CHEM 1414 or 1515, MATH 2144. Engineering aspects of the life support system; the carbon-oxygen cycle; cycling of nitrogen, sulfur and phosphorus; and the hydrologic cycle. Concepts of environmental pollution and degradation. Techniques for mitigation; water and wastewater treatment, solid and hazardous waste management, and air pollution abatement. Calculation of pollution potential and treatment system parameters.

CIVE 3833
Applied Hydraulics. Prerequisite(s): CHEM 1414 or 1515, ENSC 3233, PHYS 2014. Basic hydraulic principles and their application in civil engineering problems. Analyses of water distribution networks, open channels, storm-water management and wastewater collection systems, water pumps, hydraulic models, hydraulic measurements, treatment plant hydraulics and hydraulic structures.

CIVE 3843
Hydrology I. Prerequisite(s): CHEM 1414 or 1515, ENSC 3233, PHYS 2014. Basic principles of surface groundwater hydrology and their application in engineering problems. The hydrologic cycle, weather and hydrology, precipitation, evaporation, transpiration, subsurface waters, stream flow hydrographs, hydrologic and hydraulic stream routing, probability of hydrologic events, application of hydrologic models.

CIVE 3853
Environmental Engineering Laboratory. Lab 3. Prerequisite(s): 3813. Performance of experiments with benchscale environmental engineering unit operations, review of chemical principles and analyses important to the evaluation of these and other environmental engineering applications. Emphasis on the development of experimental results that can be used in the design of full-scale units.

CIVE 4010*
Civil Engineering Research. 1-4 credits, max 12. Prerequisite(s): Senior standing or consent of instructor. Research and investigation of civil engineering problems.

CIVE 4042
Engineering Practice. Prerequisite(s): Senior standing or consent of instructor. Topics relevant to the professional practice of civil and environmental engineering. Written communications skills are stressed. Resumes, letters of introduction and job interviews are discussed in detail. Management principles and project management are introduced. The advantages of professional registration and professional and technical society membership are covered. Laws impacting the practice of engineering such as OSHA and ADA are introduced. Other topics such as professional ethics, income taxes and investments are discussed.

CIVE 4043
Senior Design. Prerequisite(s): 3513, 3523, 3713, senior standing. Major comprehensive design experience using the team approach. Industry practitioners provide design projects and analyze and critique results. Extends the undergraduate experience and provides the student with opportunities to analyze and design complex structures.

CIVE 4143*
Environmental Engineering Design. Prerequisite(s): 3833, 3853, 4833. Factors involved in the design of engineered environmental systems. Solving "real world" environmental engineering problems. Design experience using decision-making techniques, integrating and expanding upon current knowledge, and defending engineering decisions made. Economic, environmental, social, and regulatory aspects of environmental engineering design.

CIVE 4273*
Construction Engineering and Project Management. Lab 3. Prerequisite(s): Senior standing and consent of instructor. Principles and practice of construction engineering and project management. Project planning, development of cost estimates and project schedules, construction methods and fundamental terminology used in the engineering and construction industry.

CIVE 4711*
Basic Soils Testing Laboratory. Lab 3. Prerequisite(s): 3713. Laboratory measurement of the physical and mechanical properties of soils; specific gravity, grain size distribution, plasticity, compaction, compressibility, and shear strength.

CIVE 4823*
Human Impact on the Environment. The activities of humans and how they affect the aqueous, terrestrial, and atmospheric environment.

CIVE 4833*
Unit Operations in Environmental Engineering. Prerequisite(s): 3813, ENSC 3233. Fundamental principles of water and wastewater treatment, including basic theory and development of design parameters. Application of these to the design of unit operations and processes in various treatment plants.

CIVE 5000*
Master's Thesis or Report. 1-6 credits, max 6. Prerequisite(s): Graduate standing. A student studying for a master's degree will enroll in this course for 2 credit hours if a report is to be written; 6 credits if a thesis is to be written.

CIVE 5010*
Civil Engineering Seminar. 1-3 credits, max 6. Prerequisite(s): Graduate standing and approval of major professor. Review of literature of major fields of civil engineering.

CIVE 5013*
Aquatic Chemistry. Prerequisite(s): 5813 or concurrent enrollment, CHEM 1515 or equivalent. Application of chemical principles to environmental problems. Chemical kinetics, chemical equilibrium, acid-base chemistry, development of pc-pH diagrams, and coordination chemistry. Precipitation and dissolution reactions and oxidation-reduction reactions.

CIVE 5020*
Civil Engineering Research. 1-6 credits, max 6. Prerequisite(s): Graduate standing and approval of major professor. Research and investigations other than thesis studies.

CIVE 5023*
Public Health Engineering. Protection of public health through improved environment in urban, suburban, and rural communities. Practical examples, simple formulas, general rules and guidelines for application of public health principles. Intended for students in engineering, physical sciences and other technical disciplines.

CIVE 5030*
Engineering Practice. 1-6 credits, max 9. Prerequisite(s): Approval of adviser. Professional supervised civil engineering practice involving authentic projects for which the student assumes a degree of professional responsibility. Activities must be approved in advance by the student's adviser and may consist of engineering experience on-campus or off-campus, or both. *Periodic reports, both oral and written, are required as specified by the adviser.*

CIVE 5080*
Engineering Problems. 1-3 credits, max 6. Prerequisite(s): Graduate standing. Problems of particular interest to graduate students in the field of applied science.

CIVE 5103*
Construction Simulation. Prerequisite(s): Graduate standing or consent of instructor. This course introduces students to effective ways of modeling construction processes and technologies. It provides an investigation of quantitative methods used for the design and analysis of construction operations to maximize productivity and minimize resource idleness. It includes discussions on queueing theory, line-of-balance techniques, linear programming and simulation. Comprehensive group projects that involve modeling and analyzing actual construction operations will be integral parts of this course.

CIVE 5113*
Construction Business Management. Prerequisite(s): Graduate standing or consent of instructor. Fundamental theories and applied methods of financial management of construction companies. The spectrum of the present and future practice of business management at the construction company level. Basic construction business operations in the context of construction accounting, financial management, cash flow analysis, financial planning, and risk analysis.

CIVE 5123*
The Legal and Regulatory Environment of Engineering. Prerequisite(s): Junior, senior or graduate standing. The U.S. and Oklahoma court systems. Tort law and labor law having an impact on engineering and construction. Union organization and activities. Government contracting and the laws governing it. Discussions of the Occupation Safety and Health Act and Americans with Disabilities Act. In-Depth look at environmental policy, laws, and regulations affecting engineering, including NEPA, CWA, SDWA, RCRA, CERCLA and CAA Water law.

CIVE 5133*
Construction Contracts and Specifications. Prerequisite(s): Graduate standing or consent of instructor. The nature of contracts. Contract documents. Master format. Principles of specification writing. Contract types. Bonds and insurance. Bidding. Subcontracting. Disputes and disputes resolution.

CIVE 5143*
Project Engineering and Management. Prerequisite(s): Graduate standing or consent of instructor. Management of the design and construction of civil engineering projects. Topics include owner's study, formation of project teams, design coordination, construction, and project closeout.

CIVE 5153*
Contract Administration. Prerequisite(s): Graduate standing or consent of instructor. Methods and techniques of tracking and control of construction projects. Evaluation of current research findings to contract implementation.

CIVE 5163*
Construction Equipment Management. Prerequisite(s): Graduate standing or consent of instructor. Analysis of construction equipment. Performance under various operating conditions. Application of engineering fundamentals to construction methods. Selection and costs of equipment, prediction of equipment production rates, and unit costs of work in place.

CIVE 5173*
Concrete Formwork Design. Prerequisite(s): Graduate standing or consent of instructor. Design of formwork for concrete structures. Analysis of loads, deflections, and stresses of forming systems. Evaluation of economics of formwork designs.

CIVE 5183*
Construction Estimating. Lab 2. Prerequisite(s): Graduate standing or consent of instructor. The construction industry, its makeup, operation, estimating, and bidding procedures. Theory and practice of estimating materials, labor, equipment, and overhead costs for various types of construction. Emphasis on preliminary cost estimates during the conceptual design phase of a construction project.

CIVE 5243*
Use and Design of Geosynthetics. Prerequisite(s): 3713, 4711. Description of types of geosynthetics available for engineering uses. Pertinent engineering properties required to design for various functions, basic design methodology for geosynthetics for various functions, and construction and performance considerations.

CIVE 5263*
Terrain Analysis. Prerequisite(s): Basic courses in soil mechanics and geology. Prediction of geotechnical engineering characteristics of geological landforms from remote sensing imagery. Emphasis on photographic stereo interpretation. Training and practice of this media in land-use applications and environmental problems.

CIVE 5303*
Systems Analysis for Civil Engineers. Prerequisite(s): Senior or graduate standing. Synthesis of systems modeling and simulation techniques, mathematical optimization procedures, and evaluation tools of multi-attributed systems including utility theory and decision analysis. Mathematical optimization techniques in the areas of resource allocation, transportation and water resources systems planning, structural design, construction management, and environmental and ecological problems.

CIVE 5313*
Highway Traffic Operations. Prerequisite(s): 3633. Level of service, capacity and service volume concepts. Operational characteristics of uninterrupted-flow and interrupted-flow traffic facilities. The 1985 HCM procedures for analyzing the capacity of freeways, multilane and two-lane rural highways, urban arterials, signalized and unsignalized street intersections, and transit and pedestrian facilities. Administrative and planning actions for congestion management. Design alternatives and improvement strategies for effective use of urban arterial street width.

CIVE 5343*
Urban Transportation Planning. Prerequisite(s): 3633. Determinants of demand for transportation and models for demand forecasting. Performance characteristics of transportation systems and models for performance. Quantitative analysis of multimodal transportation networks including prediction of flow patterns and service quality. Evaluation of social, environmental, and political impacts of transportation decisions. Application of systems analysis techniques to the generation, evaluation, and selection of alternative transportation systems.

CIVE 5363*
Design and Planning of Airports. Prerequisite(s): 3633. Nature of civil aviation. Aircraft characteristics and performance related to airport planning and design. Air traffic control and navigation systems. Basics of airport planning and airport demand forecasting. Analysis of airport capacity and delays. Runway length requirements. Configuration and geometric design of runways, taxiways, holding aprons, and landing areas. Airport lighting, marking, and signing. Drainage and noise control.

CIVE 5373*
Design of Traffic Control Systems. Prerequisite(s): 3633. Traffic control systems design, available technological options, and range of agency needs. Design of vehicle detectors, controllers, communications links, signal display hardware, and wiring. Development of timing plans using computer simulation models. Freeway surveillance and control: ramp metering, incident detection, and motorist information systems. Preparation of contractual documents and construction supervision.

CIVE 5383*
Geometric Design of Highways. Prerequisite(s): 3633. Geometric, functional, and aesthetic aspects of roadway design. Alignment, sight distance, at-grade intersections, interchanges, and freeway systems. Design tools and techniques.

CIVE 5403*
Advanced Strength of Materials. Prerequisite(s): 3413. General states of stress and strain, theories of failure, energy principles, beam bending, shear center, torsion of prismatic shafts, beams on elastic foundations, plates and shells, elastic stability.

CIVE 5413*
Classical Methods of Structural Analysis. Prerequisite(s): 3413. Advanced analysis of indeterminate frames, trusses and arches by classical, numerical, and energy methods with emphasis on methods for hand computations.

CIVE 5423*
Matrix Analysis of Structures. Prerequisite(s): Consent of instructor. Matrix analysis of two- and three-dimensional trusses and frames. Development of member stiffness matrices. Assemblage of structure matrices by direct stiffness method. Computer programs for structural analysis.

CIVE 5433*
Energy Methods in Applied Mechanics. Prerequisite(s): 3413, MATH 2233 or MAE 3323. Advanced structural mechanics from the standpoint of virtual work; energy principles and variational calculus applied to the analysis of structures, mechanisms, dynamics, and vibrations.

CIVE 5443*
Theory of Elastic Stability. Prerequisite(s): 5403. General theory of elastic stability; buckling of columns; analysis of beam-columns; stability analysis of structural frames, thin-walled beams of open cross-section, and plate structures.

CIVE 5453*
Engineering Analysis. Prerequisite(s): Senior standing and consent of instructor. Advanced, classical mathematical skills for engineers. Dimensional analysis, general tensor analysis, curvilinear coordinates, partial differential equations, perturbation theory, integral equations, special functions, eigen function analysis, integral transform methods, variational methods.

CIVE 5503*
Computer-aided Structural Analysis and Design. Prerequisite(s): 3413; 3513 and 3523 (or concurrent enrollment); senior or graduate standing. Major comprehensive design experience. Promotion of a design office atmosphere in using a team approach. Industry practitioners provide design projects and critique results. Analysis and design of complex structures and preparation of contract documents and drawings. Emphasis on modern computer-based computation and presentation tools.

CIVE 5513*
Advanced Reinforced Concrete Design. Prerequisite(s): 3523. Advanced topics in reinforced concrete design with emphasis on frames, slabs, and earthquake-resistant structures.

CIVE 5523*
Advanced Steel Structure Design. Prerequisite(s): 3513. Advanced topics in steel design such as plastic design, plate girders, composite design, fatigue and fracture, stability, and bracing design.

CIVE 5533*
Prestressed Concrete. Prerequisite(s): 3523. Design of simple and continuous prestressed concrete beams. Behavior under overload. Calculation of prestress losses and deflections.

CIVE 5653*
Asphalt Materials and Mix Design. Lab 1.5. Prerequisite(s): 3633 or consent of instructor. Principles of asphalt concrete mix design including material characteristics and performance. Evaluation of Hveem and Marshall mix design methods. Asphalt cements, rubberized asphalt polymer asphalts, emulsions, cutbacks, and aggregates. Laboratory sessions focused on the engineering properties of the materials discussed.

CIVE 5673*
Concrete Materials and Mix Design. Lab 1.5. Prerequisite(s): Senior or graduate standing. Principles of concrete mix design, including material characteristics, strength and durability requirements, environmental effects and forensic analysis. ACI and PCA mix design procedures. Laboratory on theoretical and practical aspects of concrete technology.

CIVE 5693*
Pavement Design and Analysis. Prerequisite(s): 3633 or consent of instructor. Principles of pavement design, including stress analyses, load and environmental effects, and material characteristics. AASHTO, PCA and AI methods of pavement design. Computer methods. Practical aspects of life cycle cost analyses and construction methods.

CIVE 5703*
Soils in Construction. Prerequisite(s): 3713, 4711 or consent of instructor. Soil types and general behavior during construction; earthwork construction requirements and specific considerations for embankments, pavements, buildings, and retaining structures; groundwater control during construction; soil modification and stabilization; and construction considerations for geosynthetics. Basic design considerations, including selection of placement conditions for compaction; proportioning of groundwater control systems; selection of type and amount of soil modifier and design of geosynthetics to meet specific functions.

CIVE 5713*
Soil Mechanics. Prerequisite(s): 3713 and 4711. Application of soil mechanics principles and concepts in geotechnical areas of permeability and seepage, settlement analysis, bearing capacity, lateral earth pressures and retaining walls, slope stability, and metastable soils.

CIVE 5723*
Foundation Engineering. Prerequisite(s): 3713 and 4711. Types of structural foundations including footings, mats, rafts, piles and drilled shafts. Site characteristics, exploration programs, field data, test results and construction materials and methods as basis for selection of type of foundation and design. Geotechnical design procedures and considerations.

CIVE 5733*
Rock Mechanics in Engineering Design and Construction. Prerequisite(s): Undergraduate courses in soils and geology. Stresses, strength variations, and deformational behavior of rock. Engineering classification of rock. Methods of field and laboratory measurement of the engineering properties of rock. Rock mechanics consideration in the design and construction of engineering works.

CIVE 5753*
Engineering Soil Stabilization. Prerequisite(s): 3713 and 4711. Theoretical and practical aspects of engineering soil stabilization as a method for improving and upgrading low quality and unstable soils for engineering purposes. Use of lime, fly ash, portland cement, asphalt, and other physical and chemical admixtures. Application of deep foundation stabilization methods such as preloading, deep compaction, injection and reinforcement.

CIVE 5803*
Essentials of Environmental Engineering. Prerequisite(s): CHEM 1314 or 1515; MATH 2155. Engineering aspects of the life support system; the carbon-oxygen cycle; cycling of nitrogen, sulfur and phosphorus; and the hydrologic cycle. Concepts of environmental pollution and degradation. Techniques for mitigation; water and wastewater treatment, solid and hazardous waste management, and air pollution abatement. Calculation of pollution potential and treatment system parameters.

CIVE 5813*
Environmental Laboratory Analysis. Lab 3. Prerequisite(s): 4833 or concurrent enrollment. Analytical procedures for water and waste water contaminants. Emphasis on the chemical theory of procedures, analytical work and an understanding of the significance or need for such laboratory data for surface and groundwater management and water and wastewater treatment processes and design.

CIVE 5823*
Environmental Risk Assessment and Management. Prerequisite(s): Introductory class in statistics and background in engineering, management or science. Environmental risk assessment and management. Applies elements of statistics, probability and environmental simulation to determine the public health and ecological risks from activities of humans.

CIVE 5833*
Introduction to Environmental Modeling. Intended as an introductory course for graduate and senior undergraduate students to the fundamentals of environmental modeling. Develops material necessary to construct models capable of identifying contaminant distributions at future times and space for water and air pollution applications. Advanced topics such as stochastic modeling, ecological risk assessment, neural modeling and spatial statistical analysis among others will be presented according to the backgrounds and interests of the enrolled students. In part, the course is designed as the "Physical Science" component for MS students in the Environmental Sciences program.

CIVE 5853*
Bioremediation. Prerequisite(s): 3813 or equivalent science background. Process selection and design of bioremediation systems for renovation of contaminated hazardous and industrial waste sites, soils, sludge. Site analysis emphasizing contaminant and environmental characteristics. Engineering factors to promote successful bioremediation. Design project required.

CIVE 5863*
Advanced Unit Operations in Environmental Engineering. Prerequisite(s): 4833. Theory and design of advanced physical-chemical water and wastewater treatment processes applied to municipal, industrial, and hazardous waste situations.

CIVE 5873*
Air Pollution Control Engineering. Causes, effects, and control of atmospheric pollution. (Same course as CHE 5873*)

CIVE 5883*
Residuals and Solid Waste Management. Theory, design and operation of systems for handling, treatment, and disposal of process sludge (water treatment, wastewater treatment, industrial) and solid wastes. Potential material reclamation options.

CIVE 5913*
Groundwater Hydrology. Prerequisite(s): 3843. Theory of groundwater movement, storage, exploration and pumping tests. Design of groundwater recovery and recharge systems.

CIVE 5923*
Water Resources Planning and Management. Application of engineering economics and microeconomic theory to the planning and management of water resources projects, including flood control, hydroelectric, water supply, and urban storm water. Systems analysis approaches, primarily linear and dynamic programming, and their application in water resources.

CIVE 5933*
Water Treatment. Prerequisite(s): 4833. Theory, design, and operation of water treatment plants. Sizing of various unit processes. Water treatment plant control procedures.

CIVE 5953*
Biological Waste Treatment. Lab 3. Prerequisite(s): 4833 or equivalent. Fundamentals of microbial systems applied to waste treatment processes. Standard suspended-growth and fixed biofilm wastewater and sludge suspensions and treatment system design calculations.

CIVE 5963*
Open Channel Flow. Prerequisite(s): 3833. Open channel hydraulics, energy and momentum concepts, resistance, channel controls and transitions, flow routing, and sediment transport.

CIVE 5983*
Groundwater Pollution Control. Theory, design and operation of groundwater pollution control systems. Includes examples from site specific applications as well as regional or national focus.

CIVE 5993*
Environmental Data and Analysis and Modeling. Prerequisite(s): 5913 or equivalent. Identification and application of various methods to analyze environmental data. Includes statistical, mathematical, and neural modeling. Emphasis on application of geostatistics to spatial environmental problems; including construction modeling semivariogram, kriging, co-kriging, and indicator kriging problems. Deterministic and stochastic simulation methods addressed, including conditional and Monte Carlo simulation with discussions of the inverse problems. More conventional statistical evaluations of environmental monitoring data including trend analysis and sampling adequacy or redundancy.

CIVE 6000*
PhD Research and Thesis. 1-16 credits, max 30. Independent research under the direction of a member of the graduate faculty by students working beyond the level of Master of Science degree.

CIVE 6010*
Seminar. 1-6 credits, max 12. Prerequisite(s): Consent of instructor and approval of the student's advisory committee. Analytical studies with suitable reports on problems in one or more of the subfields in civil engineering by students working beyond the level of Master of Science degree.

CIVE 6403*
Theory of Elasticity. Stress, strain, and deformation analysis of two- and three-dimensional elastic continua. Propagation of stress waves through elastic continua.

CIVE 6413*
Plate and Shell Structures. Prerequisite(s): 5403. Bending of thin plate structures to include rectangular and circular plates. Analysis of orthotropic plates by classical and numerical methods. Introduction to shell bending theory.

CIVE 6843*
Stochastic Methods in Hydrology. Prerequisite(s): STAT 4073 or 4033. Stochastic and statistical hydrologic analyses of surface water and ground water systems. Analyses of urban and rural drainage and detention systems. (Same course as BAE 6313)

CIVE 6853*
Modeling of Water Resources Systems. Prerequisite(s): 5913. Application of finite-difference and finite-element methods to predict water flow and chemical and biological water quality in saturated-unsaturated ground waters, streams, lakes, urban areas, and watersheds.

CIVE 6923*
Industrial Wastes Engineering. Prerequisite(s): Graduate standing. Theory and methods of waste minimization, waste product reduction or reuse; process changes and treatment of residuals to reduce volume and toxicity of industrial wastes.

CIVE 6953*
Advanced Biological Waste Treatment. Prerequisite(s): 5953. Advanced biological treatment processes and new process developments. Nutrient management, anaerobic wastewater treatment, hazardous waste bioremediation, land treatment, and macrophyte systems. Use of kinetic models for system design.

COMMUNICATION SCIENCES AND DISORDERS (CDIS)

CDIS 2033
Sign Languages. Introduction to methods of sign language currently used among the U.S. deaf society, socially and educationally, including traditional American Sign Language (ASL), Manually Coded English (MCE, SEE), and fingerspelling. Linguistic components of sign and various sociological, psychological and adaptive communication issues having an impact on the deaf community. Two hours per week devoted to lecture and theory; one hour involved in a variety of interactive sign language skill work in smaller groups.

CDIS 3123
Audiology and Audiometry. Anatomy and physiology of the hearing mechanism and related physics of sound. Common etiologies of hearing disorders. Establishing hearing screening programs. Practical experience in pure tone audiometry and impedance screening.

CDIS 3213
Introduction to Communication Disorders. The normal development of speech, language and hearing. The characteristics, diagnosis and treatment of speech, language and hearing disorders among all age groups. Suggestions for related professions involved with people with communication disorders.

CDIS 3223
Speech and Language Development. Normal acquisition of phonology, morphology, semantics, syntax, and pragmatics in children. Biological and cognitive social bases of language acquisition. Description of dialect variations, second language acquisition, and atypical language development. The relationship between spoken and written language development.

CDIS 3313
Phonetics. The analysis and description of speech at the segmental and suprasegmental levels. Development of students' perceptual and analytical skills in speech sound production. Practice using the International Phonetic Alphabet for broad and narrow transcription. Overview of the speech production mechanism and process.

CDIS 4010
Clinic Practicum. 1-3 credits, max 3, Lab 2-6. Prerequisite(s): 4022, 4031, 4323 or 4413, senior standing, 3.25 GPA in the major and consent of adviser. Supervised clinical practicum in speech-language pathology and audiology.

CDIS 4022
Clinical Methods and Issues. Prerequisite(s): 3213, 3223, 3313; acceptance into pre-professional program via Declaration of Intent in CDIS. Fundamental process and procedures of clinical practicum, report writing, goal selection; production, assessment and recording of speech and language behaviors; development of interpersonal skills with clients, families, and other professionals; problem solving skills; professional organization and credentialing requirements.

CDIS 4133
Aural Rehabilitation. Prerequisite(s): 3123. Clinical aspects of habilitation and rehabilitation programs for the deaf and the hard-of-hearing, including speech reading, auditory training, speech conservation, speech and language therapy, hearing aid orientation, and counseling. Study of amplification units including assistive listening devices.

CDIS 4213
Anatomy and Physiology of the Speech Mechanism. Structure and function of the respiratory, phonatory, articulatory, and neural systems involved in the oral communication processes.

CDIS 4222*
Language Analysis. Prerequisite(s): 3224, and one of: FLL 2443, ENGL 2443, 4003, 4013, 4063, 4093. Applications of content, form and use analysis methods to language samples of individuals with communication disorders. Analyses of word, phrase, sentence, and discourse levels. Variations as a function of age, culture, modality (spoken or written), and disorder type.

CDIS 4253*
Diagnostic Procedures in Communication Disorders. Prerequisite(s): 3224. Speech and language diagnostic testing and procedures, interpreting diagnostic information and deriving appropriate treatment goals.

CDIS 4313*
Speech Science. Prerequisite(s): Acceptance into CDIS program. Scientific bases of the acoustic parameters, the perceptual and productive processes of speech, and the interrelationships of those factors during speech communication.

CDIS 4323
Language Disorders in Children. Prerequisite(s): 3223. Principles of language assessment, diagnosis, intervention; goal selection and procedural processes for language intervention with infants, toddlers and preschool-age children.

CDIS 4413
Speech Disorders in Children. Prerequisite(s): 3223 or concurrent enrollment; 3313. Current theories and research in clinical phonology and applied linguistics related to phonological disorders in children. Normal development and contemporary approaches to assessment and treatment. Lecture, discussion, projects and clinical observation.

CDIS 4423
Neural Bases of Speech and Language. Prerequisite(s): 4213. Neuroanatomy and neuro-physiological processes related to speech and language. Including basic anatomy of the central and peripheral nervous systems and the physiological processes involved in neuromotor control and neuronal function related specifically to speech and language.

CDIS 4980
Independent Study in Communication Sciences and Disorders. 1-3 credits, max 3. Prerequisite(s): Junior standing and consent of instructor. Directed readings or research in communication sciences and disorders.

CDIS 4993
Senior Honors Thesis. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis under the direction of a faculty member. Required for graduation with departmental honors in communication sciences and disorders.

CDIS 5000*
Research and Thesis. 1-3 credits, max 6. Prerequisite(s): Consent of graduate faculty. Research in speech, language and hearing sciences and disorders.

CDIS 5013*
Research Methods in Communication Disorders. Research methods with emphasis on methods used most frequently in communication sciences and disorders; experience devising, evaluating, and implementing research.

CDIS 5113*
Advanced Language Disorders in Children. Prerequisite(s): 3223, 4323. Principles of language assessment and intervention based on linguistic, cognitive, and social learning theories. Critical analysis of current research. Design of assessment and intervention programs.

CDIS 5123*
Clinical Audiology. Prerequisite(s): 4133, 4313. Hearing disorders and their etiologies. Clinical application of pure tone and speech audiometric tests and impedance screening. Clinical management of the hearing impaired. Central auditory processing disorders diagnosis and management.

CDIS 5143*
Phonological Disorders. Prerequisite(s): 4413. Current issues in linguistic theories related to the assessment and treatment of phonological disorders in children. Critical analysis of current research.

CDIS 5153*
Neurological Communication Disorders. Prerequisite(s): 4213. Communication changes occurring with aging and common neurological diseases and trauma. Neurophysiological bases and etiology. Evaluation and treatment of aphasia and right hemisphere disorders.

CDIS 5163*
Dysphagia. Prerequisite(s): 4213. Anatomy and neurophysiology of the swallowing mechanism in relation to pediatric and adult dysphagia. Evaluation, diagnosis and treatment of swallowing problems in children and adults including videofluoroscopic training with case studies. The first two-thirds of the course focus on adult dysphagia and the latter one third on pediatric dysphagia.

CDIS 5183*
Traumatic Brain Injury and Dementia. Nature, evaluation and treatment of acquired cognitive communication disorders secondary to traumatic injury or dementia.

CDIS 5193*
Motor Speech Disorders. Nature, evaluation and treatment of neurologically-based motor speech disorders such as dysarthria and apraxia.

CDIS 5210*
Advanced Practicum. 1-6 credits, max 9. Prerequisite(s): Consent of instructor. Practical experience for the advanced student on or off campus.

CDIS 5232*
Communication Disorders in Infants and Toddlers. Prerequisite(s): 3223. Family-centered assessment, intervention, and prevention issues with infants and toddlers, birth to 3 years of age, who are at risk or have communication disorders. Impact of perinatal, neonatal and postnatal biological and environmental risks on developmental outcome.

CDIS 5243*
Language Disorders in School-Age and Adolescence. Prerequisite(s): 4323 and 5113. Nature of spoken and written language disorders in school-age children and adolescents. Impact of language disorders on academic achievement. Assessment and intervention strategies.

CDIS 5333*
Voice Disorders. Prerequisite(s): 4313. The physiology of the vocal mechanism and factors which cause voice deviations. Recent research on diagnostic and intervention procedures in a variety of disorders. Independent study, observations in medical settings, and special demonstrations.

CDIS 5422*
Adaptive Communication Systems. Prerequisite(s): Major in communication science and disorders or consent of instructor. Evaluation and management of communication disorders in individuals requiring specially adapted educational intervention programs. Adaptive communication technologies.

CDIS 5433*
Cleft Palate. Prerequisite(s): 4213, 4313. Recent research in the etiology, assessment and management of communicative disorders in individuals with cleft palate.

CDIS 5442*
Communication Disorders in Individuals with Developmental Delay. Prerequisite(s): 3223, 5113. Etiology, assessment and intervention considerations for communication disorders in children and adults with varying degrees of developmental delay.

CDIS 5710*
Special Topics in Communication Disorders. 1-4 credits, max 9. Prerequisite(s): Consent of instructor. Individual and group investigations of problems in communication sciences and disorders.

CDIS 5713*
Fluency Disorders. Prerequisite(s): Graduate admission or consent. Current research regarding the nature of etiologies, evaluation and treatment of dysfluent speech in both children and adults.

CDIS 5720*
Seminar in Communication Disorders. 1-3 credits, max 3. Prerequisite(s): Consent of instructor. Topics relevant to the evaluation and treatment of communication disorders presented on a rotating basis.

CDIS 5730*
Independent Study in Communication Sciences and Disorders. 1-3 credits, max 3. Prerequisite(s): Graduate standing and consent of instructor. Directed readings or research in communication sciences and disorders.

CDIS 5741*
Advanced Professional Issues. Prerequisite(s): 5731. Current legal, ethical, and clinical service provision issues for advanced practicum students in communication sciences and disorders.

CDIS 5742*
Multicultural Applications in Communication Disorders. Prerequisite(s): 3223 or consent of instructor. The study of communication differences and disorders in culturally and linguistically diverse individuals. Clinical applications in assessment and intervention. Case study and program design.

CDIS 5760*
Portfolio. 1-2 credits, max 2. Prerequisite(s): Graduate standing. Nature and preparation of professional portfolio with faculty guidance.

COMPUTER SCIENCE (CS)

CS 1003
Computer Proficiency. Lab 4. For students with minimal personal computer skills. Use of Internet and productivity software such as word processing, spreadsheets, databases, and presentation software. The ability to log on to a personal computer, access the OSU network, and access OSU Web sites is assumed.

CS 1103
(A)Computer Programming. Lab 2. Prerequisite(s): MATH 1513 or equivalent. Introduction to computer programming using a high-level computer language, including subprograms and arrays. Principles of problem solving, debugging, documentation, and good programming practice. Elementary methods of searching and sorting. Not intended for computer science majors.

CS 1113
(A)Computer Science I. Lab 2. Prerequisite(s): MATH 1513 or equivalent. Introduction to computer science using a block-structured high-level computer language, including subprograms, arrays, recursion, records, and abstract data types. Principles of problem solving, debugging, documentation, and good programming practice. Elementary methods of sorting and searching. Use of operating system commands and utilities.

CS 2133
Computer Science II. Prerequisite(s): 1113. Recursive algorithms. Intermediate methods of searching and sorting. Mathematical analysis of space and time complexity, worst case, and average case performance.

CS 2301
FORTRAN Programming. Prerequisite(s): Another programming language. FORTRAN control structures, arrays, subroutines, functions, input/output.

CS 2331
SAS Programming. Prerequisite(s): A different programming language or consent of instructor. SAS as a general purpose programming language. Data representation, input/output, use of built-in procedures, report generation. (Same course as STAT 2331)

CS 2351
UNIX Programming. Lab 2. Prerequisite(s): CS 1113 or EET 2303. The UNIX programming system. The programming environment. The UNIX file system and the shell. Use of pipes and filters.

CS 2433
C/C++ Programming. Prerequisite(s): 1113. C/C++ programming language types, operators, expressions, control flow, functions, structures, pointers, arrays, UNIX interface. Basic object oriented programming using C++ and the related language syntax and functionality.

CS 2570
Special Problems in Computer Science. 1-3 credits, max 6. Prerequisite(s): Consent of instructor and freshman or sophomore standing. Current topics and applications of computer science. Existing and new topics to computer science. Allows lower-division students to study topics not provided in existing classes. Can be individual study or a class with a new subject.

CS 3030
Industrial Practice in Computer Science. 1-6 credits, max 12. Prerequisite(s): 3443, MATH 2144, junior standing, consent of departmental adviser. Applied computing in industry. Topics vary with cooperating employers. Written reports will be specified by adviser.

CS 3363
Organization of Programming Languages. Prerequisite(s): 2133, 3443. Programming language constructs. Run time behavior of programs. Language definition structure. Control structures and data flow programming paradigms.

CS 3373
Advanced Object-Oriented Programming for Windowing Environments. Prerequisite(s): For CS students, 2133, 2433. For TCOM students, CS 4343 and a working knowledge of C++. Applying the object-oriented computing model to the design and development of software for windowing environments. Effective use of Graphical User Interfaces (GUIs), the Internet, data interchange principles, and related topics. *No credit for students with credit in 5373.* (Same course as 5373*)

CS 3423
File Structures. Prerequisite(s): 2133. Basic physical characteristics of peripheral storage devices. File organization and processing methods for sequential, direct, indexed, tree structured, and inverted files. Application of data structure concepts to logical and physical file organization: Performance analysis. Elements of advanced database systems.

CS 3443
Computer Systems. Prerequisite(s): 2133. Functional and register level description of computer systems, computer structures, addressing techniques, macros, linkage, input-output operations. Introduction to file processing operations and auxiliary storage devices. Programming assignments are implemented in assembly language.

CS 3513
Numerical Methods for Digital Computers. Prerequisite(s): MATH 2153; MATH 3013 or MATH 3263 and knowledge of programming. Errors, floating point numbers and operations, interpolation and approximation, solution of nonlinear equations and linear systems, condition and stability, acceleration methods, numerical differentiation and integration.

CS 3570
Special Problems in Computer Science. 1-6 credits, max 6. Prerequisite(s): Junior standing and consent of instructor. Current topics and applications of computer science. Existing and new topics to computer science. Allows lower-division students to study topics not provided in existing classes. Can be individual study or a class with a new subject.

CS 3613
Theoretical Foundations of Computing. Prerequisite(s): 2133, 3653. Introduction to the classical theory of computer science. Sequential machines and their applications to devices, processes, and programming. Models of computation: finite-state automata, push-down automata, Turing machines. The role of non-determinism. Limits of digital computation. Computability and unsolvability. The Church-Turing Thesis.

CS 3653
Discrete Mathematics for Computer Science. Prerequisite(s): MATH 2144. Theory and applications of discrete mathematical models fundamental to analysis of problems in computer science. Set theory, formal logic and proof techniques, relations and functions, combinatorics and probability, undirected and directed graphs, Boolean algebra, switching logic.

CS 4091*
Statistical Analysis System. SAS dataset construction, elementary statistical analysis, and use of statistics and graphics procedures available in the SAS package. (Same course as STAT 4091)

CS 4113
Techniques of Computer Science for Science and Engineering. Prerequisite(s): One year calculus and senior or graduate standing. For advanced undergraduate students requiring a one-semester treatment of computer topics. No background in computing topics assumed. Comprehensive treatment of the FORTRAN programming language with emphasis on numerical applications, number systems, finite arithmetic, iterative processes, program structuring, numerical methods, and program libraries. *No credit as a major elective for computer science majors.*

CS 4143*
Computer Graphics. Prerequisite(s): MATH 2163 and prior programming experience. Interactive graphics programming; graphics hardware; geometrical transformation; data structures for graphic representations; viewing in three dimensions; representation of 3D shapes; hidden edge and hidden surface removal algorithms; shading models.

CS 4154*
Computer Science Migration. Lab 2. Prerequisite(s): MATH 2144, knowledge of a programming language and senior standing. A survey of computer science for students whose major is not computer science. Programming in high level languages. Algorithm design and analysis. Fundamental data structures.

CS 4173*
Video Game Development. Prerequisite(s): 2133 and 2433 and MATH 2144. History of video games. A survey of various game platforms. Computer graphics, audio tools and techniques, and artificial intelligence for game development. Game engines. Game development tools and techniques. An overview of the video game industry from a development perspective.

CS 4183*
Video Game Design. Prerequisite(s): 2133 and 3653. Theory and pragmatics of game design including game mechanics, storytelling, and types of game play. The relationship between human/computer interaction and the user experience. A survey of game genres. An overview of the video game industry from a design perspective.

CS 4243
Algorithms and Processes in Computer Security. Prerequisite(s): 3443. Overview of the components of computer and network security. Discussion of external processes required in secure systems, information assurance, backup, business resumption. Detailed analysis of security encryption, protocols, hashing, certification, and authentication. *No credit for students with credit in CS 5243.*

CS 4273*
Software Engineering. Prerequisite(s): 2133, 3443 or ECEN 3213, 3653. Fundamental characteristics of the software life cycle. Tools, techniques, and management controls for development and maintenance of large software systems. Software metrics and models. Human factors and experimental design. (Same course as ECEN 4273)

CS 4283*
Computer Networks. Prerequisite(s): 2133, 3443 or ECEN 3213; UNIX knowledge. Computer networks, distributed systems and their systematic design. Introduction to the use, structure, and architecture of computer networks. Networking experiments to describe network topology. ISO reference model. (Same course as ECEN 4283)

CS 4323*
Design and Implementation of Operating Systems I. Prerequisite(s): 2133, 3443, 3653, 4343 or ECEN 3213. Process activation and process context block. Batch, multi-programmed, and timeshared operating system. Process management, memory management, and synchronization primitives. Deadlock prevention, avoidance, and detection.

CS 4343*
Data Structures and Algorithm Analysis I. Prerequisite(s): 2133, 3653. Storage, structures, data and information structures, list processing, trees and tree processing, graphs and graph processing, searching, and sorting.

CS 4443*
Compiler Writing I. Prerequisite(s): 2133, 3443. Syntax and semantics of procedure-oriented languages and theory of translation techniques used in their compilation. Study of languages for particular application areas, including nonalgebraic languages.

CS 4513*
Numerical Mathematics: Analysis. Prerequisite(s): MATH 2233, 3013, knowledge of programming or consent of instructor. Machine computing, algorithms, and analysis of errors applied to interpolation and approximation of functions solving equations and systems of equations; discrete variable methods for integrals and differential equations. (Same course as MATH 4513)

CS 4570*
Special Topics in Computing. 1-3 credits, max 5. Prerequisite(s): Senior standing and consent of instructor. Advanced topics and applications of computer science. Typical topics include operating systems, multiprocessor systems, programming systems or various mathematical and statistical packages. Designed to allow students to study topics not provided in existing courses.

CS 4793*
Artificial Intelligence I. Prerequisite(s): 2133, 3653. Broad coverage of core artificial intelligence (AI) topics, including search-oriented problem solving, knowledge representation, logical inference, AI languages, history and philosophy of AI.

CS 4883
Social Issues in Computing. Prerequisite(s): Senior standing and ENGL 3323 or BCOM 3113 or BCOM 3223. The history and evolution of computing systems, providing the background for the analysis of the social impact of computers. The social implications of computer use and or misuse with emphasis on the effects on the individual, society, and other human institutions. Social responsibilities of people involved in using or applying computers.

CS 4993
Senior Honors Project. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors project under the direction of a faculty member, with a second faculty reader and an oral examination. Required for graduation with departmental honors in computing and information science.

CS 5000*
Research and Thesis. 1-6 credits, max 6. Prerequisite(s): Consent of major professor. A student studying for a master's degree who elects to write a thesis or a report must enroll in this course.

CS 5030*
Professional Practice. 1-9 credits, max 9. Prerequisite(s): Graduate standing in computer science, consent of the department head. Experience in the application of computer science principles to problems encountered in industry and government. Participation in problem solving in the role of junior computer scientist, junior software engineer, or computer science intern. All problem solutions documented. *Required written report to the major professor.*

CS 5070*
Seminar and Special Problems. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Designed to allow students to study advanced topics not provided in existing courses.

CS 5113*
Computer Organization and Architecture. Prerequisite(s): 3443. Computer architecture, computer control, microprogrammed control, addressing structures, memory hierarchies, hardware description languages, specific architectures, hardware simulation, and emulation.

CS 5243*
Algorithms and Processes in Computer Security. Prerequisite(s): 3443. Overview of the components of computer and network security. Discussion of external processes required in secure systems, information assurance, backup, business resumption. Detailed analysis of security encryption, protocols, hashing, certification, and authentication. No credit for students with credit in 4243.

CS 5253*
Digital Computer Design. Prerequisite(s): ECEN 3223. Analysis and design of digital computers. Arithmetic algorithms and the design of the arithmetic/logic unit (ALU). Serial and parallel data processing; control and timing systems; microprogramming; memory organization alternatives; input/output interfaces. (Same course as ECEN 5253)

CS 5263*
Quantum Computing. Prerequisite(s): Graduate standing. The main theory of quantum information science and its applications to communications, computing and cryptography. Topics include introduction to quantum mechanics, quantum gates, circuits, entropy, cryptographic schemes, and implementations. Current technology in support of quantum processing will be reviewed.

CS 5273*
Advanced Software Engineering. Prerequisite(s): 4273. Continuation of 4273. Formal methods for software design and development. Static analysis. Emerging design and development approaches. Model checking and model-based software reuse. Component-based software engineering and software repositories. (Same course as ECEN 5273)

CS 5283*
Computer Network Programming. Prerequisite(s): 4283. Detailed technical concepts related to Internet and multimedia, high speed LANS, high speed transport protocols, MPLS, multicasting, Int. serv/ Diff serv, Router Buffer management, self-similar traffic, and socket programming.

CS 5313*
Formal Language Theory. Prerequisite(s): 3613. Formal language theory applied to procedure oriented languages. Application of finite state algorithms to lexical analysis. Chomsky hierarchy of languages. Generation, recognition, and closure properties of languages.

CS 5323*
Design and Implementation of Operating Systems II. Prerequisite(s): 4323. Task systems and concurrent programming, synchronization, and inter process communication. Theoretical investigation of resource sharing and deadlock, memory management, strategies, and scheduling algorithms, queuing theory, distributed operating systems. System accounting, user services and utilities.

CS 5333*
Compiler Writing II. Prerequisite(s): 4443. Continuation of 4443. Theory and practice of compiler writing techniques. Compiler writing systems. A formal approach to computer languages.

CS 5363*
Advanced Organization of Programming Languages. Prerequisite(s): 3363. Continuation of 3363, mathematical theory of computer language organization functional programming. Parallelism in languages. Mathematics of control structures and data structures. Applicative languages. Symbolic languages.

CS 5373*
Advanced Object-Oriented Programming for Windowing Environments. Prerequisite(s): For CS students, 2133, 2433. For TCOM students, CS 4343 and a working knowledge of C++. Applying the object-oriented computing model to the design and development of software for windowing environments. Effective use of Graphical User Interfaces (GUIs), the Internet, data interchange principles and related topics. *No credit for students with credit in 3373.* (Same course as 3373)

CS 5413*
Data Structures and Algorithm Analysis II. Prerequisite(s): 4154 or 4343. Data structures and their application in recursive and iterative algorithms. Static and dynamic data structure representations and processing algorithms. Dynamic and virtual storage management.

CS 5423*
Principles of Database Systems. Prerequisite(s): 3423, 4343 or equivalents. An overview of database management systems, entity-relationship model, relational model, structural query language, relational algebra, relational database design with normalization theorems, database integrity constraints, and principles of database systems with the Internet.

CS 5433*
Distributed Database Systems. Prerequisite(s): 5423, 4283 or 5283. Overview of relational database management systems (DBMS), distributed DBMS architecture, distributed database design, overview of query processing, introduction to transaction management, distributed concurrency control, and SQL server.

CS 5513*
Numerical Computation. Prerequisite(s): MATH 2233 and MATH 3013 or MATH 3263 or equivalent courses; CS 3513 or MATH 4513 or an equivalent course; a knowledge of computer programming. Errors in machine computation; condition of problems and stability of algorithms; interpolation and approximation; nonlinear equations; linear and nonlinear systems; differentiation and integration; applications to modeling, simulation, and/or optimization.

CS 5653*
Automata and Finite State Machines. Prerequisite(s): 5313. Sequential machines and automata. Hierarchy of recognizers. Decision problems and closure properties. Finite and infinite state machines. Cellular and stochastic automata. Coverings of automata.

CS 5663*
Computability and Decidability. Prerequisite(s): 5313. Primitive and partial recursive functions. Equivalence of models of computation. The Halting problem and undecidability. Reducing one problem to another or representation change. Tractability and the P-NP problem. Complexity hierarchies.

CS 5793*
Artificial Intelligence II. Prerequisite(s): 4793. Advance knowledge representation and expert system building, including reasoning under uncertainty. Applications to planning, intelligent agents, natural language processing, robotics, and machine learning.

CS 5813*
Principles of Wireless Networks. Prerequisite(s): 4283 or ECEN 4283. Wireless network operation, planning, mobility management, cellular and mobile data networks based on CDMA, TDMA, GSM, IEEE 802-11 WLANS, Adhoc networks, Bluetooth, power management, wireless geolocation and indoor positioning techniques. (Same course as ECEN 5563)

CS 5823*
Network Algorithmics. Prerequisite(s): 4283 and 4323. Discusses principles of efficient network implementation-router architecture, end node architecture, data copying, timer maintenance, demultiplexing, forwarding table, lookups, switching, scheduling, IP traceback.

CS 6000*
Research and Dissertation. 2-15 credits, max 30. Prerequisite(s): Graduate standing and approval of advisory committee. Independent research under the direction of a member of the graduate faculty. *For students working toward a PhD degree.*

CS 6240*
Advanced Topics in Computer Organization. 2-6 credits, max 12. Prerequisite(s): 5113 and 5253. Structure and organization of advanced computer systems, parallel and pipeline computers, methods of computation, alignment networks, conflict-free memories, and bounds on computation time.

CS 6253*
Advanced Topics in Computer Architecture. Prerequisite(s): 5253 or ECEN 5253. Innovations in the architecture and organization of computers, with an emphasis on parallelism. Topics may include pipelining, multiprocessors, data flow, and reduction machines. (Same course as ECEN 6253)

CS 6300*
Advanced Topics in Programming Languages. 2-6 credits, max 12. Prerequisite(s): 5313. Interpreter models of programming language semantics, Vienna definition language, lambda calculus, LISP definition; Knuth semantic systems and their formulation, translational and denotational semantics. *May be repeated with change of topics.*

CS 6350*
Advanced Topics in Operating Systems. 2-6 credits, max 12. Prerequisite(s): 5323. Design and analysis of operating systems. Concurrent processes, server scheduling, models of auxiliary storage, memory management, virtual systems, and performance algorithms. *May be repeated with a change in topics.*

CS 6400*
Advanced Topics in Information Systems. 2-6 credits, max 12. Prerequisite(s): 5413, 5423. Principles of distributed database systems. Overview of relational database management systems (DBMS) and computer networks, distributed DBMS architecture, distributed database design, distributed concurrency control, query processing and distributed DBMS reliability.

CS 6500*
Advanced Topics in Numerical Analysis. 2-6 credits, max 12. Prerequisite(s): MATH 5543, 5553. Systems of nonlinear equations, nonlinear least squares problems, iterative methods for large systems of linear equations, finite element methods, solution of partial differential equations. *May be repeated with change of topics.*

CS 6600*
Advanced Topics in Analysis of Algorithms. 2-6 credits, max 12. Prerequisite(s): 5413. Analysis of various algorithms. Sorting, searching, computational complexity, lower bounds for algorithms; NP-hard and NP-complete problems; parallel algorithms; proof of correctness of algorithms. *May be repeated with change of topics.*

CS 6623*
Algebraic Structures of Formal Grammars. Prerequisite(s): 5313, 5653. Context-free languages, Kleene languages, Dyck languages, context-sensitive languages; use of algebraic systems to define languages; linear bounded automata.

CS 6700*
Advanced Topics in Artificial Intelligence. 2-6 credits, max 12. Prerequisite(s): 5793 or consent of instructor. Machine learning; computer perception and robotics; logic programming; natural language understanding; intelligent agents; medical informatics. *May be repeated with change of topics.*

CS 6800*
Advanced Topics in Computing Networks. 2-12 credits, max 12. Prerequisite(s): 5283; Graduate standing in Computer Science; consent of instructor. Large scale embedded networks, deep-space networking, ubiquitous computing, optical networking, Next Generation Internet. *May be repeated with change of topics.*

CONSTRUCTION MANAGEMENT TECHNOLOGY (CMT)

CMT 1214
Introduction to Construction. Lab 2. Overview of the construction industry with emphasis on construction materials, methods, and systems.

CMT 2253
Construction Drawings. Principles of graphic communication are applied to reading and drawing construction plans. Techniques for measuring items of construction work from plans and specifications are also covered.

CMT 2263
Estimating I. Prerequisite(s): Grade of "C" or better in 1214 and 2253. Quantity take-off with emphasis on excavation, formwork and concrete, masonry, rough carpentry and miscellaneous specialty items.

CMT 2343
Concrete Technology. Lab 2. Prerequisite(s): Grade of "C" or better in 1214. Fundamentals of concrete and concrete making materials including admixtures. Proportioning concrete mixtures. Batching, mixing, conveying, placing, finishing, and curing concrete. Hot and cold weather concreting, jointing, volume change and crack control.

CMT 3273
Scheduling Construction Projects. Prerequisite(s): Grade of "C" or better in 2263 and acceptance to the CMT upper-division. Scheduling basics, including bar charts and critical-path methods; manual and computer techniques using current software; emphasis on using schedules for construction project management.

CMT 3331
Construction Practicum I. Prerequisite(s): Grade of "C" or better in 1214 or 2253. Supervised field experience in construction; 400 hours minimum documented time required.

CMT 3332
Construction Practicum II. Prerequisite(s): Grade of "C" or better in 2263, 3331 and CIVE 3614. Supervised temporary, full-time employment in construction, emphasizing field and office engineering and a variety of project management functions; *400 hours minimum documented time required.*

CMT 3364
Structures I. Lab 2. Prerequisite(s): Grade of "C" or better in 2343 and GENT 3323 and acceptance to the CMT Upper Division. Methods of structural analysis applicable to construction; design of timber structures and forms for concrete structures.

CMT 3433
Principles of Site Development. Lab 2. Prerequisite(s): Grade of "C" or better in CIVE 3614 and GENT 3323 and acceptance to the CMT Upper Division. Site layout, vertical and horizontal control, surveying instrument adjustments, site investigations, excavations, site drainage and geotechnical considerations.

CMT 3463
Environmental Building Systems. Lab 2. Prerequisite(s): Grade of "C" or better in PHYS 1214 and acceptance to the CMT Upper Division. Plumbing, heating, air-conditioning, electrical and lighting systems as applied to residences and commercial buildings.

CMT 3554
Structures II. Lab 2. Prerequisite(s): Grade of "C" or better in 3364 and acceptance to the CMT Upper Division. Analysis and design of elements in steel and reinforced concrete structures; review of shop drawings for both types of construction.

CMT 3633
CAD and BIM for Construction Managers. Prerequisite(s): 1214 and 2253. Interpretation and production of construction drawings using computer aided drafting. Theory and use of Building Information Modeling software builds upon computer aided drafting skills.

CMT 4050
Advanced Construction Management Problems. 1-6 credits, max 6. Prerequisite(s): Junior standing and consent of instructor. Special problems in construction management.

CMT 4263
Estimating II. Prerequisite(s): Grade of "C" or better in 2263 and acceptance to the CMT Upper Division. Extensive use of actual contract documents for quantity take-off, pricing and assembling the bid for several projects. Use of computers in estimating.

CMT 4273
Computer Estimating. Lab 6. Prerequisite(s): Grade of "C" or better in 4263 and acceptance to the CMT Upper Division. Various software programs applied to estimating for building construction. Automated take off (Digitizer) systems.

CMT 4283
Business Practices for Construction. Prerequisite(s): Grade of "C" or better in 4563 and ACCT 2103 and acceptance to the CMT Upper Division. Principles of management applied to construction contracting; organizing office and field staff; bonding, liens, financial management practices; introduction to the construction manager concept; schedule of values; construction billings.

CMT 4293
Construction Manager Concepts. Prerequisite(s): Grade of "C" or better in 3332, 4273 and 4283 and acceptance to the CMT Upper Division. Capstone course utilizing skills and knowledge of estimating, scheduling, bidding, construction management, CAD, TQM, partnering and safety; includes topics in leadership, motivation and the use of current project management software.

CMT 4333
Equipment Management for Constructors. Prerequisite(s): 2263 and ACCT 2103. Selection and use of equipment, estimating equipment costs, estimating equipment production rates for all types of equipment used in building construction and heavy/highway construction.

CMT 4443
Construction Safety and Loss Control. Prerequisite(s): Must be accepted to the CMT Upper Division or obtain department permission. A detailed study of OSHA Part 1926 - Construction Safety and Health Compliance and related safety topics; all elements of the OSHA 30-hour training course; students completing the course are OSHA Certified Competent Persons; concepts and methods of loss control.

CMT 4533
Heavy and Highway Estimating. Prerequisite(s): 2343 and 2263. Theory and application of contractor estimating and bidding procedures used in heavy and highway construction projects.

CMT 4563
Construction Law and Insurance. Prerequisite(s): Grade of "C" or better in 3273 and acceptance to the CMT Upper Division. Legal and insurance problems as they pertain to the construction industry.

COUNSELING PSYCHOLOGY (CPSY)

CPSY 1112
World of Work. Assists students in exploring career options through increased understanding of self and expanded knowledge of occupational information. Includes a study of the decision-making process and a look at the present and future changing world of work.

CPSY 4443
(D)Cultural Diversity in Professional Life. Knowledge, awareness and skills regarding cultural diversity in one's professional life.

CPSY 5000*
Master's Thesis. 1-6 credits, max 6. Prerequisite(s): Consent of advisory committee chairperson. Report of research conducted by a student in the master's program in counseling. Credit given and grade assigned upon completion and acceptance of the thesis.

CPSY 5173*
Gerontological Counseling. An examination of mental health treatment modalities and approaches to counseling with older adults. An experiential component is included.

CPSY 5320*
Seminar in Counseling Psychology. 3-9 credits, max 9. Prerequisite(s): Graduate standing. In-depth exploration of contemporary topics in counseling psychology.

CPSY 5413*
Critical Issues in School Counseling. Counseling and guidance activities to enhance school climate and promote development of student academic, career, and personal/social competencies. Knowledge of the school counselor's role in advocating for students with special needs.

CPSY 5453*
Vocational and Career Information. Local, state and national sources of occupational information about jobs and sociological factors related to career planning and worker effectiveness.

CPSY 5473*
Introduction to Counseling Practice. Prerequisite(s): Graduate standing. Orientation to counseling practice through observation and participation. The supervised experiences permit the student and the counselor education staff to evaluate the student's strengths and weaknesses as a potential counselor or student personnel administrator.

CPSY 5483*
Community Counseling and Resource Development. Prerequisite(s): Graduate standing. Application of educational, preventive, and crisis interventions in a variety of human service settings, including the development and evaluation of community helping resources.

CPSY 5493*
Professional and Ethical Issues in Counseling. Prerequisite(s): Admission to community counseling, elementary or secondary school counseling graduate program or consent of instructor. Principles and issues of professionalism and ethics. Seminar format with special emphasis on student's thorough preparation for, and active participation in, class discussions.

CPSY 5503*
Multicultural Counseling. Emphasis on effective communication skills in cross-cultural counseling or helping relationships and the integration of theoretical knowledge with experimental learning. Psycho-social factors, life styles, etc. of various cultural and ethnic groups and their influence on the helping relationship.

CPSY 5513*
Comprehensive School Counseling Programs. Foundations of school counseling focusing on the knowledge and skills required to develop, implement, coordinate, and manage a comprehensive, developmental school counseling program. (Same course as 5573*)

CPSY 5523*
Individual Appraisal. Methods of developing a framework for understanding individuals and techniques for data collection, assessment, and interpretation such as interviews, testing, and case study. The study of individual differences including ethnic, cultural and gender factors.

CPSY 5533*
Developmental Interventions. Lab 2. Counseling theories and techniques for working with children, adolescents, and their parents in individual and group counseling and consulting. Laboratory portion translates theory to practice.

CPSY 5543*
Career Development Theories. Historical and contemporary viewpoints advanced by Ginsberg, Super, Holland, Roe, etc. Counselors are assisted in developing the theoretical and applied basis for developing school-based career education programs and for assisting individuals in career planning.

CPSY 5553*
Principles of Counseling. A comprehensive foundation for counseling practice and the application of contemporary theories to further knowledge of counseling as a communication process.

CPSY 5563*
Conceptualization and Diagnosis in Counseling. Prerequisite(s): 5473 and 5553 or consent of instructor. Foundation in skills necessary to conceptualize and diagnose clients presentation of problems in counseling. Intake interviewing and report writing skills, case conceptualization skills, and differential diagnostic skills using the DSM system.

CPSY 5583*
Group Process. Group dynamics, theory and techniques applicable to working with people of all ages in various school and non-school settings. Group member competencies are stressed during the laboratory period.

CPSY 5593*
Counseling Practicum. Prerequisite(s): Grade of "B" or better in 5473 and 5553; admission to program or instructor consent. Supervised experience in human interaction processes of counseling and consulting with the major goal of facilitating positive growth processes through individual supervision. May be conducted in a variety of settings with a wide range of developmental levels.

CPSY 5663*
Counseling and Sexuality. Prerequisite(s): Permission of instructor. Current trends in counseling clients with sexual problems, as well as clients with varying sexual orientations and identities.

CPSY 5673*
Substance Abuse Counseling. Prerequisite(s): Permission of instructor. Current therapeutic trends, strategies, and modalities used in the treatment of addictions, as well as relapse prevention strategies and treatment of special populations.

CPSY 5683*
Internship in Counseling I. Prerequisite(s): Grade of "B" or better in 5593 and admission to counseling program. Supervised experience working and studying in a counseling agency or setting.

CPSY 5693*
Internship in Counseling II. Prerequisite(s): Grade of "B" or better in 5683 and admission to counseling program. Supervised experience working and studying in a counseling agency or setting.

CPSY 5720*
Workshop. 1-9 credits, max 9. Professional workshops on various topics. Designed to meet unique or special needs of professionals in various mental health fields.

CPSY 6000*
Doctoral Dissertation. 1-25 credits, max 25. Prerequisite(s): Consent of advisory committee chairperson. Report of research conducted by a student in the doctoral program in counseling psychology. Credit given and grade assigned upon completion and acceptance of the doctoral dissertation.

CPSY 6053*
Ethical and Legal Issues in Professional Psychology. Prerequisite(s): Consent of instructor. Ethical and legal standards applied to the professional practice of psychology.

CPSY 6083*
Principles of Counseling Psychology. Prerequisite(s): Admission to the doctoral program in counseling psychology. Development, theoretical foundations and applications of therapeutic models of counseling and psychology.

CPSY 6123*
Adult Personality Assessment. Prerequisite(s): Admission to counseling, school, or clinical psychology program. Administration and interpretation of adult personality assessment instruments such as Rorschach, TAT and DAP.

CPSY 6153*
Personality Theories. Prerequisite(s): Graduate standing. An in-depth analysis of personality theories and personality disorders.

CPSY 6223*
Beck's Cognitive Therapy. Prerequisite(s): Graduate standing in counseling, counseling psychology, school psychology, or clinical psychology; or consent of instructor. The theory and practice of Aaron T. Beck's cognitive therapy approach. Cognitive restructuring, problem-solving, imagery work, and cognitive case conceptualization skills to help clients with a variety of presenting problems.

CPSY 6310*
Advanced Practicum and Supervision. 3-12 credits, max 12. Prerequisite(s): Admission to counseling psychology program. For prospective counseling psychologists, counselor educators and supervisors, and practicing counselors. Supervised assistance in development of counseling, consulting, and supervising competencies.

CPSY 6313*
Advanced Group Interventions. Lab 1. Prerequisite(s): Admission to counseling psychology program or consent of instructor. Discussion and exploration of various aspects of group development and treatment. Theory and application of theory. Various factors associated with group psychotherapy cohesion, dynamics and screening.

CPSY 6323*
Psychological Consultation. Prerequisite(s): Admission to graduate program in the SAHEP or psychology program. Models and strategies for the delivery of special services in the schools and other agencies that focus on serving the mental health needs of children, adolescents and adults. The use of consultation as a problem-solving alternative to the assessment/label approach. *Students can receive credit in only one of the courses.* (Same course as EPSY 6323*)

CPSY 6413*
Counseling Psychology Practicum I. Prerequisite(s): Admission to the doctoral program in counseling psychology. For prospective counseling psychologists. Individual and group supervision and didactic experiences to facilitate the development of counseling psychology competencies with clients at practicum sites. Establishing therapeutic conditions conducive to growth and change.

CPSY 6423*
Counseling Psychology Practicum II. Prerequisite(s): Grade of "B" or better in 6413. For prospective counseling psychologists. Individual and group supervision and didactic experiences to facilitate the development of counseling psychology competencies with clients at practicum sites. Integrating theory and research into the practice of counseling psychology.

CPSY 6433*
Counseling Psychology Practicum III. Prerequisite(s): Grade of "B" or better in 6423. For prospective counseling psychologists. Individual and group supervision and didactic experiences to facilitate the development of counseling psychology competencies with clients at practicum sites. Integrating theory and psychological assessment skills into the practice of counseling psychology.

CPSY 6443*
Counseling Psychology Practicum IV. Prerequisite(s): Grade of "B" or better in 6433. For prospective counseling psychologists. Individual and group supervision and didactic experiences to facilitate the development of counseling psychology competencies with clients at practicum sites. Building integrating consultation skills into the practice of counseling psychology.

CPSY 6543*
Clinical Supervision. Prerequisite(s): Admission to clinical, counseling or school psychology doctoral program, or consent of instructor. Building the doctoral psychology student's knowledge base in theory and research of clinical supervision in psychology, and development and refinement of the student's supervision skills. Current theory and research in supervision, including a practical component.

CPSY 6553*
Advanced Practice in Marital and Family Treatment. Prerequisite(s): Admission to counseling, school or clinical psychology program. Advanced methods in assessment, diagnosis, and treatment of marital and family problems. Skill development, professionalism, ethics and case management. Dynamics of co-therapy and conjoint treatment. Case consultation format. (Same course as PSYC 6553)

CPSY 6560*
Advanced Internship in Counseling. 1-3 credits, max 6. Prerequisite(s): Admission to the doctoral program in psychology. Designed to facilitate counseling effectiveness and to set the stage for a productive life of professional practice.

CPSY 6850*
Directed Reading. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Directed reading for students with advanced graduate standing.

CURRICULUM AND INSTRUCTION EDUCATION (CIED)

CIED 0123
Improving College Reading Skills. Lab 1. Individualized instruction and lab experiences for the improvement of college reading and learning skills, including vocabulary, reading rate, comprehension, and learning strategies. May be used to fulfill the reading improvement requirement established by State Regents policy. *Graded on a satisfactory-unsatisfactory basis.*

CIED 1230
Reading and Study Skills for College Students. 1-4 credits, max 4, Lab 1-4. Instruction and laboratory experience for the improvement of reading rate, vocabulary, comprehension, and study skills. *Graded on pass-fail basis.*

CIED 2450
Early Lab and Clinical Experience in Elementary Education I. 1-2 credits, max 2, Lab 3-6. Prerequisite(s): Declaration of intention to pursue a program in Professional Education. The initial pre-professional clinical experience in schools, kindergarten through grade eight. Required for full admission to Professional Education. *Graded on a pass-fail basis.*

CIED 3005
Foundations of Literacy. Lab 0-2. Prerequisite(s): ENGL 1113, 1213, 2413. Survey of evaluation, selection and utilization of literature of childhood; introduces cognitive and linguistics foundations of literacy; language conventions needed to compose and comprehend oral and written texts. Work in school setting.

CIED 3153
Teaching Mathematics at the Primary Level. Lab 2. Prerequisite(s): Grade of "C" or better in MATH 3403 or 3603; six hours of math; consent of instructor. Developmental levels in selection and organization of content and procedures for primary mathematics education.

CIED 3430
Early Lab and Clinical Experience in Elementary Education II. 1-2 credits, max 3, Lab 3-6. Prerequisite(s): Full admission to Professional Education. Directed observation and participation in classrooms, kindergarten through grade eight. Concurrent seminar exploring multicultural education and integrated programs. *Graded on a pass-fail basis.*

CIED 3450
Foreign Language Field Experiences in the Schools, K-12. 1-2 credits, max 2, Lab 3-6. Prerequisite(s): Consent of instructor; 2.50 GPA and passing scores on the Oklahoma General Education Test. Seminars, directed observation and participation in foreign language classrooms, K-12. Experiences in addressing the mental, social, physical, and cultural differences among children. *Graded on a pass-fail basis.*

CIED 3622
Middle Level Education. Lab 0-2. Overview of the nature and needs of early adolescents as well as an examination of the curriculum, instruction, and organization of middle grade schools. Also includes a field-based experience in a middle school.

CIED 3712
Field Experiences in the Secondary School. Lab 2. Prerequisite(s): Consent of instructor, 2.50 GPA, and passing scores on the Oklahoma General Education Test. Seminars, directed observation and participation in a particular subject area of the secondary school. Experience in meeting the mental, social, physical, and cultural needs among children. *Graded on a pass-fail basis.*

CIED 4000
Field Studies in Education. 1-4 credits, max 4. Independent study and/or field experiences, such as spending a semester in an experimental program working with handicapped children in schools, in-depth studies in research projects, internships with school personnel. *Graded on a pass-fail basis.*

CIED 4003*
Teaching Fundamental Concepts of Mathematics. Prerequisite(s): Full admission to Professional Education. Teaching of the basic skill areas. Study and comparison of contemporary basic mathematics textbooks. Recommended to be taken concurrently with public school practicum experiences.

CIED 4005
Literacy Assessment and Instruction. Lab 0-2. Prerequisite(s): 3005 or HDFS 3213. Provides a comprehensive survey of teaching strategies, formal and informal assessment, curriculum materials, theory, and research pertaining to reading, writing, spelling and oral language development at the primary and elementary school levels. Practical experiences required.

CIED 4012
Integration of Literacy across the Curriculum. Prerequisite(s): 4005; full admission to Professional Education. Integration of reading, writing, and oral language; integration of literacy instruction into the content areas in elementary school curriculum.

CIED 4041
Interdisciplinary Curriculum Design and Development. Lab 2. Prerequisite(s): Full admission to Professional Education and concurrent enrollment in 3430, 4012, 4153, 4323,4353, and 4362. Planning and development of interdisciplinary teaching units for the elementary school classroom. Pedagogical approaches and materials for teaching integrated themes, as well as research on effective integrated teaching practices.

CIED 4053*
Teaching Geometry in the Secondary School. Prerequisite(s): Full admission to Professional Education. Overview of the present secondary geometry curricula and future trends. Axiomatic development of Euclidean geometry, proofs and transformational geometry from the perspective of the secondary mathematics teachers. Study and comparison of contemporary basic mathematics textbooks. *Recommended to be taken concurrently with 3710 and MATH 4043.*

CIED 4153
Teaching Mathematics at the Intermediate Level. Lab 1. Prerequisite(s): 3153 and MATH 3403 and 3603 and full admission to Professional Education. Selection and organization of content, procedures for instruction, and evaluation of outcomes in teaching the mathematics of the intermediate grades. Some attention to instruction in upper grades of the elementary school.

CIED 4213
Introduction to the Visual Arts in the Curriculum. Lab 4. Provides an understanding of the theoretical basis for the use of art activities in developing sensory perception and aesthetic sensitivity as an integral part of the curriculum. Includes a wide range of opportunities for student involvement in experimentation and exploration with a variety of two- and three-dimensional art media. Emphasis on both creative expression and appreciation of the visual arts in the home, school and community as a vital aspect of instruction in the school, preschool level through grade eight.

CIED 4263*
Teaching and Learning Foreign Languages in the Elementary Schools (Grades 1-8). Purpose, selection and organization of foreign language curriculum content, teaching and learning theories, and procedure and evaluation of outcome for diverse students. Teaching techniques and materials for grades 1-8.

CIED 4313*
Young Adult Literature. Prerequisite(s): Senior or Graduate level standing. Survey of print and non-print materials, including multicultural and multi-ethnic materials for young adults from middle school through high school. History, criticism, selection, and evaluation of young adult literature and exploration of its relation to the needs and interests of young people.

CIED 4323
Social Studies in the Elementary School Curriculum. Prerequisite(s): Full admission to Professional Education. Purposes, selection and organization of content, teaching and learning procedures, and evaluation of outcomes in elementary social studies.

CIED 4353
Science in the Elementary School Curriculum. Lab 2. Prerequisite(s): Completion of 12 hours with a grade of "C" or better in required science courses and be fully admitted to Professional Education. The purposes, selection and organization of content, teaching and learning procedures and evaluation of outcomes in elementary school science.

CIED 4362
Design and Management of the Elementary School Classroom. Prerequisite(s): Full admission to Professional Education. Introduction to the design and management of the physical, social, intellectual aspects of the elementary classroom. Overview of the purposes, selection and organization of classroom management systems and teaching approaches.

CIED 4450
Internship in Elementary Education. 1-12 credits, max 12, Lab 3-36. Prerequisite(s): Concurrent enrollment in 4453 or 4730 and 4720 and full admission to Professional Education. Advanced clinical experience as associate (student) teacher in schools, kindergarten through grade eight. *Graded on a pass-fail basis.*

CIED 4453
Senior Seminar in Elementary Education. Prerequisite(s): Concurrent enrollment in 4450 and full admission to Professional Education. Legal and ethical issues, forms of assessment, including standardized testing, working with colleagues and other professionals, integration of performing arts including music and drama, and completion of a professional portfolio. Taken concurrently with student teaching in the final semester of the elementary education program.

CIED 4463
Senior Seminar: Learning and Teaching in Diverse School Cultures. Prerequisite(s): Senior classification; full admission to Professional Education and concurrent enrollment in 4450. Designing elementary classroom environments and curriculum that meet the needs of diverse populations.

CIED 4473
Reading for the Secondary Teacher. Prerequisite(s): Full admission to Professional Education and consent of instructor. Materials and procedures in the teaching of reading in secondary schools for content area teachers.

CIED 4560*
Environmental Education. 1-4 credits, max 4, Lab 1. Development of (teacher/leader) competencies in the content, methods, philosophy, and historical perspective of contemporary environmental education curricula using both indoor and outdoor settings as a multidisciplinary learning laboratory. (Same course as 5730)

CIED 4713*
Teaching and Learning in the Secondary School. Prerequisite(s): Full admission to Professional Education (or consent of instructor for graduate students). Purposes, selection and organization of curriculum content, teaching and learning theories and procedures, and evaluation of outcomes for diverse students. Teaching techniques and materials in grades 7-12 subject areas. Available in certification disciplines: art, English/language arts, foreign languages, mathematics, science, social studies. Graduate students will be required to complete additional assignments that meet criteria for advanced level academic work.

CIED 4720
Internship in the Secondary Schools. 1-12 credits, max 12, Lab 3-36. Prerequisite(s): Concurrent enrollment in 4730 or 4724 or 4734 and full admission to Professional Education. Supervised observation and student teaching in fields in which the student intends to qualify for teaching certification. Development of awareness of and experience with mental, social, physical and cultural differences among adolescents. *Graded on a pass-fail basis.*

CIED 4724
Planning and Management in the Multicultural Secondary Classroom. Prerequisite(s): 4713; full admission to Professional Education or 4003 and 4053. Taken concurrently with the student teaching internship. Includes student teaching seminar (one hour). Based on curriculum and teaching theory in 4713, planning and organizing for the secondary classroom in a diverse society, grades 7-12. Classroom management and discipline approaches as well as teacher research, parental involvement, school climate and community relations. Available in discipline-specialized sections: English/language arts, mathematics, science and social studies.

CIED 4730
Planning and Management in the Multicultural Art Classroom K-12. 1-2 credits, max 2. Prerequisite(s): 4713 and full admission to Professional Education. Taken concurrently with the student teaching internship. Student teaching seminar (one hour) included. Based on curriculum and teaching theory, planning and organizing for the art classroom in a diverse society, grades K-12. Classroom management and discipline approaches as well as teacher research, parental involvement, school climate and community relations. *Required for art education students.*

CIED 4734
Planning and Management in the Multicultural Foreign Language Classroom K-12. Prerequisite(s): 4713 and full admission to Professional Education. Taken concurrently with the student teaching internship. Student teaching seminar (one hour) included. Based on curriculum and teaching theory, planning and organizing for the foreign language classroom in a diverse society, grades K-12. Classroom management and discipline approaches as well as teacher research, parental involvement, school climate and community relations. *Required for foreign language education students.*

CIED 5000*
Master's Report or Thesis. 1-6 credits, max 6. Prerequisite(s): Consent of adviser. Students studying for a master's degree enroll in this course for a total of 2 credit hours if they write a report or 6 hours if they write a thesis.

CIED 5033*
Teaching Foreign Languages in the Schools K-12. Curriculum, materials, methods and procedures related to foreign languages (grades K-12).

CIED 5043*
Issues in Teaching. Current issues and trends in teaching theory, practice and research with emphasis on teacher reflection.

CIED 5050*
Seminar in Integrated Mathematics and Science Applications. 1-6 credits, max 6. Seminar topics may differ depending upon the nature of current interests and topics in mathematics and science education.

CIED 5053*
Curriculum Issues. A study of curriculum that includes philosophy, history, decision-making, major concepts and terms.

CIED 5073*
Pedagogical Research. Theory and application of pedagogical inquiry with emphasis on teacher as researcher, pedagogical question posing, and techniques of pedagogical inquiry, including narrative, autobiography, case writing, action research, and artifactual documentation of teacher performance.

CIED 5123*
Curriculum in the Secondary School. Contemporary curricular issues, philosophies, and points of view in secondary school education.

CIED 5143*
Language Arts in the Curriculum. Content and current issues in the language arts. Materials and methods for teaching the communication skills.

CIED 5153*
Advanced Studies in Children's Literature. Study of children's literature within the prevailing political, economic and social factors influencing cultural patterns and values. The tools of research in children's literature and the nature and direction of contemporary children's book publishing.

CIED 5163*
Middle School Curriculum. Theory of planning and developing learning experiences appropriate to the needs and interests of early adolescents.

CIED 5173*
Kindergarten-Primary Curriculum. Study of kindergarten-primary curriculum, including philosophy, history, current practice, and issues. For administrators, teachers and students in curriculum and early childhood education.

CIED 5183*
Media Literacy Across The Curriculum. Examination of the history of media literacy. Major topics and issues in the field of media literacy and curriculum in media literacy across subject areas.

CIED 5223*
Teaching Science in the Schools. Materials, methods and classroom procedures related to science in grades K-12.

CIED 5243*
Environmental Education in the Curriculum. Integration of environmental concepts in the total school curriculum. Review of K-12 environmental education curricula and methods of teaching environmental education in formal and nonformal settings.

CIED 5253*
Intermediate (4-6) Mathematics Education. The study of the theory and research on mathematics curriculum and instruction at the intermediate (4-6) grade levels. Problem solving, fractions, decimals, percent and applications.

CIED 5263*
Assessment and Evaluation in School Mathematics. Lab 2. Focus on classroom assessment to help teachers identify what students know about critical mathematics concepts, skills, procedures, and facts. Emphasis would be on using that information to inform their instructional decisions and enhance student learning.

CIED 5270*
Practicum in School Mathematics. 1-3 credits, max 6, Lab 2-6. Diagnostic and therapeutic procedures in mathematics with students of all ages. Laboratory classes provide for clinical experiences in evaluation and instruction with children experiencing difficulty in mathematics.

CIED 5273*
Kindergarten-Primary (K-3) Mathematics Education. Theory and research on mathematics learning and teaching from the preschool level through the early elementary years. Study and analysis of children's construction of mathematics knowledge and the implications for teaching. Methods for promoting conceptual understanding and enthusiasm for the further study of mathematics.

CIED 5280*
Workshop in Science Education. 1-4 credits, max 4. Develops and/or implements elementary and secondary science programs.

CIED 5283*
Problem-Centered Learning in Mathematics. Focus on the different aspects of a problem-centered learning environment. Using current research as a guide, students will examine tasks, collaborative work, and the roles of students, teachers and discourse.

CIED 5293*
Teaching and Learning Mathematics in Technology. The focus of this course is on research and methods of teaching and learning with technology in the mathematics classroom. Topics will include philosophical, social, developmental and theoretical issues associated with the development and use of technology and school reform. Activities and applications will be explored as they relate to the potential for providing a technology-rich learning environment conducive to student construction of mathematical knowledge.

CIED 5313*
Curriculum of the Elementary School. Contemporary trends, philosophies and points of view in elementary school education.

CIED 5323*
Teaching Social Studies in the Schools. Curriculum, materials, methods, and procedures related to social studies.

CIED 5350*
The Visual Arts in the Curriculum. 1-3 credits, max 6, Lab 2. Creative approaches to the use of two- and three-dimensional media as they relate to various aspects of education. Opportunities available for periodic group and individual evaluation in order to give direction and significance to future growth.

CIED 5353*
Literature for Children, Adolescents and Adults. Exploration of the elements and characteristics of quality literature for readers of all ages, addressing evaluation, selection, and utilization. Research component requiring learners to design and conduct relevant research into literature learning and engagement with selected populations.

CIED 5423*
Literacy Instruction in Primary Grades. Analysis of growth in literacy from the preschool level through early elementary years. Examination of literacy learning processes and instructional procedures.

CIED 5433*
Reading and Writing in the Content Areas. Study of the development and use of reading and writing across the content areas.

CIED 5463*
Reading Assessment and Instruction. Lab 0-2. Prerequisite(s): 5423 or 5433 or consent of instructor. Development of knowledge of reading assessment and instruction for children and adults who find reading difficult. Laboratory experience for authentic assessment and tutoring in reading.

CIED 5473*
Reading and Writing Difficulties. Study of research and formal assessment tools related to reading and writing difficulties in children and adults.

CIED 5483*
Literacy and Technology Across the Curriculum. The characteristics of computer-facilitated learning relating to broad definitions of literacy. Use of a variety of computer and literacy tools across the curriculum.

CIED 5523*
Practicum in Reading Instruction. Lab 0-2. Evaluation and instruction in reading and writing for children who experience difficulty learning to read. Collaboration among teachers, learners, and resource personnel.

CIED 5553*
Literacy Leadership and Coaching. Prerequisite(s): 5463. Develops skills and knowledge for school literacy program design and leadership, and for coaching other teaching professionals in literacy teaching.

CIED 5613*
Effective Teaching of Mathematics in the Secondary School. Prerequisite(s): Consent of instructor. Directed advanced practicum in secondary school mathematical education. Includes study of current research findings in mathematical education, teaching strategies, materials and evaluation procedures in the secondary school. For experienced classroom teachers, superintendents, principals and supervisors.

CIED 5623*
Multicultural and Diversity Issues in Curriculum. Understanding of the historical and contemporary perspectives toward cultural diversity. Development of an awareness of diverse culture and language communities; understanding of critical issues of race, class, gender, and ethnicity in education; perennial issues of multiculturalism in public education and in global society; a comprehensive overview of principles and current research on bilingual and multicultural education.

CIED 5633*
Developmental Reading for College and Adult Learners. Identification of the needs, materials, curricula, and instructional strategies for college and adult readers. The study of illiteracy. Consideration of the development, organization and supervision of programs for such learners.

CIED 5640*
Special Topics in Literacy Education. 1-6 credits, max 6. Topics vary to address special topics in literacy education.

CIED 5643*
Integrating Teaching at the Elementary Level. Study and analysis of theories related to children's learning and implications for integrating teaching at the elementary level. Examination of teachers, own practices through reflection and research, study diverse populations, share teaching approaches and materials across the curriculum, and explore outreach to school, family and community.

CIED 5663*
Integrating Teaching in the Secondary School. In-service for middle to secondary teachers especially with professional development in their own school settings and in further graduate work. Examination of own practices through reflection and research, study of diverse adolescents, sharing of teaching approaches and materials across the curriculum, and exploration of outreach to school, family and community. Teacher leadership.

CIED 5720*
Education Workshop. 1-8 credits, max 8. For teachers, principals, superintendents and supervisors who need advanced curriculum and instruction course work related to K-12 subject areas and pedagogy, in the areas of instruction and administration. Students must register for the full number of credit hours for which the workshop is scheduled for a particular term.

CIED 5730*
Seminar in Education. 1-6 credits, max 6. Seminar topics may differ depending upon the nature of current interests and topics in American education. (Same course as 4560*)

CIED 5750*
Seminar in Mathematics Education. 1-6 credits, max 6, Lab 0-6. Prerequisite(s): Consent of instructor. Problems, issues and trends in mathematics education.

CIED 5813*
Educational Advocacy and Leadership. Preparation of teachers as advocates and leaders in educational policy and practice at various levels. Skills in action research, policy analysis, and coalition building leading to advocacy.

CIED 5850*
Directed Study. 1-6 credits, max 6, Lab 1-6. Prerequisite(s): Consent of instructor. Directed study for master's level students.

CIED 6000*
Doctoral Dissertation. 1-25 credits, max 25. Required of all candidates for the Doctor of Philosophy degree. Credit is given upon completion of the dissertation.

CIED 6030*
Contemporary Issues in Curriculum Studies. 1-6 credits, max 6. Examination of selected contemporary topics in curriculum studies.

CIED 6033*
Analysis of Teaching. Advanced study of multiple forms of analysis of teaching such as behavioral, phenomenological, and constructivist with emphasis on major research on teacher reflection and teacher narrative.

CIED 6043*
Curriculum Leadership. A study of curriculum leadership and implications for schooling; focus on what it means to be a curriculum leader in times of major societal change and educational reform.

CIED 6053*
Advanced Curriculum Studies. In-depth examination of key concepts, topics, trends, and the interdisciplinary nature of curriculum studies. Critical analysis of contemporary curriculum discourses.

CIED 6060*
Advanced Special Topics in Literacy Education. 1-6 credits, max 6. Topics vary to address special topics in literacy education at the doctoral level.

CIED 6063*
Curriculum History. Examines in-depth the history of various movements in U.S. curriculum thinking and the individuals who promoted them, with attention to the cultural and institutional contexts within which they worked. Emphasis is give to primary sources and the position of curriculum thinking within evolving educational thinking.

CIED 6073*
Advanced Pedagogical Research. Advanced theory and application of pedagogical research with emphasis on teacher as researcher, teacher research as professional development and education reform, techniques of pedagogical research and pedagogical question posing.

CIED 6133*
Theory to Practice in Education. A culminating seminar demonstrating the application of theory from several disciplines to the practical problems of education: curriculum development, organization, teaching strategies and evaluations.

CIED 6143*
School Reform. Current issues in school reform with an emphasis on U.S. education; focus on what it means to engage in reform from dual points of view: curriculum leader and recipient of reform mandate.

CIED 6163*
Advanced Research Strategies in Curriculum. Prerequisite(s): SCFD 6113. Exploration of designs and methods within qualitative and quantitative research as applied to the field of curriculum. Articulation on how to ensure that both qualitative and quantitative studies meet their respective standards of rigor.

CIED 6183*
Advanced Media Literacy Across the Curriculum. This course examines the interdisciplinary area of media literacy across the curriculum. Major themes such as issues of hegemony and strategies of media literacy in diverse classrooms will be explored. Students will analyze and evaluate various curriculum theories as applied to media literacy as well as research in the field. Finally, the future of media literacy and debates in the field will be considered.

CIED 6433*
Seminar in Literacy. Research of issues in literacy education using knowledge gained through both research and classroom practice.

CIED 6503*
Doctoral Seminar. In-depth investigation into the doctoral experience and the professoriate including research and writing for the dissertation and for publication; grant writing; professionalism and ethics; professional service; and teaching in higher education. Primarily for students in the PhD program in Curriculum Studies and Professional Education Studies.

CIED 6513*
Staff Development in Literacy Education. Design and delivery of research related to staff development experiences in literacy.

CIED 6683*
Language, Literacy and Culture. The social-cultural perspectives related to the role of language in mediating literate behaviors, cognition and action in learning contexts. Aspects of language use within various learning contexts (situated cognition) and its academic, technical and everyday discourse in understanding the interrelationships among teaching, learning, knowledge and culture.

CIED 6750*
Research in Mathematics and Science Education. 1-6 credits, max 6. The examination of current research in mathematics and science learning and teaching research designs, employed, and the generation of new hypotheses.

CIED 6850*
Directed Reading. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Directed reading for students with advanced graduate standing to enhance students' understanding in areas where they wish additional knowledge.

CIED 6853*
Improvement of Instruction in Reading. Problems and issues related to reading instruction. The roles of various school personnel in changing curriculum and methods.

CIED 6880*
Internship in Education. 1-8 credits, max 8, Lab 3-24. Prerequisite(s): Consent of instructor. Directed off-campus experiences designed to relate ideas and concepts to problems encountered in the management of the school program.

CIED 6910*
Practicum. 1-6 credits, max 6. Prerequisite(s): Consent of adviser. Helps the student carry out an acceptable research problem (practicum) in his/her local school situation. Credit given upon completion of the written report.

DESIGN, HOUSING AND MERCHANDISING (DHM)

DHM 1003
Design Theory and Processes for Apparel and Interiors. Lab 4. Prerequisite(s): DHM majors only. Design elements, principles and processes applied to design and merchandising.

DHM 1103
Basic Apparel Assembly. Lab 4. Basic apparel assembly techniques. Problems including basic fit, spreading and cutting methods and equipment, and use and application of sewing equipment, including lock, chain, and overedge.

DHM 1123
Interior Design Graphics. Lab 6. Prerequisite(s): DHM majors only. Drafting and visual communication techniques related to interiors.

DHM 1433
Innovation and Marketing of Fashion Products. The process of fashion innovation; variables of fashion affecting production and distribution of consumer goods; development of present structure in the apparel, interiors and related industries.

DHM 1993
Communications and Presentation Techniques for Apparel Design. Lab 6. Prerequisite(s): 1003. Creative communication methods and techniques, including a variety of media for two- and three-dimensional presentations in apparel design.

DHM 2003
Creative Problem Solving in Design and Merchandising. Participatory problem solving in design and merchandising; critique of proposed solutions as a positive process of evaluation.

DHM 2073
Computer-aided Design for Interiors. Lab 4. Prerequisite(s): 1123 and pass proficiency review. Computer-aided design and drafting for two-dimensional and three-dimensional interior systems.

DHM 2103
Interior Design Studio I: Residential. Lab 4. Prerequisite(s): Pass proficiency review. Studio course utilizing the design process in the analysis and planning of residential environments using computer-aided and hand drafting techniques.

DHM 2203
Intermediate Apparel Assembly. Lab 4. Prerequisite(s): 1103. Development of skill in apparel assembly. Intermediate problems in fit, spreading, cutting, and sequencing of apparel assembly operations for lined garments, plaids, other special fabrics and closures.

DHM 2212
Heritage of Dress I. Prerequisite(s): 3 credit hours of history. Survey of ancient to Baroque European modes of dress, as that clothing reflects the environment and cultural life of a people.

DHM 2243
Interior Design Studio II: Interior Components and Construction Documents. Lab 4. Prerequisite(s): 2073, 2103. Studio course exploring the design, materials, construction and production of interior design components for small scale commercial projects using computer-aided and hand drafted documents and renderings for visualization of design solutions.

DHM 2313
Codes and Regulations for Interiors. Prerequisite(s): 1123 or equivalent. Study of local, state, national and international building codes and regulations and the agencies that administer them.

DHM 2573
(L,N)Textiles. Lab 2. Science principles as the basis for understanding fibers, the basic structure of yarns and fabrics. Relationships between the chemical composition of fibers and properties such as tensile strength, flammability, elasticity, moisture absorption, and dye affinity. Understanding science principles in relation to textile properties for evaluation of textile products. Recommended for education majors seeking knowledge to be used for innovative teaching of science principles in grades K-12. *Required for all DHM majors.*

DHM 2913
Sewn Product Quality Analysis. Lab 2. Prerequisite(s): 1433, 2573. Sewn product manufacturing process with emphasis on evaluating product quality and its relationship to performance. Examined from the retailers', manufacturers', and consumers' perspectives.

DHM 3013
Flat Pattern Design. Lab 4. Prerequisite(s): 2203 and MATH 1483 or 1513, pass proficiency review. Interpretation of dress design developed through the medium of flat pattern; introduction to pattern drafting.

DHM 3023
Computer-aided Flat Pattern Design. Lab 4. Prerequisite(s): 3013 and pass proficiency review. Advanced apparel design problems using flat pattern and computer-aided design (CAD) techniques.

DHM 3123
Advanced Technology for Apparel. Lab 4. Prerequisite(s): DHM majors only and 1993 and 3023. Building on CAD skills using software as applied to apparel design and production. Development of technical designs and specification materials.

DHM 3153
Mass Production of Apparel and Related Products. Lab 4. Prerequisite(s): DHM majors only and 3023. Understanding and applying mass production strategies for apparel related products. Includes design for production, production operations including CAD marker making and material utilization, production simulation, modeling and costing.

DHM 3203
Functional Clothing Design. Lab 4. Prerequisite(s): 2573, 3013 and 4 credit hours of chemistry. Problem-solving approach to functional clothing design for specialized market segments (athletic sportswear, occupational clothing, children's wear, clothing for the handicapped) including performance evaluation of selected materials using standard methods of textile testing.

DHM 3213
(H)Heritage of Dress II. Prerequisite(s): 3 credit hours of history. Survey of historic modes of dress from the 18th to the 21st centuries, as that clothing reflects the environment and cultural life of a people, and change within the fashion industry.

DHM 3233
(H)Heritage of Interiors I. Religious, civic, commercial, and domestic architecture and furnishings prior to and including the 18th Century with emphasis on the periods which have greatly influenced housing and interior design.

DHM 3301
Supervised Field Experience. Prerequisite(s): 2243 or consent of instructor. Field experience in specialized residential, commercial and institutional design with both historic and contemporary elements.

DHM 3303
Materials and Finishes for Interior Design. Prerequisite(s): 2243 (Interior Design students) or 1123 and 2573 (Merchandising students). An overview and examination of interior materials and finishes.

DHM 3363
Interior Design Studio III: Small Scale Contract. Lab 4. Prerequisite(s): 2243. Analysis and planning of small office, hospitality and retail environments with emphasis on materials, lighting, codes and accessibility using computer-aided 2D drafting and 3D modeling techniques.

DHM 3433
Retailing of Apparel, Interiors and Related Products. Prerequisite(s): DHM majors or minors only or by permission of instructor and 1433 and ACCT 2103 and ECON 1113 or 2103. Marketing structures at retail level; job descriptions and responsibilities at management level; financial and control functions.

DHM 3453
Interior Design Studio IV: Environmental Design. Lab 2. Prerequisite(s): 3363. Exploration of the design factors and human performance criteria for lighting, acoustics, and thermal/atmospheric comfort and their applications in studio projects using computer-aided and hand drafted techniques.

DHM 3533
Decorative Fabrics. Lab 4. Historic and contemporary textile designs. Creation of textile designs using personal inspirations, cultural expressions and a variety of techniques.

DHM 3553
Profitable Merchandising Analysis. Prerequisite(s): 3433, ACCT 2103, MATH 1483, 1513 or 2103. Relationship analysis of profit and loss statement. Retail mathematical calculations necessary to plan and control merchandising results, open-to-buy, mark-up, mark-down, turn-over, stock-sales ratio. Initial development of a six-month buying plan.

DHM 3563
Merchandise Acquisition and Allocation. Prerequisite(s): 3433, 3553. In-depth study of buying and distributing merchandise.

DHM 3643
Apparel and Accessories for Special Markets. Prerequisite(s): 1433, PSYC 1113, SOC 1113, and completion of 60 credit hours. An analysis of the apparel and accessory needs of specialized market segments and the products designed to meet those needs, with consideration given to both product design and merchandising.

DHM 3823
Professional Practices for Interior Design. Prerequisite(s): 2243, 2313. Specific terminology, procedures, relationships and ethics pertaining to the organization and conduct of interior design practice in the United States.

DHM 3853
Visual Merchandising and Promotions. Lab 1. Prerequisite(s): 1003, 1433 and completion of 60 credit hours. Study and application of principles and practices in merchandise presentation and promotions for commercial purposes.

DHM 3881
Interior Design Pre-Internship Seminar. Prerequisite(s): DHM majors only, 2073, 3363, SPCH 2713. Preparation for obtaining and completing a directed practical experience in a work situation in the interior design field.

DHM 3991
Merchandising and Apparel Design Pre-Internship Seminar. Prerequisite(s): DHM majors and 2.5 major GPA and 1003 and 2003 and 2573 and SPCH 2713 and (merchandising students) 3433 or (ADP students) 3013. Skills requisite to a directed practical experience in an approved work situation related to the fashion industry.

DHM 3994
Internship. Prerequisite(s): DHM majors only and 3991 and (merchandising students) 3553 or (apparel design and production students) 3023. Directed practical experience in an approved work situation related to the fashion industry.

DHM 4001
Design and Merchandising Speakers Colloquium. Seminars presented by distinguished industry professionals. Current issues and implications for the future of apparel and interiors.

DHM 4003
Environmental Perspectives on Apparel and Interior Design. Prerequisite(s): Completion of 90 credit hours. Analysis of apparel and interior design, development and use from physical, technological, economic, political, religious, social and aesthetic perspectives.

DHM 4011
Post-internship Seminar. Prerequisite(s): DHM majors only, 3994. Study and comparison of student work experiences. Individual student conferences, review of merchant supervisor reactions.

DHM 4143*
Design for Special Needs. Problems and alternative solutions for apparel and interiors for special groups, e.g., the aging, children, the handicapped, special markets. Includes field study or design problem.

DHM 4163
Housing in Other Cultures. Housing and interior design and expressions of cultural beliefs, attitudes, family patterns and environmental influences.

DHM 4243*
Draping. Lab 4. Prerequisite(s): 3013 and pass proficiency review. Interpretation of garment design developed through the medium of draping on dress forms.

DHM 4264*
Interior Design Studio V: Large Scale Commercial. Lab 6. Prerequisite(s): 3453. Analysis of large scale office planning and institution design including systems and specifications and emphasizing computer-aided design techniques for construction documents and presentations.

DHM 4294*
Interior Design Studio VI. Lab 6. Prerequisite(s): 4264. Studio course utilizing the design process in the analysis and planning of hospitality design and/or institutional design such as health care and education. Approaches includes the consideration of the impact on facility management.

DHM 4323*
Heritage of Interiors II. Exploration of the architecture, interiors and furnishings of a variety of structures. Residential, commercial, governmental, institutional, and recreational buildings of different cultures of the 19th and 20th centuries.

DHM 4373*
Advanced Computer-aided Design for Interiors. Lab 2. Prerequisite(s): 3373 and pass proficiency review. Advanced computer-aided design and visualization for three-dimensional interior systems.

DHM 4403*
Advanced Apparel Design. Lab 4. Prerequisite(s): 4243 and pass proficiency review. Application of design and pattern-making principles and apparel assembly processes in the development of original designs.

DHM 4423*
Heritage III: Designing for Progress. A thematic survey of movements affecting the design of the built environment after 1900. Social and political developments as generators of new building types, construction techniques, materials and stylistic directions.

DHM 4433*
Facility Management and Design. Survey of nine competency areas of facility management and design, ensuring functionality of the built environment by integrating people, places, processes and technology.

DHM 4453*
Entrepreneurship and Product Development for Apparel and Interiors. Prerequisite(s): ECON 1113 and completion of 90 credit hours. In-depth study of entrepreneurship concepts as applied to manufacturers and retailers of apparel and interior products including product development, accounting and control, merchandising and buying, operation and management, advertising and promotion.

DHM 4503*
Couture Techniques. Lab 4. Prerequisite(s): 4243. Advanced clothing construction techniques using couture methods.

DHM 4523
Critical Issues in Design and Merchandising. Prerequisite(s): Senior standing in major. Capstone course examining professional issues in design and merchandising in the context of central themes from general education.

DHM 4573*
Environmental Sustainability Issues for Designers and Merchandisers. Prerequisite(s): 2573. Scientific concepts are the basis for the understanding the environmental impacts of textile raw materials, manufacturing, dyeing, finishing, packaging and product lifecycle as related to apparel and interior design products. McDonough and Braungart's "cradle to cradle" design model will be introduced through case study analyses for informed design, buying and specification decisions.

DHM 4810*
Problems in Design, Housing and Merchandising. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Selected areas of study in design, housing and merchandising.

DHM 4824
Professional Internship. Prerequisite(s): DHM majors only, 3453, 3881, 4373. A supervised internship experience that simulates the responsibilities and duties of a practicing professional in interior design.

DHM 4850*
Special Unit Course in Design, Housing and Merchandising. 1-6 credits, max 6. In-depth study of specific areas of design, housing and merchandising.

DHM 4900
Honors Creative Component. 1-3 credits, max 3. Prerequisite(s): College of Human Environmental Sciences Honors Program participation, senior standing. Guided creative component for students completing requirements for College Honors in the College of Human Environmental Sciences. Thesis, creative project or report under the direction of a faculty member in the major area, with second faculty reader and oral examination.

DHM 4993
Textiles, Apparel, Interiors and Related Products in the International Economy. Prerequisite(s): 3 credit hours of ECON and 90 credit hours and 2573 and ADP and Ap-merch students: 2913 or ID and Int-merch students: 3303. Broad multi-disciplinary study of textiles, apparel, interiors and related products in the international economy.

DHM 5000*
Master's Thesis. 1-6 credits, max 6. Prerequisite(s): Graduate standing and consent of major professor. Research related directly to design, housing and merchandising for the master's thesis.

DHM 5001*
Orientation to Graduate Studies in Design, Housing and Merchandising. Process of developing a graduate plan of study in the Department of Design, Housing and Merchandising. Fundamental skills needed for successful completion of a DHM graduate degree.

DHM 5003*
Theoretical Perspectives for Design, Housing and Merchandising. A study of terminologies associated with theory. Exploration of key theories and their application to practice and research in design, housing and merchandising.

DHM 5013*
Research Developments in Design, Housing and Merchandising. Current methods and needs in research for design, housing and merchandising including the application and integration of research into design, housing and merchandising practice.

DHM 5112*
Research Planning and Proposal Writing. Prerequisite(s): 5001, 5013, STAT 4013 or 5013. Fundamentals of planning and completing qualitative and quantitative research projects, including writing the proposal.

DHM 5113*
Theories of Creative Process in Design and Merchandising. A study of the creative processes used in art, science, business and hybrid disciplines, with application to design and merchandising.

DHM 5163*
Housing in Different Cultures. Prerequisite(s): Graduate student status. Housing and life style as an expression of cultural aesthetics, beliefs, attitudes and environmental influences.

DHM 5213*
Product Design, Production and Promotional Strategies for Apparel and Interior Design Industries. Lab 2. Prerequisite(s): 5113. An overview of product design and production techniques for apparel and interior design markets using an industry approach. Promotional strategies needed for successful advertising campaigns.

DHM 5233*
Design Evaluation. Prerequisite(s): Consent of instructor. Theoretical perspectives on evaluation of applied design; examination and evaluation of historic and contemporary designers, their philosophies and their work.

DHM 5240*
Master's Creative Component. 1-6 credits, max 6. Prerequisite(s): Consent of major professor and department head. An in-depth design application of theoretical design models and philosophies. *A maximum of six hours to be used by graduate students following Plan III for the master's degree.*

DHM 5273*
Interpretative Theories of Material Culture. A theoretical analysis of the influences of cultural values and characteristics upon the design, acquisition and use of apparel, furnishing and building products, and the cultural diffusion of those material goods.

DHM 5303*
Sociological, Psychological and Economic Aspects of Consumer Behavior. Analysis and integration of social, psychological and economic theories related to consumer acquisition of products. Application and testing of these theories as appropriate to apparel and interior consumption processes.

DHM 5343*
Constructed Environment and Human Behavior. Prerequisite(s): 5013, 5273, PSYC 1113, SOC 1113. An exploration and evaluation of the physical attributes of the constructed environment and the interrelationships with the social and psychological aspects of human behavior.

DHM 5353*
Graduate Interior Design Studio. Prerequisite(s): Consent of instructor. Studio course exploring alternative, research-based design solutions for selected interior environments.

DHM 5360*
Advanced Studies in Design, Housing and Merchandising. 1-6 credits, max 6. Investigation into special areas in the fields of design, housing and merchandising.

DHM 5363*
Color Theories and Applications for Apparel and Interiors. Prerequisite(s): Nine hours in DHM graduate courses or consent of instructor. Survey of color theories as they apply to the physical, psychological, and aesthetic aspects of apparel and interiors.

DHM 5383*
Design, Housing and Merchandising in Higher Education. Prerequisite(s): Nine credit hours in design, housing and merchandising. Development and organization of curricula and teaching methods for design, housing and merchandising.

DHM 5440*
Career Internship. 1-6 credits, max 6. Prerequisite(s): Consent of instructor and department head. An individualized career-oriented internship. Selected learning experiences in approved work situations in industry, government, education or research institutions related to design, housing or merchandising.

DHM 5463*
Design and Merchandising Management. Analysis of project management strategies and techniques unique to apparel and interiors industries as applied to budget, schedule, and personnel with emphasis on leadership, quality assurance and risk management issues.

DHM 5503*
Housing and Real Estate for Family Financial Planning. Overview of the role of housing and real estate in financial planning process from a theoretical perspective. Taxation, legal aspects, mortgages, and financial calculations related to home ownership and real estate investments. New and emerging issues in the context of housing and real estate. Role of ethics in financial planning including housing and real estate.

DHM 5533*
Theory and Design of Functional Apparel. Lab 2. Prerequisite(s): 2573, 3013, 5013, or consent of instructor. A holistic approach to the study of apparel design with an emphasis on integrating knowledge of the needs and functions of the individual, the structural properties of textiles and apparel design.

DHM 5543*
Textile Arts and Design. Lab 6. Prerequisite(s): Permission of instructor/adviser. Interpretation of designs developed through experimental studies in textile surface design and manipulation resulting in portfolio/competition quality designs/artwork and written documentation for submissions to a "juror selection" format exhibition.

DHM 5603*
Historical and Contemporary Issues in Trade. The examination of fiber, textile, and apparel industries in a global context. The historical development of the global and U.S. textile and apparel industries and how the global environment (economic, political, and social systems) affects the textile and apparel production and trade. *Web-based instruction.*

DHM 5613*
Merchandising Research Methods. Prerequisite(s): 5303, 5623, 5633, 5643, 5653 and graduate course in Statistics. An overview of the research process used in social science, including a survey and analysis of research methodologies. A review of current merchandising literature with implications for future research. *Web-based instruction.*

DHM 5623*
Professional Advancement in Merchandising. Analysis of leadership and how it affects organizational culture and change through a prism of past and current experiences. Various leadership styles examined and a personal leadership philosophy developed for professional advancement in merchandising. *Web-based instruction.*

DHM 5633*
Product Design, Development and Evaluation. Advanced study of issues and management strategies necessary to design and produce a competitively priced product. Examination of the role of globalization and rapidly changing technology on the development of a successful product. *Web-based instruction.*

DHM 5643*
Promotional Strategies in Merchandising. Examination of integrated marketing communications (i.e., promotional strategies and techniques) while fostering cultural and global awareness, social responsibility and ethical decision-making in the field of promotion. *Web-based instruction.*

DHM 5653*
Merchandising Trends Practices and Theories in Apparel and Interior Industries. Prerequisite(s): Nine credit hours in marketing, merchandising or management. Current trends in merchandising; theories, concepts and processes related to management level problems.

DHM 5663*
International Merchandising Management. Prerequisite(s): Merchandising or business courses or consent of the instructor. Comprehensive understanding of theory, practices, and trends in international merchandising management. An analysis of global retail systems and the way goods are distributed to consumers in various countries.

DHM 5673*
Financial Merchandising Implications. Advanced study of financial trends in the merchandising industries; implications related to sole proprietors, partnerships, franchises, S corporations, and C corporations. Foci will be on the financial implications of recent advances in the field that assist graduate students as they embark on careers in academic and/or the merchandising industries. *Web-based instruction.*

DHM 5683*
Strategic Planning for the Merchandising Executive. Examination of the merchandising executive planning process utilized to develop successful corporate strategies. Emphasis on the importance of a market orientation for building customer value and sustaining a competitive advantage. *Web-based instruction.*

DHM 5810*
Problems in Design, Housing and Merchandising. 1-3 credits, max 6. Prerequisite(s): Consent of instructor and department head. Individual and group investigations and discussions of special problems in the various phases of design, housing and merchandising.

DHM 5830*
Design, Housing and Merchandising Seminar. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. A selected group of current issues in design, housing and merchandising.

DHM 6000*
Doctoral Thesis. 1-12 credits, max 30. Prerequisite(s): Consent of major professor. Research in design, housing and merchandising for the PhD degree.

DHM 6133*
Research Methods in Design, Housing and Merchandising. Prerequisite(s): 5013 or equivalent, and six credits of graduate statistics. Survey and discussion of research methods, experiences in research design and analysis of data.

DHM 6403*
Merchandising Theory Application and Strategy Implementation. Prerequisite(s): 5653. Integration of marketing, merchandising, and management theories, strategies, models, and frameworks. Application of theories and implementation of strategies relevant to apparel and interior industries.

DHM 6410*
Independent Study in Design, Housing and Merchandising. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Selected areas of design, housing and merchandising for advanced graduate students working toward the doctorate degree.

DHM 6810*
Advanced Problems in Design, Housing and Merchandising. 1-6 credits, max 6. Prerequisite(s): Consent of instructor and department head. Intensive individual or small-group study of problems in various areas of design, housing and merchandising for advanced graduate students who are working toward doctorate degrees.

DHM 6830*
Design, Housing and Merchandising Seminar. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Problems and recent developments in design, housing and merchandising.

ECONOMICS (ECON)

ECON 1113
(S)The Economics of Social Issues. Issues-oriented approach. Basic economic principles introduced and developed through study of important social issues: for example, inflation, unemployment, poverty, discrimination, crime, population growth and environmental quality. Develops the economist's approach to social problems, and evaluates the contribution of economics to their solution. *No credit for students with prior credit in 2103 or 2203. No general education credit for students also taking ECON 2103 or AGEC 1114.*

ECON 2103
(S)Introduction to Microeconomics. Goals, incentives and outcomes of economic behavior with applications and illustrations from current social issues: operation of markets for goods, services and factors of production; the behavior of firms and industries in different types of competition; income distribution; and international exchange. *No general education credit for students also taking ECON 1113 or AGEC 1114*.

ECON 2203
Introduction to Macroeconomics. Prerequisite(s): 2103 or AGEC 1114. The functioning and current problems of the aggregate economy: determination and analysis of national income, employment, inflation and stabilization; monetary and fiscal policy; and aspects of international interdependence.

ECON 3010
Special Topics in Economics. 1-3 credits, max 9. Prerequisite(s): 2203, prior approval of instructor. Analysis of a contemporary topic in economics. Course content will vary to reflect changing social issues and trends in applied economics.

ECON 3023
Managerial Economics. Prerequisite(s): 2103. Application of economic theory and methodology to decision problems of private industry, nonprofit institutions and government agencies; demand and cost analysis, forecasting, pricing and investment.

ECON 3113
Intermediate Microeconomics. Prerequisite(s): 2103. How the market system organizes economic activity and an evaluation of its performance. Principles of price theory developed and applied to the interactions of consumers, producers and resource owners in markets characterized by different degrees of competition.

ECON 3123
Intermediate Macroeconomics. Prerequisite(s): 2203. Development of a theoretical framework for studying the determinants of national income, employment and general price level. National income accounting, consumption, investment, government spending and taxation, the supply of and demand for money. Monetary, fiscal and incomes policies considered with regard to unemployment, inflation and economic growth.

ECON 3213
Game Theory and Experimental Economics. Prerequisite(s): Three credit hours in economics. The fundamentals of strategic actions presented in a game theory context and the validation of these ideas with economic experiments.

ECON 3313
Money and Banking. Prerequisite(s): 2203. The economics of money and banking. Operations of commercial banks and structure and competition of the banking industry. Organization and operation of the Federal Reserve System and its effects on interest rates, employment and prices. An introduction to monetary economics and international banking concludes the course.

ECON 3423
(S)Public Finance. Prerequisite(s): Three credit hours in economics. The economics of the government sector. Scope of government activity, efficiency in government expenditures, federal budget, fiscal and debt management policy. Principles of taxation. Major tax sources, tax distribution, tax issues. Current public finance problems such as revenue sharing, negative income tax, urban transport systems and national health insurance.

ECON 3513
(S)Labor Economics and Labor Problems. Prerequisite(s): Three credit hours in economics. Economic analysis of contemporary labor market problems and survey of U.S. unionism. The labor force, education and training. discrimination, inflation and unemployment theories of the labor movement, economic impact of unions and public policy toward labor.

ECON 3523
(S)Economics of Health Care and Social Security. Prerequisite(s): Three credit hours in economics. Examination of the long-run budget problems created by an aging society and evaluation of policies designed to solve them, with a focus on Medicare, Medicaid, and Social Security.

ECON 3613
(I,S)International Economic Relations. Prerequisite(s): Three credit hours in economics. International trade and finance; international economic organizations; the foreign economic policy of the U.S.

ECON 3713
(S)Government and Business. Prerequisite(s): Three credit hours in economics. Methods of measuring the extent of monopoly power in American industries and ways of evaluating the effects of this power on consumer welfare. U.S. antitrust laws, their enforcement and landmark court decisions under these laws.

ECON 3723
The Economics of Sport. Prerequisite(s): 2103. Using economic analysis to understand the world of professional and amateur sport. Emphasis will be on economic decision-making relevant to the teams, leagues and institutions in the world of sport.

ECON 3813*
Development of Economic Thought. Prerequisite(s): Three credit hours in economics. The ideas of great economists with emphasis upon economic concepts and systems of thought in relation to social, ethical and political ideas under evolving historical conditions.

ECON 3823
(S)American Economic History. Economic development and economic forces in American history; emphasis upon industrialization and its impact upon our economic society since the Civil War. (Same course as HIST 4513)

ECON 3903
(S)Economics of Energy and the Environment. Prerequisite(s): 2103. Issues related to the development and use of energy resources, and the management of the natural environment.

ECON 3913
State and Local Economic Development. Prerequisite(s): Three hours of economics. The process of local economic growth and development; innovation, technology, and government policy.

ECON 4213
Econometric Methods. Prerequisite(s): 2203 and three credit hours in statistics. Basic quantitative methods used in economic analysis emphasizing applications to economic problems and interpretation of empirical results. Statistical analyses, regression and forecasting techniques using computer programs.

ECON 4223*
Business and Economic Forecasting. Prerequisite(s): 2203 and three credit hours in statistics. Forecasting business and economic variables. Regression models and time series models such as exponential smoothing models, seasonal models, and Box-Jenkins models. Evaluation of methods and forecasting accuracy. Application of methods using computer programs.

ECON 4643
(I,S)International Economic Development. Prerequisite(s): Three credit hours in economics. Problems of underdeveloped economics related to the world economy; obstacles to economic growth and policies for promoting growth.

ECON 4713*
Economics of Industries. Prerequisite(s): 2103. Industrial organization of major U.S. industries. The structure-conduct-performance paradigm is used to evaluate how costs and concentration interact with pricing, marketing and R&D decisions to affect industry profitability, technological progress, and the efficient allocation of resources. Case studies included.

ECON 4723*
Economic Analysis of Law. Prerequisite(s): Three credit hours in economics. Use of economic analysis to explain why certain laws exist and to evaluate the effects of various alternative rules of law on economic efficiency and behavior. Emphasis on the economics of the common law areas of property, contracts, and torts. Also, products liability, crime and punishment, distributive justice, and discrimination.

ECON 4823
Comparative Economic Systems. Prerequisite(s): 2203. Comparative analysis of the economic theory and institutions of capitalism, socialism, and mixed systems.

ECON 4993
Economics Honors Thesis. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis under the direction of a faculty member, with second faculty reader and oral examination. *Required for graduation with departmental honors in economics*.

ECON 5000*
Research and Thesis. 1-6 credits, max 6. Workshop for the exploration and development of research topics. Research leading to the master's thesis.

ECON 5003*
Research Report. Prerequisite(s): Consent of committee chairperson. Supervised research for MS report.

ECON 5010*
Research and Independent Studies. 1-3 credits, max 10. Prerequisite(s): Consent of departmental committee under a workshop arrangement or supervised independent studies.

ECON 5013*
Contemporary Environmental Policy. Economic, social and political factors that influence the formation and implementation of environmental policy. Environmental policy instruments (including pollution taxes, standards and marketable pollution permits), measurement of environmental damages and risk. Risk comparison, regulatory issues, health risk assessment, and risk communication. Political-economic considerations.

ECON 5033*
Macroeconomic Analysis. Prerequisite(s): Three hours of economics or consent of instructor. Study of the determinants of aggregate output, employment, price level, and interest rates, including international aspects. Monetary, fiscal, and exchange rate policies and impact on the macroeconomy and business environment. *No credit for PhD students in economics.*

ECON 5043*
Microeconomic Analysis. Prerequisite(s): 3113 and MATH 2144 or consent of instructor. A calculus-based microeconomics course developing basic consumer, producer, and equilibrium models.

ECON 5113*
Managerial Economics. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Economic theory applied to business decision-making. Concepts of microeconomics and macroeconomics related to understanding the economic system, analysis of policy, forecasting, and international economics. *No credit for PhD students in economics*.

ECON 5123*
Microeconomic Theory I. Prerequisite(s): 3113. Contemporary price and allocation theory with emphasis on comparative statics.

ECON 5133*
Macroeconomic Theory I. Prerequisite(s): 3123. National income, employment and the price level from the point of view of comparative statics.

ECON 5213*
Introduction to Econometrics. Prerequisite(s): STAT 3013 or equivalent; consent of instructor. Introductory course in econometric regression analysis for first year graduate students in economics, business and agricultural economics. A review of basic probability and statistics, linear regression with one or more explanatory variables, binary dependent variables regression, instrumental variables regression, the use of panel data, and program evaluation. Assessment of the internal validity of estimated models.

ECON 5223*
Mathematical Economics I. Prerequisite(s): 3113 and MATH 2163 or equivalent. Mathematical concepts of single variable and multivariate calculus, topological properties of Euclidean space, convergence, linear algebra, optimization theory and the Kuhn-Tucker Theorem with applications from economic theory.

ECON 5243*
Econometrics I. Prerequisite(s): 4213 or STAT 4043. Theory and application of econometrics to economic problems. Topics include OLS, GLS, distributed lags, serial correlation, heteroske-dasticity, and simultaneous equations.

ECON 5313*
Monetary Economics I. Contemporary issues in monetary theory and policy. Demand for money and supply of money theory, interest rate theory and issues in monetary policy.

ECON 5413*
Economics of the Public Sector I. Allocation and distribution effects as well as incidence of governmental budget policies.

ECON 5433*
Economics of the Public Sector II. Fiscal policy as a means of promoting economic stabilization and growth.

ECON 5543*
Labor Market Theory and Analysis. A critical evaluation of the theoretical literature dealing with labor market processes, including labor supply and demand, the investment in human capital, discrimination, and unemployment.

ECON 5603*
Global Economics. This courses presents an introduction to economic issues from a global perspective for the non-specialist. It emphasizes the problems and challenges the process of globalization poses to national economies. The first part of the course presents the main theories of international trade and their relevance to explaining current global trade patterns. The second part of the course examines the foreign exchange market and the process of exchange rate determination. It covers various international financial issues such as global current account imbalances, the role of the dollar in international financial markets and international currency crises.

ECON 5613*
International Finance. Open economy macro-economics and the role of devaluation, fiscal and monetary policy in the open economy, monetary approach to the balance of payments, portfolio balance and asset market approaches to the determination of exchange rates.

ECON 5623*
Economic Development I. Characteristics and problems of less-developed countries. Criteria of growth and development with emphasis on strategies for development. The role of capital, labor, technological progress and entrepreneurship. Growth models.

ECON 5633*
International Trade. International trade and commercial policy. Comparative advantage, general equilibrium and modern trade theories; welfare implications of international resource allocation models; the theory of protection and international interdependence.

ECON 5643*
Economic Development II. Major problems of development policy. Inflation and mobilization of capital, investment criteria, agriculture, foreign trade, population and manpower, planning and programming methods.

ECON 5703*
The Economics of Organization and Competitive Advantage. Prerequisite(s): 3113 or 5113 or consent of instructor. An analysis of organizational architecture (the assignment of decision-making rights, performance evaluation, and reward systems within an organization). An appropriate architecture to give an organization a competitive advantage and to help an organization develop prowess in innovation and reputation, providing other sources of competitive advantage.

ECON 5713*
Industrial Organization I. Organization and operation of the enterprise sector of a free enterprise economy; interrelations of market structure, conduct and performance; public policies affecting these elements.

ECON 5723*
Industrial Organization II. Alternative market structures and their relationships to market performance; the empirical evidence concerning these. Public policies toward business, including emphasis on U.S. antitrust laws and economic analysis of their enforcement; theories of public utility regulation.

ECON 5903*
Regional Economic Analysis and Policy. Selected topics in location theory, regional economic growth and policies toward regional development in the U.S.

ECON 5913*
Urban Economics. The urban area as an economic system. Problems of economic policy in urban environment.

ECON 6000*
Research and Thesis. 1-12 credits, max 30. Prerequisite(s): Approval of advisory committee. Workshop for the exploration and development of research topics. Research leading to the PhD dissertation.

ECON 6010*
Seminar in Economic Policy. 1-3 credits, max 6. Intensive analysis of selected problems in economic policy. Individual research, seminar reports and group discussion of reports.

ECON 6113*
Seminar in Economic Theory. Microeconomics.

ECON 6123*
Seminar in Economic Theory. Macroeconomics.

ECON 6133*
Microeconomic Theory II. Prerequisite(s): 5123. Contemporary price and allocation theory with emphasis on general equilibrium analysis. Welfare economics.

ECON 6143*
Macroeconomic Theory II. Prerequisite(s): 5133. National income, employment and the price level from the point of view of dynamics. Growth models.

ECON 6233*
Time Series Econometrics. Prerequisite(s): 5243 or equivalent. Advanced topics and fundamental elements in economic as well as financial time series models. Recently developed techniques with stationary and nonstationary time series, including Box-Jenkins and forecast methods, unit root, cointegration, error correction model, and VAR.

ECON 6243*
Econometrics II. Prerequisite(s): 5243. Advanced econometric theory covering single and simultaneous equations models, seemingly unrelated regressions, limited dependent variable models, causality, and pooled models.

ECON 6313*
Monetary Economics II. Intensive analysis of classical monetary theory and individual research on selected problems in monetary economics. The ideas of Patinkin, Wicksell, Fisher and Keynes.

ECON 6803*
History of Economic Thought. Economic theories from the 18th century until the present with emphasis on the origin and improvement of analytical tools.

EDUCATION (EDUC)

EDUC 1111
Orientation to Education. Lab 1. Designed to aid in the transition from high school to university, and to increase student success at Oklahoma State University and the College of Education. Student will explore topics and resources related to the academic and social development of OSU students. In addition, students are encouraged to reflect on their own personal characteristics, values, and attitudes and relate these to their chosen major and ultimately their profession.

EDUC 2000
Special Topics in Education. 1-3 credits, max 3. Specialized readings in education.

EDUC 2510
Innovative Education Studies. 1-3 credits, max 6. Designed to meet unique or special needs of individuals involved in education. Topics include contemporary approaches to meeting educational challenges on the professional as well as the personal classroom experience. *Graded on a pass-fail basis.*

EDUC 3080
International Experience. 1-18 credits, max 36. Prerequisite(s): Consent of the associate dean of the college. Participation in a formal or informal educational experience outside of the USA.

EDUC 3090
(I)Study Abroad. 12-18 credits, max 18. Prerequisite(s): Participation in an OSU reciprocal exchange program, consent of the Study Abroad office, and associate dean of the college. Participation in a formal study abroad program in which a semester or year is spent in full-enrollment at a university outside the U.S.

EDUC 3110
Honors Directed Study. 1-3 credits, max 3. Prerequisite(s): Admission to the College of Education's Honor Program. Individualized directed study approved by a sponsoring professor or Honors coordinator.

EDUC 4050
Honors Colloquium. 1-9 credits, max 9. Prerequisite(s): Consent of instructor or honors coordinator. Study of an interdepartmental and interdisciplinary nature of various important issues and aspects as related to the field of education. Provides an intellectual challenge for the able student with a strong dedication to scholarship.

EDUC 4110
Professional Education Seminar. 1-6 credits, max 6. Problems, trends, and pertinent education issues. May include simulation, small-group instruction and field-based experiences. For the pre-service or in-service level.

EDUC 5110*
Contemporary Educational Issues. 1-6 credits, max 6. Contemporary topics and issues in the broad field of education. May include television interaction, small group discussion and outreach and field experiences. *Written reports required. Graded on a pass-fail basis.*

EDUC 5910*
Educational Field Experiences. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Guided field experience appropriate to a specific program of study. Field experience preceded and followed by appropriate on-campus seminars, readings and reports.

EDUC 5993*
Instructional Effectiveness in Higher Education. Prerequisite(s): Graduate standing or consent of instructor. For teaching assistants in all areas. The many aspects of teaching in higher education. Both theory, e.g., traditional instructional design and practical applications, e.g., how to create a lecture. Issues related to instructional design, development of classroom climate, understanding and assessment of students, classroom practices, materials creation for teaching and development of support systems.

EDUCATIONAL LEADERSHIP (EDLE)

EDLE 2513
Foundations of Ethical Leadership. Prerequisite(s): 24 hours in good standing; admission into the UGLC or consent of instructor. Introduces students to a variety of theoretical views of ethics and leadership studies through the identification of contemporary ethical challenges and the development of foundational leadership skills to meet those challenges. (Same course as EPSY 2513)

EDLE 4513
Ethical Leadership for the Common Good. Prerequisite(s): 2513 or EPSY 2513. Builds on foundational knowledge of ethical theory and leadership studies through application of ethical theory and leadership skills to specific contexts and evaluation of their results. (Same course as EPSY 4503)

EDLE 5000*
Thesis or Report. 1-10 credits, max 10. Prerequisite(s): Consent of instructor. Master's students may earn up to two hours of credit for a report or six hours of credit for a thesis. Students working on a specialist's report may earn a maximum of 10 hours of credit.

EDLE 5203*
Foundations of Adult and Continuing Education. Societal trends, issues and institutions which have influenced the development and current status of adult and continuing education. Analyses and critiques of contemporary adult and continuing education activities, materials and clientele groups served, and their implications for new and existing programs in the field.

EDLE 5253*
The Principalship. Prerequisite(s): 5000-level course in school administration or equivalent. Strategies, techniques and solutions used by the principal in the administration and leadership of a public school.

EDLE 5313*
Characteristics of Adult Learners. Learning patterns, interests and participation patterns among adults in a variety of educational settings. Theories of learning and behavior modification for adults, with implications for adult and continuing education programs. Particular attention given to learners in occupational, adult basic, community junior college, extension and proprietary program settings.

EDLE 5323*
School Finance. Development of conceptual bases in economics of education, taxation, distribution systems, policy analysis; application to Oklahoma school finance; and introduction to budget development.

EDLE 5353*
Instructional Strategies for Adults. An analysis and application of the various techniques and materials available to facilitate the learning process for adults. Concentration on the process of designing effective learning experiences for adults and developing competencies of the facilitators of group and self-directed learning.

EDLE 5473*
Supervision of Instruction. Application of modern approaches to instructional supervision through practice in recording and analyzing teacher behavior in actual classroom settings. Clinical and group methods for improving instruction.

EDLE 5633*
Community Education. Purpose, organization and administration of community education and its various components.

EDLE 5720*
Education Workshop. 1-4 credits, max 8. Analysis of organizational, administrative, and instructional problems by common schools and higher education personnel.

EDLE 5723*
Education Law. Study of the legal framework of education (constitutional law, case law, and Oklahoma law) with emphases on church-state issues, tort liability, teachers' rights, and student rights.

EDLE 5813*
Leadership Theory and Ethical Decision-Making. Developing understanding of leadership theory and issues related to decision-making in educational settings. Exploring leadership and decision-making within an ethical context.

EDLE 5883*
Field Studies Internship I. Lab 3. Prerequisite(s): Consent of instructor. Directed internship experiences designed to relate ideas and concepts to problems encountered in education by faculty and administrators.

EDLE 5893*
Field Studies Internship II. Lab 3. Prerequisite(s): Consent of instructor. Directed advance internship experiences designed to relate ideas and concepts to problems encountered in educational organizations by faculty and administrators.

EDLE 5953*
Developing Educational Organizations. Prerequisite(s): 5813. Understanding and critically analyzing conventional and novel approaches to the climate and governance of schools and higher education.

EDLE 5973*
Foundations of Higher Education. Overview of the historical background and philosophical foundations of American higher education.

EDLE 5983*
Administrative Issues in Higher Education. Overview of the organization and administration operations and analyses of social, political and legal influences on colleges and universities.

EDLE 6000*
Doctoral Dissertation. 1-15 credits, max 15. Required of all candidates for the Doctor of Education degree. Credit given upon completion of the thesis.

EDLE 6003*
Educational Ideas. Decision-making processes used in educational systems and use of modern technologies for curricular enhancement and professional development.

EDLE 6143*
Resources for the Study of Educational Leadership. Introduction to research traditions, tools and processes that are integral to the study of educational leadership.

EDLE 6233*
Critical Issues in Higher Education. Issues that have shaped and are shaping higher education in American society.

EDLE 6243*
Connecting Theory and Practice in Administering Schools. Application of research findings and theoretical concepts to best practice in administering educational organizations.

EDLE 6343*
Problem Solving in School Administration. Identifying and analyzing administrative problems, individually and collectively, in school settings.

EDLE 6363*
Special Topics in School Finance Policy. Prerequisite(s): Admission to the Graduate College and EDLE 5323 or equivalent. Investigation of problems in education finance policy within the interconnected concepts of liberty, equity, equality, adequacy and efficiency.

EDLE 6393*
The Human Factor in Administering Schools. Analysis and critique of current issues in school personnel administration such as recruitment, selection, promotion, morale, salary, staff relations and teacher assessment.

EDLE 6423*
The Politics of Education. Activities of schools as they relate to the political environment, e.g., voter behavior, change strategies and community power structures.

EDLE 6453*
Special Topics in Education Law. Analysis and critique of selected topics in school law relating to public school administration.

EDLE 6463*
Higher Education Law. National and state constitutional provisions, laws, and court cases concerning higher education. Considerable legal research required.

EDLE 6483*
School Leadership, Culture and Ethics. Prerequisite(s): Admission to the School Administration doctoral program. Ethical dilemmas and leadership are explored. Personal ethics are studied in terms of integrity in leadership roles.

EDLE 6493*
School Improvement/Reform. Prerequisite(s): Admission to the School Administration doctoral program. Focus on the theory and practice of school improvement/reform, especially addressing conditions of underachievement and performance gaps among diverse populations. Knowledge and skill related to understanding evaluating, and implementing school improvement/reform practices. Addresses Oklahoma licensure standards related to the provision of effective instructional practices.

EDLE 6583*
The Impact of College on Students and on Society. The psychological and sociological impact that attending four-year colleges and universities has on undergraduates from their freshman year until they graduate.

EDLE 6603*
Organizational Theory in Education. Selected organizational typologies, conceptualizations and theoretical frameworks as they relate to organizational behavior and behavior of personnel in organizations.

EDLE 6650*
Problems in Educational Administration. 1-4 credits, max 8. Special administrative problem in common schools or higher education, e.g., school plant, school/community relations, administration and the instructional programs, attrition and finance.

EDLE 6683*
The Community Junior College. The American two-year college including historical and philosophical development, curricula, students and the learning process, faculty and instruction, administration and governance, support and control. Principles, practices and problems of community colleges in America.

EDLE 6703*
Finance in Higher Education. Problems and prospects of financing American education, with in-depth discussion of selected topics, e.g., social capital, federal aid, faculty salaries and state support.

EDLE 6710*
Special Problems. 1-4 credits, max 8. Assists administrators with either recurrent or unique problems arising in common schools or in higher education. Emphasizes evaluation and planning related especially to staff, programs and faculty needs.

EDLE 6713*
Effective Teaching in Colleges and Universities. Relevant research and practice about effective college teaching, role of faculty in higher education settings, and development of teaching strategies and lessons for application in college classrooms.

EDLE 6733*
Planning and Educational Change. Organizational and environmental parameters, sources of change, barriers to change, and strategies for planning and implementing organizational change.

EDLE 6753*
Historical Development of Higher Education. History and development of higher education, studies of objectives and functions of institutional types and of students and faculty.

EDLE 6803*
Administration in Higher Education. Functions and principles of administration in higher education from historical and contemporary points of view. Both internal and external forces acting on the institution treated.

EDLE 6823*
Educational Leadership. Leadership and the implications of leadership across contexts, cultures and time.

EDLE 6833*
College and University Presidency. The role and function of the presidency. For those who anticipate a career in college and university administration or a related management position.

EDLE 6843*
The Academic Department. Organization and administration in higher education emphasizing an analysis of the academic department and its leader, the department head.

EDLE 6850*
Directed Reading. 1-4 credits, max 6. Directed reading for students with graduate standing.

EDLE 6853*
Research Traditions in Educational Leadership. Exploration of advanced integrated research strategies and the development of designs and methods supporting the field of educational leadership.

EDLE 6863*
University and College Campus Culture. This course examines the concept of institutional and collegiate culture as a lens to understanding higher education institutions and their various stakeholders.

EDLE 6870*
Seminar. 1-6 credits, max 6. Topical issues related to administration and/or higher education, including research techniques available to analyze such topics.

EDLE 6883*
Internship in Education I. Lab 3. Prerequisite(s): Consent of instructor. Directed internship experiences designed to relate ideas and concepts to problems encountered in education by faculty and administrators.

EDLE 6893*
Internship in Education II. Lab 3. Prerequisite(s): Consent of instructor. Field experiences in a variety of educational work settings.

EDLE 6910*
Practicum. 1-5 credits, max 9. Prerequisite(s): Consent of instructor. Required of all candidates for the Specialist in Education degree. Designed to help the student carry out an acceptable field study or research problem. Credit given upon completion of the written report.

EDUCATIONAL PSYCHOLOGY (EPSY)

EPSY 1003
Learning to Learn. Learning effective strategies to succeed through online individualized assessment, positive attitude development, habit change, development and self-efficacy and self-regulation. Learning tools include goal setting, developing information skills, questioning, transformational learning, presentation and information use skills. Analyzing class materials, problem solving, creativity, teacher analysis, reflection, developing classroom motivation and appropriate classroom behavior to lead to classroom success.

EPSY 2513
Foundations of Ethical Leadership. Prerequisite(s): 24 hours in good standing; admission into the UGLC or consent of instructor. Introduces students to a variety of theoretical views of ethics and leadership studies through the identification of contemporary ethical challenges and the development of foundational leadership skills to meet those challenges. (Same course as EDLE 2513)

EPSY 3110
Educational Psychology Seminar. 1-3 credits, max 3. Problems, trends, contemporary topics, and pertinent issues in educational psychology. Concentrated study of selected areas not usually addressed in the undergraduate curriculum.

EPSY 3113
Psychological Foundations of Childhood. The child from conception to puberty with focus on educational implications of development in cognitive, affective and psychomotor domains.

EPSY 3213
Psychology of Adolescence. The adolescent from pubescence to adulthood with focus on educational implications of development in cognitive, affective and psychomotor domain.

EPSY 3413
Child and Adolescent Development. The person from conception through adolescence with focus on education implications of development in cognitive, affective, social, and physical domains.

EPSY 3513
Behavior Management for Teachers of Diverse Learners. Comprehensive and practical introduction to classroom management for diverse learners. Avoidance of behavioral problems through planning, organization and class management; group management procedures to promote positive learning environments, individualized management for specific behavior problems are addressed.

EPSY 3533
Motivating Learners. Current practices in learner motivation, school age through adult. Developing positive attitudes and building community in classrooms to stimulate motivation of all learners.

EPSY 4063*
Exploration of the Creative Experience. The creative experience in art (visual to performing), articulation (oratory to literature), thought (philosophy to psychology), business (practices to products), leisure (procreation to recreation). Western and Eastern viewpoints. Personal creative development fostered by modeling and by investigation of proven techniques. A wide range of creative endeavor with an experiential approach. Future-oriented applications.

EPSY 4223
Human Learning in Educational Psychology. Instructional psychology focusing on the study of teaching and learning theory as part of an instructional program to deal with individual, cultural, and environmental differences. Case studies and group discussion emphasizing motivation, planning, evaluation, classroom problems and management.

EPSY 4503
Ethical Leadership for the Common Good. Prerequisite(s): EPSY or EDLE 2513. Builds on foundational model of ethical theory and leadership studies through application of ethical theory and leadership skills to specific contexts and evaluation of their results. (Same course as EDLE 4513)

EPSY 4513*
Prevention and Intervention for Violent Incidents and Emergencies in School Settings. The literature and best practices for prevention and intervention for violent incidents and emergencies in school settings.

EPSY 4533
Competency Motivation. Development of competence through the application of research strategies in achievement motivation. Examines intellectual ability, motives, goals, attributions, competence perceptions and values as they relate to developmental issues, demographics, contextual influences, culture, and self-regulation.

EPSY 5000*
Master's Thesis. 1-6 credits, max 6. Prerequisite(s): Consent of advisory committee chairperson. Report of research conducted by a student in the master's program in school and educational psychology. Credit given and grade assigned upon completion and acceptance of the thesis.

EPSY 5023*
Introduction to School Psychological Service. Prerequisite(s): Admission to school psychometry or school psychology program or consent of instructor. History, role and function, and issues and problems of the school psychological service worker.

EPSY 5063*
Introduction to Gifted and Talented Education. Concepts, techniques and strategies for providing differentiated educational programs and experiences for the gifted and talented. State and Federal legislation; development of gifts and talents; program types; identification systems; program development; materials development; teaching techniques and methodologies.

EPSY 5103*
Human Development in Psychology. Introduction to basic research and theories of cognitive, emotional and social development. Applications to educational and family settings.

EPSY 5113*
Child Psychopathology. Prerequisite(s): 5103 or equivalent; enrolled in school psychology, counseling psychology or clinical psychology program or consent of instructor. Survey of theoretical and conceptual issues related to etiology, assessment and treatment of childhood psychopathology. Educational, empirical and clinical taxonomic systems compared and contrasted.

EPSY 5163*
Counseling Techniques for Teachers of Gifted and Talented Students. Techniques for dealing with the conflicts experienced by gifted and talented students. Strategies for consulting with teachers, peers, and parents regarding optimal development of gifts. Peer counseling techniques, dealing with self-concept, social and emotional concerns, problem solving and decision-making, referral procedures and self analysis for teachers related to learning and teaching philosophy and style.

EPSY 5210*
Introductory Practicum in School Psychometry. 2-6 credits, max 6. Prerequisite(s): Admission to school psychology program and consent of instructor. Various roles and functions of school psychologists; supervised experience with and shadowing of psychological service delivery activities, introduction to science-based child learner success orientation and professional identify as school psychologists.

EPSY 5213*
Advanced Educational Psychology. Learning and its effect upon coping and adjustment. How learning, environmental and personality factors interact to change human behavior.

EPSY 5310*
Practicum in Child and Adolescent Therapy. 1-6 credits, max 12. Prerequisite(s): 6033 and/or permission of instructor. Practicum offers supervised therapy experience with children, adolescents, and their parents for students in School Psychology.

EPSY 5320*
Seminar in Educational and School Psychology. 3-9 credits, max 9. In-depth exploration of contemporary topics in educational and school psychology.

EPSY 5363*
Differentiated Curriculum Techniques and Materials for Gifted and Talented. Development of curriculum content for horizontal and vertical enrichment and acceleration. Commercial and teacher-prepared materials in imagination; imagery; analogy; metaphor; inductive, deductive and abductive thinking; science; philosophy; psychology; logic systems; problem solving; concept learning; creativity; creative dramatics, etc. Conceptual approaches to the use of the preceding in various interest-based and non-interest-based formats.

EPSY 5403*
Issues in Adolescent Development. Current issues in adolescent development in an educational context and culture, including self, family, peers, school and work relationships. Gender differences within culture, race and class examined. Current dilemmas explored using critical theory and action research.

EPSY 5463*
Psychology of Learning. Application to education of the principles and theories of the psychology of learning.

EPSY 5503*
Crisis Intervention and Emergency Action in School Settings. Current models for crisis intervention and emergency actions plans in school settings. Preparation for crisis intervention and experience in evaluating crisis and emergency action plans in schools.

EPSY 5510*
Practicum in School Psychology. 2-6 credits, max 6. Prerequisite(s): Admission to school psychology program and consent of instructor. Supervised experience in the schools of psychological service delivery. Assessment, consultation, direct interventions and development of professional practice for school psychologists within school settings. Science-based child-success model. Two-three semester sequence.

EPSY 5603*
Developmental Issues in Instruction. Prerequisite(s): Three hours in developmental psychology, educational psychology or consent of instructor. Developmental issues in instruction at all levels from early childhood through adulthood. Specific impacts of developmental stages on the acquisition and retention of cognitive, affective and psychomotor development at various levels and contexts will be examined and applications to instruction will be provided.

EPSY 5620*
Practicum with Exceptional Learners. 1-8 credits, max 8, Lab 1-8. Prerequisite(s): Consent of instructor. Supervised individual and group experience with exceptional learners. The particular experience (learning disability, mental retardation, gifted, etc.) is determined by the student's field of specialization.

EPSY 5663*
Creativity for Teachers. Theoretical origins of creativity and their concomitant applications in the learning environment. Blocks to creative thinking, imagination, imagery, creativity testing, developing ideas and innovations, creative problem solving and teaching techniques and methods to maximize creative potential in all kinds and types of students.

EPSY 5713*
Transpersonal Human Development. Human development in terms of individual consciousness, focusing on the implications of such extraordinary states of consciousness as those associated with hallucinogenic drugs and mystical religious experience. Integration of psychological and religious interpretations of development. Applications to practical problems in education and psychology.

EPSY 5720*
Educational and School Psychology Workshop. 1-9 credits, max 9. Workshop on various topics related to educational and school psychology.

EPSY 5753*
Psychoeducational Assessment of Pre-schoolers. Relevant issues and challenges associated with the intellectual, social and behavioral assessment of preschool children, from the vantage point of recent research, discourse and policy initiatives. The link between assessment and intervention.

EPSY 5763*
Teaching Methods and Techniques for the Gifted and Talented. Subject and skill-related learning facilitation that is process-oriented and doing-centered. The role of the teacher as facilitator, counselor and non-directive change agent. Individualized educational plans, involving independent study, tutoring, correspondence, clustering, mentors, learning centers, resource centers.

EPSY 5783*
Psycho-educational Testing of Exceptional Individuals. Intensive practice in the selection, administration and interpretation of individual tests, appropriate for exceptional individuals.

EPSY 5793*
Individual Intellectual Assessment of Children and Youth. Prerequisite(s): 5783 or consent of instructor. Intensive study of the Wechsler Scales, the Stanford-Binet, and other selected tests of mental ability. Emphasis and practice in administration, scoring, interpretation. Issues related to report writing and non-discriminatory assessment.

EPSY 5803*
Advanced Intellectual Assessment, Contemporary Theories and Assessment of Intelligence and Cognitive Abilities. Prerequisite(s): 5783 or equivalent; good standing in school, counseling, or clinical psychology program, or consent of instructor. Examination of contemporary theories of intelligence and cognitive abilities and intelligence to new assessment technology. Appropriate for school, counseling, or clinical psychology students who are already familiar with tests such as the Wechsler Series and the Stanford Binet IV.

EPSY 5813*
Parent and Family Interventions in School Psychology. Prerequisite(s): By consent of instructor only. Empirically-supported, parent-implemented interventions for children and adolescents addressing a variety of home and school problems within the discipline of school psychology.

EPSY 5853*
Applied Behavior Analysis. Intensive study of behavior and analytical principles as they relate to the functional assessment and intervention development with an emphasis on developmental issues. Fundamental theoretical and philosophical issues, procedures and findings within applied behavior analysis in educational and related psychology specialties.

EPSY 5863*
Developing Programs for the Gifted and Talented. Programs based on various philosophies and structural concepts of gifted and talented education, e.g., mainstreaming, self-contained, pullouts, magnet schools, time blocking, acceleration and enrichment. Programs designed for general and specific academic ability; however, exposure will be provided to creative and productive thinking programs, leadership programs, and visual and performing arts programs. Specific models included.

EPSY 5963*
Developing Resources to Support Educational Programs. Development, management and evaluation of programs in intra- and extra-class settings. Program types include parent, volunteer, mentor, tutor, group sponsors in technology, business involvement, curricular enhancement and service learning. Developing community and business interest through public relations, financial development, grantsmanship or resource information sources. Developing Internet resources to support learners.

EPSY 5993*
Identification and Behavior Characteristics of the Gifted and Talented. Cognitive, affective, and behavioral characteristics of the gifted and talented. Selection of tests and interest inventories. Selection and/or developing of nomination/recommendation forms/models, inventories, checklists, rating scales, sociograms as well as data abstraction from cumulative and anecdotal records. Functions of gifted/talented identification committees.

EPSY 6000*
Doctoral Dissertation. 1-25 credits, max 25. Prerequisite(s): Consent of advisory committee chairperson. Report of research conducted by a student in the doctoral program in educational school psychology. Credit given and grade assigned upon completion and acceptance of the doctoral thesis.

EPSY 6030*
Doctoral Seminar in School Psychology. 3-6 credits, max 6. Prerequisite(s): Admission to school psychology doctoral program. Research in school psychology in areas such as philosophy of science, major areas of emphasis, research design, ethical concerns, solving problems in schools, and publication. Scientific and professional ethics and standards of psychologists.

EPSY 6033*
Introduction to Psychotherapy with Children and Adolescents. 3 credits. Prerequisite(s): 5113. Development of individual and group skills in therapy with children and adolescents. Applications of theories of psychotherapy to a variety of disorders and coping skills, crisis intervention and adaptive social skills training.

EPSY 6043*
Adult Development. Theory and research concerning human development during the adult years. Practical applications for serving adult populations in education and education-related settings.

EPSY 6063*
Research Applications with Q Methodology. Research applications using qualitative, quantitative and Q methodology. Subjectivity and abductive reasoning explored with a limited research project. Professional research skills, including ethics, process, team research and manuscript development.

EPSY 6110*
Seminar in School Psychology. 1-3 credits, max 6. An assessment of psychological techniques applied to problems encountered in the internship.

EPSY 6113*
Child Personality Assessment. Prerequisite(s): Admission to school psychology or counseling psychology program, or consent of instructor. The personal and social assessment of children using objective and projective techniques.

EPSY 6133*
History and Systems of Psychology. History and systems of psychology related to contemporary applied psychology.

EPSY 6143*
Introduction to Developmental Psychopharmacology. Prerequisite(s): Graduate student in School of Applied Health and Educational Psychology, or psychology; or 5103, or equivalent, or consent of instructor. Introduction to biological basis of behavior and behavior disorders. Review of the biological systems associated with psychopharmacological treatments. Major drug classes and their role in the treatment of developmental psychopathology.

EPSY 6153*
Advanced Research in Educational Psychology. Prerequisite(s): Admission to doctoral program in Educational Psychology (School, Educational, Counseling, REMS Options). Research in educational psychology in areas such as philosophy of science, issues in basic and applied research in psychology, research ethics, advanced quantitative and qualitative research design. Preparation of the dissertation and grant proposals and dissemination of research.

EPSY 6163*
Emotion and Cognition. The relationship between emotion and cognition as it relates to knowing and learning. History, wisdom and the interdependence of affect and cognition, the effects of mood on memory, emotion in feminist epistemology, the role of feeling in the writing process, intuition, and narrative thought. Exploration of potential research.

EPSY 6210*
Internship in School Psychology. 3-6 credits, max 12. Prerequisite(s): Admission to school psychology program; completion of all course work; completed readiness for internship form and approval of school psychology faculty. Supervised field experience of non-doctoral school psychologists by certified school psychologists for a maximum of 1200 hours over the course of an academic year, or half-time for two years.

EPSY 6310*
Doctoral Practicum in School Psychology. 1-6 credits, max 6. Prerequisite(s): 5510 and consent of instructor. Advanced practica for doctoral students in school psychology. Supervised experiences in assessment, consultation, intervention and supervision activities in a non-school setting.

ESPY 6323*
Psychological Consultation. Prerequisite(s): Admission to graduate program in the SAHEP or psychology program. Models and strategies for the delivery of special services in the schools and other agencies that focus on serving the mental health needs of children, adolescents and adults. The use of consultation as a problem solving alternative to the assessment/label approach. (Same course as CPSY 6323, students can receive credit in only one of the courses)

EPSY 6333*
Instructional Assessment and Consultation. Prerequisite(s): Admission to College of Education or psychology program; or consent of instructor. Development of skills in consulting with educational and agency personnel and families regarding academic and educational functioning. Systematic curriculum-based assessment and measurement techniques as well as planning, implementing and evaluating instructional interventions. Evaluation of the instructional environment.

EPSY 6343*
Behavioral Assessment and Consultation. Prerequisite(s): 5113 or equivalent; admission to school psychology, clinical psychology or counseling psychology program; or consent of instructor. Development of psychological skills in systematic behavioral assessment and consultation with application to school, agency and home settings. Systematic behavioral observation, data collection and intervention design, implementation and evaluation.

EPSY 6443*
Theories and Problems in Educational Psychology. Prerequisite(s): Admission to the doctoral program in educational psychology or consent of instructor. Theoretical foundations and nature of the problems studied in educational psychology; current issues and historical overview.

EPSY 6460*
Internship in Educational Psychology. 1-9 credits, max 9. Prerequisite(s): Consent of instructor. Supervision and guidance of teaching and service in educational psychology. May be repeated for credit when work assignment varies. Required of all teaching assistants in educational psychology during the first semester of each new teaching assignment. Includes cooperative planning and evaluation.

EPSY 6533*
Human Motivation. A theoretically-oriented approach to the concept of motivation; essential precursors to human behavior and applications to the solution of real and hypothetical problems.

EPSY 6610*
Doctoral Internship in School Psychology. 3-6 credits, max 6. Prerequisite(s): Admission to school psychology doctoral program, completion of all course work; readiness for internship form, approved by school psychology faculty. Supervised experience of doctoral school psychologists for final preparation to enter the profession of school psychology. Designed to fulfill requirements of APA and State Board of Examiners of Psychologists.

EPSY 6613*
Instructional Systems Design. A practically-oriented coverage of analyzing, defining, sequencing and validating instructional systems. Developing educational objectives, course development, matching instruction to individual differences and evaluation of systems. Techniques of developing and validating instructional components.

EPSY 6850*
Directed Readings in Educational and School Psychology. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Directed reading for students with advanced graduate standing in educational and school psychology.

EPSY 6880*
Internship in Education. 1-8 credits, max 8, Lab 3-24. Prerequisite(s): Admission to advanced graduate program and consent of area coordinator. Directed off-campus experiences designed to relate ideas and concepts to problems encountered in the management of the school program.

EDUCATIONAL TECHNOLOGY (EDTC)

EDTC 3123
Applications of Educational Technologies. Introduction to the design and development of instruction using educational media and technology. Materials development, contemporary applications of computers and other electronic systems to instruction. Integration of instructional design, instructional media, and instructional computing.

EDTC 4113
Applications of Media and Technology. Introduction to the application of media and technology to formal and informal learning situations. *Intended for non-professional education majors.*

EDTC 5000*
Master's Report or Thesis. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Students studying for a master's degree enroll in this course for a total of 2 credit hours if they write a report or 6 hours if they write a thesis.

EDTC 5103*
Advanced Computing Applications in Education. Lab 0-2. Includes educational applications involving authoring systems, database management, hardware interfacing, and non-instructional uses within the school environment. Impact of current issues on instructional computing.

EDTC 5113*
Digital Media Production for Instruction. Introduction to the production of digital media for instruction. Topics covered: Instructional design for digital media, message design, use of graphics, multimedia development tools. Current research, trends, tools and issues in media production will also be addressed.

EDTC 5153*
Computer-Based Instruction Development. Lab 0-2. Prerequisite(s): 4113. Examinations of curriculum strategies, related research issues, and techniques for developing computer-based instruction. Students will develop and evaluate computer-based instruction with case studies.

EDTC 5203*
Foundations of Educational Technologies. A general introduction to the field of Educational Technology. Define, describe, and critically evaluate the foundations, issues and careers in educational technology.

EDTC 5720*
Education Workshop. 1-8 credits, max 8. For teachers, principals, superintendents and supervisors who have definite problems in instruction or administration. Students must register for the full number of credit hours for which the workshop is scheduled for a particular term.

EDTC 5753*
Introduction to Instructional Design. Introduction to the systematic design of instruction. Topics covered: Analysis, design, development, implementation, and evaluation of instructional materials in a variety of educational settings. Current research, trends and issues in instructional design will be addressed.

EDTC 5773*
Instructional Systems Management. Principles of management relevant to instructional systems, including, but not limited to: project, resource, quality, change, financial, information technology, human resource, program evaluation, product, knowledge and performance management.

EDTC 5850*
Directed Study. 1-3 credits, max 3. Prerequisite(s): Consent of instructor. Directed study for master's level students.

EDTC 6000*
Doctoral Dissertation. 1-15 credits, max 15. Required of all candidates to the Doctor of Education degree. Credit is given upon completion of the thesis.

EDTC 6153*
Advanced Computer-Based Instructional Development. Prerequisite(s): 5153 or consent of instructor. Design of user-friendly instructional interfaces and computer-based learning management systems.

EDTC 6283*
Performance Improvement Technology. Overview of performance improvement, as defined within the field of Educational Technology. Training and non-training interventions to improve performance in learning situations. Sample topics may include needs assessment, motivation systems, compensation systems, job aids, or electronic performance support systems.

EDTC 6333*
Human Computer Interaction. Prerequisite(s): 5153 or consent of instructor. Human cognitive architecture, information processing, and design of effective educational, computer-based interfaces.

EDTC 6423*
Trends and Issues in Educational Technology. Selected problems, issues and trends in educational technology.

EDTC 6850*
Directed Reading. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Directed reading for students with advanced graduate standing to enhance students' understanding in areas where they wish additional knowledge.

EDTC 6880*
Internship in Education. 1-8 credits, max 8. Prerequisite(s): Consent of instructor. Directed off campus experiences designed to relate ideas and concepts to problems encountered in the management of the school program.

EDTC 6910*
Practicum. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Helps the student carry out an acceptable research problem (practicum) in a local school situation. *Credit given upon completion of the written report.*

ELECTRICAL AND COMPUTER ENGINEERING (ECEN)

ECEN 2011
Experimental Methods I. Lab 3. Prerequisite(s): PHYS 2114; Co-requisite(s): ENSC 2613. Basic electrical measurements and instrumentation techniques and devices. Use of voltmeters, ammeters, oscilloscopes, impedance bridges to study resistive, inductive, and capacitive circuit elements in steady state and transient operation. Reinforces ENSC 2613 and introduces design of instrumentation networks. *Serves as introduction for non-majors.*

ECEN 3020
Supervised Research Project. 1-3 credits, max 3. Prerequisite(s): Consent of instructor and ECEN department head. Supervised research project for qualified students. May be repeated no more than three times for a total of three credit hours.

ECEN 3021
Experimental Methods II. Lab 3. Prerequisite(s): 2011, ENSC 2613; Co-requisite(s): ECEN 3713. Second laboratory in electrical measurements and instrumentation techniques and devices. Frequency response using gain/phase meter and spectrum analyzer. Identification of unknown two-port networks, steady state operation of linear networks. Reinforces ECEN 3713 and continues with the design of networks.

ECEN 3031
Experimental Methods III. Lab 3. Prerequisite(s): 3021, 3713; Co-requisite(s): 3313. Third laboratory in electrical measurements and instrumentation techniques and devices. Use of transistor curve tracers. Transistor operating points. Behavior of BJT amplifiers. MOSFET circuits and behavior. Operational amplifiers and feedback circuits. Reinforces ECEN 3313, continuing the design experience in the context of electronics.

ECEN 3113
Energy Conversion. Lab 2. Prerequisite(s): 3714. Physical principles of electromagnetic and electromechanical energy conversion devices and their application to conventional transformers and rotating machines. Network and phasor models; steady-state performance.

ECEN 3213
Microcomputer Principles and Applications. Lab 2. Prerequisite(s): Junior standing or above. Introductory microcomputers. Digital logic elements and number systems, memory components and organization. Microprocessor and microcomputer system architecture, assembly language programming, software development, interfacing techniques.

ECEN 3233
Digital Logic Design. Lab 2. Boolean algebra, optimization of logic networks. Design using SSI, and MSI, LSI components. ROM and PLA applications. Analysis and design of clock sequential logic networks. Flip-flops, counters, registers. Asynchronos circuit design and analysis. Laboratory experience in implementing combinational and sequential logic devices.

ECEN 3314
Electronic Devices and Applications. Lab 2. Prerequisite(s): 2011, 3714. Semiconductor electronic components including MOSFETs, BJTs, JFETs, and OpAmps. Emphasis on device models and use of solid state electronic devices to analyze, synthesize and design amplifiers and switching circuits. SPICE simulations are extensively utilized. Basic building blocks for analog and digital applications. Theoretical concepts and methods are demonstrated and reinforced through laboratory exercises.

ECEN 3513
Signal Analysis. Prerequisite(s): 3201, 3713 or 3714. Deterministic signals. Fourier series and Fourier transforms. Impulse response, convolution and correlation. Sampling theorem. Analog modulation techniques.

ECEN 3613
Electromagnetic Fields. Prerequisite(s): ENSC 2613, MATH 2163 and MATH 2233. Time-harmonic and transient response of transmission lines. Maxwells equations and their applications to engineering problems in electrostatics, magnetostatics, time-harmonic fields and plane wave propagation.

ECEN 3623
Mathematical Foundations of Electromagnetics and Photonics. Lab 2. Prerequisite(s): 3613. Mathematical and computational treatment of fundamental electromagnetic theory, with applications to microwave engineering, photonics and semiconductor design. Energy and power; Laplace and Poisson equations; wave equation, including reflection, refraction, and diffraction; and classical electromagnetic radiation at macroscopic and microscopic levels.

ECEN 3714
Network Analysis. Lab 2. Prerequisite(s): 2011, ENSC 2613, MATH 2233. Laplace transform, transfer functions, magnetically coupled circuits and two-port networks. Theoretical concepts and methods are demonstrated and reinforced through laboratory exercises.

ECEN 3723
Systems I. Prerequisite(s): ENSC 2123. Physical and mathematical modeling of electrical and mechanical dynamic systems. Transient response of first- and second-order systems. Laplace transform techniques for solving differential equations, transfer functions, frequency response and resonance. (Same course as MAE 3723)

ECEN 4010*
Technical Problems and Engineering Design. 1-12 credits, max 12. Prerequisite(s): Consent of instructor. Individual independent study projects selected in consultation with the instructor; analysis or design problems, literature searches and computer simulations may be involved.

ECEN 4013
Senior Design Lab I. Lab 4. Prerequisite(s): 2011, 3714, 3314, 3213 or 3233 or ENSC 3213, ENGL 3323. Complete design cycle for several small design projects, each including establishing objectives, synthesis, analysis, construction, testing and evaluation. Use of modern lab equipment and fabrication techniques. Development of communication skills.

ECEN 4024
Senior Design Lab II. Lab 6. Prerequisite(s): 4013. Continuation of ECEN 4013. Student project teams design, build, test and present results for realistic projects from university and industrial sponsors. Formulation of specifications, consideration of alternative solutions, feasibility considerations, detailed system descriptions, economic factors, safety, reliability, aesthetics, ethics and social impact.

ECEN 4030
Undergraduate Professional Practice. 1-8 credits, max 8. Prerequisite(s): Approval of ECEN department head. Experience in application of electrical engineering principles to typical problems encountered in industry. Solutions to the problems by student participation in the role of engineer or engineering intern.

ECEN 4133*
Power Electronics. Power electronic devices, components, and their characteristics; DC to AC conversion; fundamentals of inverters and waveshaping devices; application aspects; control aspects; characteristics and state-of-the-art of advanced power inverter and power conditioning topologies.

ECEN 4153*
Power System Analysis and Design. Prerequisite(s): 3113. Power system component models from circuit theory. Formulation and design of the load flow model and the optimum economic generator allocation problem utilizing computer methods.

ECEN 4213*
Embedded Computer Systems Design. Lab 2. Prerequisite(s): 3213 or ENSC 3213 and CS 1113. Design of microprocessor-based systems through proper integration of hardware and software. Serial and parallel communications, sensor interfacing, computer control of external devices, and color graphics hardware. Design of PASCAL and assembly language modules for optimum real-time system performance.

ECEN 4233*
High Speed Computer Arithmetic. Prerequisite(s): 3233. Course covers computer arithmetic as applied to general purpose and application-specific processors. Focus is on developing high-speed arithmetic algorithms and understanding their implementation in VLSI technology at the gate level.

ECEN 4243*
Computer Architecture. Lab 2. Prerequisite(s): 3213 or ENSC 3213 and ECEN 3233. Functional organization and hardware design of digital computer systems with emphasis on microprocessor-based systems. CPU organization, features of microprocessors including advanced 32-bit CPU's, memory system design including cache, virtual memory, error detection and correction, I/O operations, including direct memory access and peripheral interface design.

ECEN 4273*
Software Engineering. Prerequisite(s): 3213 or ENSC 3213 or CS 1113, CS 3443. Fundamental characteristics of the software life cycle. Tools, techniques, and management controls for development and maintenance of large software systems. Software metrics and models. Human factors and experimental design. (Same course as CS 4273)

ECEN 4283*
Computer Networks. Prerequisite(s): 3213 or ENSC 3213 or CS 3443; UNIX knowledge. Computer networks, distributed systems and their systematic design. Introduction to the use, structure, and architecture of computer networks. Networking experiments to describe network topology. ISO reference model. (Same course as CS 4283)

ECEN 4303*
Digital Electronics Circuit Design. Prerequisite(s): 3233 and 3314 or 3313. Theory of digital and electronics circuits. Digital logic families TTL, IIL, ECL, NMOS, CMOS, GaAs. Large signal models for transistors. Implementation at RAM and ROM. Circuit design for LSI and VLSI.

ECEN 4313*
Linear Electronics Circuit Design. Prerequisite(s): 3314. Class A and B small-signal, push-pull power, complementary symmetry, differential and operational amplifiers, utilizing field-effect transistors, bipolar transistors, tunnel diodes and integrated circuits. Emphasis on amplification in electronic devices, design and analysis of wide-band amplifier circuitry.

ECEN 4353*
Communication Electronics. Prerequisite(s): 3314. Design of tuned voltage and power amplifiers, oscillators and mixers, modulation and detection, and parametric amplifiers.

ECEN 4413*
Automatic Control Systems. Prerequisite(s): 3723 or MAE 3723. Properties of feedback control systems, mathematical models of basic components, state-variable models of feedback systems, time-domain analysis, stability, transform analysis, frequency domain techniques, root-locus design of single input single output systems and simple compensation techniques. (Same course as MAE 4053)

ECEN 4503*
Random Signals and Noise. Prerequisite(s): 3513, 3714. Analysis of electrical systems using elementary concepts of probability, random variables and random processes. Frequency and time domain response of linear systems driven by random inputs. Statistical properties of electrical noise. Analysis and design of optimum linear systems.

ECEN 4523*
Communication Theory. Prerequisite(s): 3513. Noise in modulation systems. Digital data transmission. Design of optimal receivers. Introduction to information theory.

ECEN 4533*
Data Communications. Prerequisite(s): 4503. Signal detection in noise. Tradeoffs between bandwidth signal-to-noise ratio and rate of information transfer. Transmission multiplexing and error handling. Elements of computer network design. Data link protocols.

ECEN 4613*
Microwave Engineering. Prerequisite(s): 3613. Aspects of propagation, transmission, and radiation of microwave energy. Plane wave propagation; lossless and lossy media, reflection, refraction, and polarization. Transmission line theory; lumped element model, characteristic impedance, impedance matching, and transient response. Theory of waveguides and cavity resonators. Microwave network theory and S-parameters. Introduction to radiating systems.

ECEN 4703*
Active Filter Design. Prerequisite(s): 3714. Introduction to passive filters; operational amplifiers as network elements; filter specifications; design of active filters. Laboratory design projects and computer simulations.

ECEN 4743*
Introduction to Biomedical Engineering Modeling and Systems. Prerequisite(s): 3714, 4763. An overview of the field of biomedical engineering and an introduction of the modeling approaches implemented in biomedical engineering. Topics include bio-electronics, biomechanics, compartmental modeling, bio-signal processing, biomedical optics, etc. The course will demonstrate a few of major fields of activity in which biomedical engineers are engaged and modeling approaches are implemented.

ECEN 4763*
Introduction to Digital Signal Processing. Prerequisite(s): 3513. Introduction to discrete linear systems using difference equations and z-transforms. Discrete Fourier analysis. Design of digital filters. Sampling theorem. Applications of digital signal processing.

ECEN 4773*
Real Time Digital Signal Processing. Prerequisite(s): 4763 or equivalent. DSP Processor architectures and programming. A/D, D/A, polled and interrupt-driven I/O. Realtime implementation of FIR/IIR filters, the FFT, and other DSP algorithms on special purpose DSP hardware from Motorola, Texas Instruments and others. Link between DSP theory and practical implementation.

ECEN 4823*
Design of Optical Systems. Lab 2. Prerequisite(s): PHYS 2114. Introduction to optics through the design, construction, and characterization of optical systems. Emphasis on geometrical optics and spectroscopy.

ECEN 4843*
Design of Lasers and Systems. Lab 2. Prerequisite(s): 3613. Introduction of the design of lasers and optical systems based on lasers including the design, construction, and characterization of lasers. Gaussian beams and optics, laser gain materials, laser cavities, advanced topics.

ECEN 5000*
Thesis or Report. 1-6 credits, max 6. Prerequisite(s): Approval of major professor. A student studying for the master's degree will enroll in this course for a maximum of six credit hours.

ECEN 5030*
Professional Practice. 1-8 credits, max 8. Experience in application of electrical engineering principles to typical problems encountered in industry and government engineering design and development projects. Solutions to the problems require participation by the student in the role of junior engineer or engineer-intern. Problem solutions involve economics and ecological considerations as well as technology and must be adequately documented.

ECEN 5060*
Special Topics. 1-6 credits, max 30. Prerequisite(s): Consent of instructor. Engineering topics not normally included in existing courses. Repeat credit may be earned with different course subtitles assigned.

ECEN 5070*
Directed Studies. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Investigation outside of the classroom of topics not normally covered in lecture courses.

ECEN 5113*
Power System Analysis by Computer Methods. Quasi-static control of power systems and analysis of power systems under abnormal operating conditions. Transient stability studies. Models formulated and solutions outlined for implementation on the computer.

ECEN 5123*
Engineering Systems Reliability Evaluation. Techniques and concepts needed for evaluating the long-term and short-term reliability of a system. Topics include static and spinning generation capacity; transmission, composite, interconnected, and dc system reliability evaluations; and power system security. Applications to systems other than power systems included. For students with little or no background in probability or statistics.

ECEN 5153*
Direct Energy Conversion. Energy conversion techniques and applications; thermo-electrics, thermionics, fuel cells, MHD and other processes involving electrical, mechanical and thermal energies. State-of-the-art developments in direct energy conversion using selected papers from journals and other publications. Gives the student a proper perspective of the possibilities and problems associated with satisfying future energy requirements.

ECEN 5193*
Power Economics and Regulation. Prerequisite(s): Vector calculus, familiarity with complex numbers. Natural monopoly, regulated monopolities. Power pricing. Deregulation and the Energy Policy Act of 1992. Bulk power markets, transmission access and wheeling. Economic dispatch and system operations. Security and reliability. Environmental externalities and Clean Air Act compliance. Procurement of new capacity and integrated resource planning. Co-generators and independent power producers.

ECEN 5223*
Digital Systems Testing. Prerequisite(s): 3233. Testing of combinational and sequential circuits. Test generation techniques. Design of reliable and testable circuits and systems. Testing for LSI and VLSI.

ECEN 5253*
Digital Computer Design. Prerequisite(s): 3233, 4243 or graduate standing. Analysis and design of digital computers. Arithmetic algorithms and the design of the arithmetic/logic unit (ALU). Serial and parallel data processing; control and timing systems; microprogramming; memory organization alternatives; input/output interfaces. (Same course as CS 5253)

ECEN 5263*
VLSI Digital Systems Design. Prerequisite(s): 4303; 5253 recommended or graduate standing. Design of very large-scale digital systems on a single chip. Review of MOS technology. Design rules imposed by fabrication techniques. Systematic structures for control and data flow; system timing; highly concurrent systems. Experimental opportunities available.

ECEN 5283*
Computer Vision. The development of machine vision and advanced image understanding techniques for robotics, automated inspection, biomedicine. Object recognition, motion analysis, object tracking, segmentation, representation, and 3-D analysis.

ECEN 5313*
Solid-state Electronics I. An advanced study of electronic networks. Application of solid-state devices to the medium- and low-frequency regions. Integrated networks as replacements for discrete-component networks. Discrete and integrated operational amplifiers. Broad-band and tuned amplifiers.

ECEN 5333*
Semiconductor Devices. Prerequisite(s): 3314 and PHYS 3313 or equivalent. Semiconductor crystal structure and device fabrication, carrier distribution and transport, pn junction and diode, metal-semiconductor heterojunction, MOSFET, BJT and optoelectronic devices.

ECEN 5353*
Advanced Power Electronics. Prerequisite(s): 4133. Characteristics of high power semiconductor devices and the application of such devices to power conditioning, inversion and wave shaping at high power levels.

ECEN 5363*
CMOS Analog Integrated Circuit Design. Prerequisite(s): 4313. Advanced study of solid state CMOS linear integrated circuits. Topics include: Op Amps, comparators, multipliers, D/A and A/D converters and Op Amp building blocks. Op Amp building blocks include, differential pairs, current mirrors, gain, output stages, and references. VLSI layout and circuit simulation using SPICE.

ECEN 5373*
RF Microwave Circuit Design. Prerequisite(s): 3314 , 4613 and 5333 or equivalent. Smith chart, single- and multi-port network, filter design, RF/microwave components and modeling, matching and biasing network, amplifier, oscillators and mixers.

ECEN 5413*
Optimal Control. Prerequisite(s): 5713 or MAE 5713. Optimal control theory for modern systems design. Specification of optimum performance indices. Dynamic programming, calculus of variations and Pontryagin's minimum principle. Iterative numerical techniques for trajectory optimization. (Same course as MAE 5413)

ECEN 5423*
Control of Hybrid Systems. Prerequisite(s): 5713 Linear Systems or consent of instructor. Introduction and definitions. Modeling of hybrid systems. Analysis of hybrid systems. Stability analysis. Switched control systems. Hybrid control design. Applications in power systems, robotics, transportation and multivehicle systems.

ECEN 5433*
Robotics Kinematics, Dynamics and Control. Prerequisite(s): 4413 or MAE 4053 or consent of instructor. Kinematic and dynamic analysis of robot manipulators. Inverse kinematics, motion planning and trajectory generation. Industrial practice in robot servo control. Dynamics and control in the presence of constraints. Actuators and sensors. Force sensors and vision systems. Robotic force control and its applications in industry. Passivity-based control algorithms. Advanced control techniques for motion and force control. (Same course as MAE 5433)

ECEN 5463*
Nonlinear System Analysis and Control. Prerequisite(s): 4413 or MAE 4053. Failure of superposition of effects; phase-plane analysis; limit-cycles; Lyapunov stability; hyperstability and input-output stability; controllability and observability of nonlinear systems; feedback linearization; robust nonlinear control system design. (Same course as MAE 5463)

ECEN 5473*
Digital Control Systems. Prerequisite(s): 4413 or MAE 4053. Input-output and state-space representation of linear discrete-time systems. Approximate methods in discrete-time representation. Stability methods. Controllability, observability, state estimation, and parameter identification. Design and analysis of feedback control system using frequency-domain and state-space methods. Introduction to optimal control. (Same course as MAE 5473)

ECEN 5483*
Digital Data Acquisition and Control. Prerequisite(s): Undergraduate course in programming. Use of microcomputers operating in real-time applied to engineering systems for data acquisition and control, use of analog to digital, digital to analog, and digital input/output, synchronous and asynchronous programming. Competence in the engineering use of microcomputers through lectures and laboratory applications. (Same course as MAE 5483)

ECEN 5493*
Software Design for Real-time Distributed Systems. Prerequisite(s): 5483 or MAE 5483 or consent of the instructor. Fundamental concepts associated with the design of software for implementation on distributed computer systems using real-time operating systems. Parallel computing in a real-time environment and control algorithm design. State-of-the-art boards including analog-to-digital and digital-to-analog equipment and newest computer-aided software engineering tools.

ECEN 5513*
Stochastic Systems. Prerequisite(s): 3513 and 4503 or STAT 4033. Theory and applications involving probability, random variables, functions of random variables, and stochastic processes, including Gaussian and Markov processes. Correlation, power spectral density, and non-stationary random processes. Response of linear systems to stochastic processes. State-space formulation and covariance analysis. (Same course as MAE 5513)

ECEN 5523*
Estimation Theory. Prerequisite(s): 5513 or MAE 5513. Optimal estimation theory including linear and nonlinear estimation of discrete and continuous random functions. Wiener and Kalman filter theory included. (Same course as MAE 5523)

ECEN 5533*
Modern Communication Theory. Prerequisite(s): 5513. Noise as a random process, analog and digital signal detection in the presence of noise, optimum receiver design using signal space concepts and introduction to information theory. Trade-offs between bandwidth, signal-to-noise ratio and the rate of information transfer. Example system designs include earth satellite, deep space and terrestrial communication systems and computer communication networks.

ECEN 5543*
Data Transportation and Protection. Data and its representation; finite field matrices, pseudorandom sequences; information protection; space division networks; synchronization; and channel and error control.

ECEN 5553*
Telecommunications Systems. Prerequisite(s): Graduate standing or consent of instructor. Surveys the ways and means that voice, data and video are moved long distances. Covers computer networks (Ethernet LAN's, Internet WAN's); telephone systems (PSTN, VolP and cellular telephony); video (MPEG, H.323, and IPTV); and last mile delivery systems.

ECEN 5563*
Principles of Wireless Networks. Prerequisite(s): 4283 or CS 4283. Wireless network operation, planning, mobility management, cellular and mobile data networks based on CDMA, TDMA, GSM; IEEE 802-11 WLANS, Adhoc networks, Bluetooth, power management, wireless geolocation and indoor positioning technique. (Same course as CS 5813)

ECEN 5613*
Electromagnetic Theory. Prerequisite(s): 3613. First graduate level treatment of classical electromagnetic theory. Wave equation, potential theory, boundary conditions. Rectangular, cylindrical and spherical wave functions. Conducting and dielectric guiding structures. Scattering and radiation. Introduction to numerical techniques.

ECEN 5623*
Antenna Theory. Prerequisite(s): 3613. Fundamental antenna parameters, including directivity, efficiency, radiation resistance, and pattern. Analysis of dipole, loop, aperture, broad- band, and traveling wave antennas. Array theory. Introduction to numerical techniques used in modern antenna design.

ECEN 5633*
Radar Theory. Prerequisite(s): 3613; 4503 or 5513. Theoretical treatment of radar principles. Overview of radar systems and techniques, radar equation, integration of signals. Radar cross-section of single and multiple targets. Waveform design, resolution, ambiguities and accuracy. Range, speed and angular measurements. Detection of targets in noise. Statistical description of clutter. Signal processing techniques.

ECEN 5643*
Antennas and Propagation for Wireless Communications. Prerequisite(s): 3613, 4503. Aspects of radiowave propagation for fixed and mobile communication systems. Review of Maxwell's equations and plane wave propagation, antenna principles. Reflection, refraction, diffraction, fading and scintillation, attenuation, ducting, diversity. Propagation in a cellular environment. Satellite communications.

ECEN 5703*
Optimization Applications. Prerequisite(s): Graduate standing. A survey of various methods of unconstrained and constrained linear and non-linear optimization. Applications of these methodologies using hand-worked examples and available software packages. *This applications oriented course is intended for engineering and science students.* (Same course as CHE 5703, IEM 5023 & MAE 5703)

ECEN 5713*
Linear Systems. Prerequisite(s): Graduate standing or consent of instructor. Introduction to the fundamental theory of finite-dimensional linear systems with emphasis on the state-space representation. Mathematical representations of systems; linear dynamic solutions; controllability, observability, and stability; linearization and realization theory; and state feedback and state observer. (Same course as MAE 5713)

ECEN 5733*
Neural Networks. Prerequisite(s): Graduate standing. Introduction to mathematical analysis of networks and learning rules, and on the application of neural networks to certain engineering problems in image and signal processing and control systems. (Same course as CHE 5733 & MAE 5733)

ECEN 5753*
Digital Processing of Speech Signals. Prerequisite(s): 4763 or 5763. Digital signal processing; speech production; digital modeling of speech; short time analysis and synthesis; the short time Fourier transform, linear predictive coding and solution of the normal equations; vocal tract spectrum calculation; speech coding; homomorphic processing; applications of speech processing. Introduction to more advanced topics as time permits.

ECEN 5763*
Digital Signal Processing. Introduction to discrete linear systems; frequency-domain design of digital filters; quantization effects in digital filters; digital filter hardware, discrete Fourier transforms; high-speed convolution and correlation with application to digital filtering; introduction to Walsh-Fourier theory.

ECEN 5773*
Intelligent Systems. Prerequisite(s): 5733. Introduction to the state-of-the art intelligent control and system successfully deployed to industrial and defense applications. Emerging intelligent algorithms (e.g., NN, FS, GA, EP, DES); intelligent control architecture (e.g., bottom-up, top-down, seminotics); reinforcement learning and hybrid systems; and case studies and design projects. (Same course as MAE 5773)

ECEN 5783*
Medical Imaging. A comprehensive introduction to the standard medical imaging modalities used today. Topics include radiation, radiation-interaction with matter, X-ray radiography, ultrasound, computer topography, image reconstruction and analysis, MRI, nuclear medicine, and radiation therapy. The fundamental mathematics underlying each imaging modality is reviewed and the hardware needed to implement each system is examined.

ECEN 5793*
Digital Image Processing. Prerequisite(s): 4763 or 5763. Digital image processing including image acquisition and characterization, transforms, coding and compression, enhancement, restoration and segmentation. Use of modern image processing software on Sun and IBM work stations.

ECEN 5803*
Geometrical Optics. Prerequisite(s): PHYS 3213 or consent of instructor. Foundations of geometrical optics, geometrical theory of optical imaging, geometrical theory aberrations, image forming instruments. (Same course as PHYS 5123*)

ECEN 5823*
Physical Optics. Prerequisite(s): PHYS 3213 or consent of instructor. Multiple beam interference, diffractions, imaging, near field optical probes of matter, surface plasmons, light scattering from random media, optical coherence tomography- biomedical applications, negative materials, perfect lenses and super resolution. (Same course as PHYS 5303)

ECEN 5833*
Fiber-Optic Communication Systems. Prerequisite(s): Graduate standing or consent of instructor. Five generations of fiber-optic communication systems described in detail. Technical advances and increased capability of each system. Historical framework of how technical capability at the time forced technical decisions. A systems engineering point of view, emphasizing optimization of all components of the optical fiber link.

ECEN 5843*
Microelectronic Fabrication. Lab 1. Prerequisite(s): 3314. Contamination control and clean-room, vacuum systems, wafer manufacturing. Photolithography and alternative lithographic techniques. Physical and chemical vapor deposition, oxidation, etching, doping, packaging, formation of semiconductor devices and circuits. A series of Fabrication lab projects is conducted starting from bare silicon wafers to fabricate Optoelectronic circuits.

ECEN 5853*
Ultrafast Optoelectronics. Prerequisite(s): Graduate standing or consent of instructor. Combining ultra fast laser pulses with electronic circuitry. Increased device performance. Optoelectronic/electrical pulses as short as 0.2 psec. High performance areas illustrating the power of advanced techniques in applications.

ECEN 5923*
Introduction to MEMS. Prerequisite(s): 5843 or consent of instructor. Fundamentals of Microsystems. Topics include: energy transduction mechanisms, energy dissipation modeling, energy methods, mechanics of small scale, fabrication process design, micromachining, electronic interface.

ECEN 6000*
Research. 1-16 credits, max 36. Prerequisite(s): Consent of major professor. Independent research for students continuing graduate study beyond the level of the MS degree.

ECEN 6001*
PhD Seminar Series. Prerequisite(s): Approval of ECEN department head. Seminar series for PhD studies and research.

ECEN 6050*
Preliminary PhD Research and Proposal. 3 credits, max 3. Prerequisite(s): Consent of adviser. Independent research and report of an advanced electrical engineering problem. Work performed serves as foundation of the oral PhD preliminary exam.

ECEN 6060*
Advanced Special Topics. 1-6 credits, max 30. Prerequisite(s): Consent of instructor. Advanced engineering topics not normally included in existing courses. Repeat credit may be earned with different course subtitles assigned.

ECEN 6070*
Advanced Directed Studies. 1-6 credits, max 12. Prerequisite(s): Admission into PhD program and consent of instructor. Investigation outside of the classroom of topics not normally covered in lecture courses.

ECEN 6123*
Special Topics in Power Systems. Prerequisite(s): 5113. Selected relevant current topics related to power system operation and planning.

ECEN 6253*
Advanced Topics in Computer Architecture. Prerequisite(s): 5253 or CS 5253. Innovations in the architecture and organization of computers, with an emphasis on parallelism. Topics may include pipelining, multiprocessors, data flow, and reduction machines. (Same course as CS 6253)

ECEN 6263*
Advanced VLSI Design and Applications. Prerequisite(s): 5223 and 5263. System timing. Designing testable integrated circuits. Specialized parallel processing architectures. Application examples.

ECEN 6363*
Analog VLSI for Signal Processing. Lab 2. Prerequisite(s): 4273. Continuation of 5363. Advanced theory and practice of analog VLSI design methodology. Very large scale design and implementation of signal processing solutions, including over sampled A/Ds, neural networks and filters.

ECEN 6423*
System Identification. Prerequisite(s): 5473 or 5713 or MAE 5473 or MAE 5713. Linear and nonlinear system modeling of random systems. Models of linear time-invariant systems, nonparametric methods and preliminary model development, parameter estimation methods, convergence and consistency, asymptotic distributions of parameter estimates. Nonlinear modeling. (Same course as MAE 6423)

ECEN 6453*
Adaptive Control. Prerequisite(s): 5473 or 5713 or MAE 5473 or MAE 5713. Analysis and design of control techniques that modify their performance to adapt to changes in system operation. Review of systems analysis techniques, including state variable representations, linearization, discretization, covariance analysis, stability, and linear quadratic Gaussian design. On-line parameter estimation, model reference adaptive systems, self-tuning regulators, stable adaptive systems. (Same course as MAE 6453)

ECEN 6463*
Advances in Nonlinear Control. Prerequisite(s): 5463 or MAE 5463. Introduction to vector fields and Lie algebra; controllability and observability of nonlinear systems; local decompositions; input-output and state-space representation of nonlinear systems; feedback linearization; controlled invariance and distribution; control of Hamiltonian systems. (Same course as MAE 6463)

ECEN 6483*
Robust Multivariable Control Systems. Prerequisite(s): 5713 or MAE 5713. Introduction to multivariable systems: SISO robustness vs. MIMO robustness; multivariable system poles and zeros; MIMO transfer functions; multivariable frequency response analysis; multivariable Nyquist theorem; performance specifications; stability of feedback systems; linear fractional transformations (LFT's); parameterization of all stabilizing controllers; structured singular value; algebraic ricatti equations; H2 optimal control; H-infinity controller design. (Same course as MAE 6483)

ECEN 6803*
Photonics I: Advanced Optics. Lab 9. Prerequisite(s): 3813 or PHYS 3213 or consent of instructor. Advanced optics including spectral and time characteristics of detectors, characteristics of lasers, time, spectral and spatial parameters of laser emission, interferometric techniques, and nonlinear effects such as two-photon absorption and second and third harmonic generations. Emphasis on ultrashort laser pulses. (Same course as CHEM 6803 & PHYS 6803)

ECEN 6810*
Photonics II: THz Photonics and THz-TD. 1 credit, max 4, Lab 3. Prerequisite(s): 6803. THz photonics and THz time-domain spectroscopy (THz-TDS). Concepts and techniques of driving electronic circuitry with ultra short laser pulses to generate and detect freely propagating pulses of THz electromagnetic radiation using several operational research systems. (Same course as CHEM 6810 & PHYS 6810)

ECEN 6820*
Photonics II: Spectroscopy II. 1 credit, max 4, Lab 3. Prerequisite(s): 6803. Operating principles and applications of laser spectroscopy of atoms, molecules, solids and complex fluids. Absorption, emission, photon correlation, coherence, time resolved Fourier transform. Raman spectroscopy and non-linear optical. (Same course as CHEM 6820 & PHYS 6820)

ECEN 6823*
Advanced Optical Techniques. Prerequisite(s): 5853. State-of-the-art optical devices and research methodologies. Investigation and discussion of contemporary developments in non-linear optical devices and laser applications. Includes both analytical and experimental techniques.

ECEN 6830*
Photonics II: Spectroscopy III. 1 credit, max 4, Lab 3. Prerequisite(s): 6803. Advanced spectroscopic instruments and methods used for investigation of semi-conductors and solid state material. Stimulated emission characterized both in wavelength and in time. Time-resolved fluorescence measurements. Multiphotonic excitations. Fast measuring techniques, including subnanosecond detectors, picosecond streak cameras, and ultra fast four-wave mixing and correlation techniques. Time-dependent photoconductivity measurements. (Same course as CHEM 6830 & PHYS 6830)

ECEN 6840*
Photonics III: Microscopy I. 1 credit, max 4, Lab 3. Prerequisite(s): CHEM 3553 or consent of instructor. The structure and imaging of solid surfaces. Basics of scanning probe microscopy (SPM). Contact and non-contact atomic force microscopy (AFM). Scanning tunneling microscopy (STM) in air. (Same course as CHEM 6840 & PHYS 6840)

ECEN 6850*
Photonics III: Microscopy II. 1 credit, max 4, Lab 3. Prerequisite(s): CHEM 3553 or consent of instructor. Advanced techniques of scanning probe microscopy (SPM). Magnetic force microscopy, Kelvin force microscopy, scanning probe microscopy (STM) in vacuum. Characterization of materials with SPM. Nanolithography with SPM. Device manufacturing and analysis. (Same course as CHEM 6850 & PHYS 6850)

ECEN 6860*
Photonics III: Microscopy III and Image Processing. 1 credit, max 4, Lab 3. Prerequisite(s): 5793. Digital image processing, including projects. Image acquisition and display, image enhancement, geometric operations, linear and nonlinear filtering, image restoration, edge detection, image analysis, morphology, segmentation, recognition, and coding/compression. (Same course as CHEM 6860 & PHYS 6860)

ECEN 6870*
Photonics IV: Synthesis and Devices I. 1 credit, max 4, Lab 3. Prerequisite(s): 6803 and 6840. Preparation of functional nanostructures and related optical/electronic devices. Physical and chemical methods of thin film deposition. Engineering of prototypes of light emitting diodes, sensors, optical limiting coatings, lithographic patterns. (Same course as CHEM 6870 & PHYS 6870)

ECEN 6880*
Photonics IV: Semiconductor Devices, Testing and Characterization. 1 credit, max 4, Lab 3. Prerequisite(s): 6803, 6840. Test and characterization of semiconductor and optoelectronic devices. Hall effect, four point probe, CV and IV measurements, optical pump-probe, photoluminescence and electro-optics sampling. (Same course as CHEM 6880 & PHYS 6880)

ECEN 6890*
Photonics IV: Semiconductor Synthesis and Devices III. 1 credit, max 4, Lab 3. Prerequisite(s): 6803. Processing, fabrication and characterization of semiconductor optoelectronic devices in class 100/10000 cleanrooms. Cleanroom operation including general procedure for material processing and device fabrication. Device processing using a variety of processing such as mask aligner, vacuum evaporators and rapid thermal annealer. Testing using optical and electrical testing apparatus such as I-V, C-V, Hall, and optical spectral measurement systems. (Same course as CHEM 6890 & PHYS 6890)

ELECTRICAL ENGINEERING TECHNOLOGY (EET)

EET 1003
Introduction to Microcomputer Programming. Lab 2. Co-requisite(s): MATH 1513. Programming a microcomputer in BASIC. Algorithms to solve defined problems. Numerical limitations of small machines.

EET 1104
Fundamentals of Electricity. Lab 3. Prerequisite(s): MATH 1513 and consent of department. Elementary principles of electricity covering basic electric units. Ohm's law, Kirchoff's law, circuit solutions, network solutions, magnetism, inductance and capacitance.

EET 1244
Circuit Analysis I. Lab 4. Prerequisite(s): 1104. Co-requisite(s): MATH 1613. Analysis of AC electric circuits. The use of network theorems and phasors, coupled circuits, resonance, filters, and power.

EET 2303
Technical Programming. Lab 3. Prerequisite(s): 1104, MATH 1513 or completion of comparable engineering science courses. Introduction to machine programming using industrial standard languages, emphasis on problems from science and technology.

EET 2544
Pulse and Digital Techniques. Lab 3. Prerequisite(s): 1244 and 1225. Electronic circuits used in digital control and computation. Pulse generation, Boolean algebra and logic circuits.

EET 2635
Solid State Devices and Circuits. Lab 1. Prerequisite(s): 1244, MATH 1613. Diodes, transistors, LSI linear devices; their operation and applications in electronic circuits.

EET 3005
Electronics Analysis I. Prerequisite(s): 1104, 1244, 2544, 2635, MATH 1513, 1613, or evaluated equivalent. Co-requisite(s): MATH 2123. Extensive use of mathematics in analyzing discrete, linear device, linear systems and non-linear circuits. Development of the analytic skills necessary for upper-division work. The use of basic calculus in circuit analysis. *Must obtain a "C" or better before admission to other 3000 level EET courses. Intended for transfer and returning students. Enrollment by adviser consent.*

EET 3104
Elements of Electricity and Electronics. Lab 1. Prerequisite(s): MATH 1513. Essentials of electricity, controls, and electronics for non-majors. *No credit for ECT majors.*

EET 3113
Circuit Analysis II. Prerequisite(s): 3123; Co-requisite(s): GENT 3123. Application of elementary switching functions and LaPlace transforms to electronic circuit analysis. Circuit analysis in the S-plane, transfer functions. Application of circuit analysis software.

EET 3124
Project Design and Fabrication. Lab 1. Prerequisite(s): 1244, 2544, 2635. Methods of designing, analyzing and fabricating electronic circuits using standard software packages. Heat transfer characteristics and problem solutions are included.

EET 3254
Microprocessors I. Lab 3. Prerequisite(s): 2544. An introduction to microcontrollers and their uses in embedded applications. Topics include system architecture, assembly language, structured programming, memory systems, user I/O, timers, peripherals, etc.

EET 3264
Microprocessors II. Lab 3. Prerequisite(s): 2544, 3254. A continuation of EET 3254. Programming and interfacing of microcontrollers in embedded application, including interrupts, EEPROM, serial programming, interfacing, power management, algorithms, stepper motor control.

EET 3354
Communication and Signal Processing. Lab 1. Prerequisite(s): 1244, 2635, MATH 2133, GENT 3123; Co-requisite(s): EET 3113. Bandpass signaling principles and circuits. The Fourier transform; AM, SSB, FM, and PM signaling; binary modulated bandpass signaling (FSK and PSK); superheterodyne receiver; phase locked loop (PLL); modulators and mixers; frequency multiplication; special purpose IC's.

EET 3363
Data Acquisition. Lab 3. Prerequisite(s): 2544, 2634. Methods used to convert physical variables to digital signals and vice versa. Signal conditioning, digital-to-analog converters, analog-to-digital converters, sample-and-hold circuits, sensors, and transducers. The use of computers in data acquisition and signal processing.

EET 3524
Advanced Logic Circuits. Lab 1. Prerequisite(s): 2544, 2635, 3254. Computer-based design, simulation and implementation of digital/mixed-signal systems using programmable logic, field programmable gate arrays, ASICs and system-on-chip technology.

EET 3533
Introduction to Telecommunications. Lab 1. Prerequisite(s): 2544, 2635, 3254. Introductory course to the field of telecommunications. Study of the various technologies and how the application of these technologies work together to form functioning systems and networks.

EET 4050
Advanced Electronic Problems. 1-4 credits, max 4. Prerequisite(s): Junior standing and consent of head of department. Special problems in the electronic area.

EET 4314
Elements of Control. Lab 3. Prerequisite(s): 3113, 3123, 3363, GENT 3123. Principles of analog and digital control, with emphasis on the analysis of feedback control systems in their various conceptual configurations. Application of feedback control theory to the analysis and design of present day circuits and systems. Use of circuit analysis software.

EET 4363
Digital Signal Processing. Prerequisite(s): 3123, 3354, 3363. Introduction to Digital Signal Process. Theoretical development of Fourier transforms, IIR and FIR filters. Significant Design and programming projects.

EET 4514
Advanced Telecommunication Topics. Lab 1. Prerequisite(s): 3533. Study of data transmission techniques between digital electronic devices.

EET 4654
Microwave Techniques. Lab 1. Prerequisite(s): 2635, 3354. Study of topics pertaining to VHF behavior of circuits and systems. Transmission line theory: wave equations, SWR, impedance calculations and transformations, and lossy lines. Extensive use of the Smith chart to solve transmission line problems. Introduction to Maxwell's equations, with emphasis on steady state. Wave propagation in rectangular waveguides. Introduction to antennas. Modeling of transistors at VHF, UHF, and microwave frequencies. Design and analysis of transistor amplifiers at VHF using y and s parameters. Designing LC impedance matching networks.

EET 4833
Industrial Project Design I. Lab 1. Prerequisite(s): 20 credit hours of upper-division electronics courses or consent of instructor. Course mirrors the design process in industry. Topics covered are Design Team formation, Identify Objectives, define design specifications, write specifications, create a state of work and Gantt chart, create a project budget, perform a Preliminary Design Review, Design Prototype.

EET 4843
Industrial Project Design II. Prerequisite(s): 4833. Student continues in the project steps of Change Board Review, Critical Design Review, Developing & Writing Test Specs., Product Fabrication and Testing, Formal Technical Report Submission and Outcomes Assessment Exam.

ENGINEERING (ENGR)

ENGR 1111
Introduction to Engineering. An introduction to the study and practice of engineering. Skills for students in CEAT; expected engineering student behavior; tools needed by CEAT students; and the role of engineers in society. An introduction to engineering ethics; safety issues; and the relationship of engineering to social, global and contemporary issues. Student enrichment opportunities in the CEAT.

ENGR 1113
Applying Mathematics to Engineering Design. Lab 2. Prerequisite(s): High school algebra OR MATH 0123 or equivalent. This course focuses on applications of engineering mathematics to analysis and design problems across disciplines of engineering. Application of algebra, trigonometry, linear systems of equations, and basic calculus are illustrated through hands-on laboratory experiments and design projects.

ENGR 1322
Engineering Design with CAD. Lab 2. Introduction to engineering design using modern design methodologies and computer-aided tools. Design, construction and testing through participation in a multidisciplinary team-based design project contest.

ENGR 1332
Engineering Design with CAD for MAE. Lab 2. Introduction to engineering design using modern design methodologies and computer-aided tools appropriate for mechanical and aerospace engineering. Design, construction and testing through participation in a multidisciplinary team based design project contest.

ENGR 1342
Engineering Design with CAD for ECEN. Lab 2. Introduction to engineering design using modern design methodologies and computer-aided tools appropriate for electrical and computer engineering. Design, construction and testing through participation in a multidisciplinary team-based design project contest.

ENGR 1352
Engineering Design with CAD for CHE. Lab 2. Introduction to engineering design using modern design methodologies and computer-aided tools appropriate for chemical engineering. Design, construction and testing through participation in a multidisciplinary team-based design project contest.

ENGR 1412
Introductory Engineering Computer Programming. Lab 2. Programming to solve problems typical of practice in engineering. Techniques and methods.

ENGR 2030
Co-op Industrial Practice I. 1-3 credits, max 6. Prerequisite(s): Sophomore standing and permission of Co-op coordinator. Pre-engineering industrial practice. *Written reports as specified by adviser. Application of credit to meet degree requirements varies with level and department.*

ENGR 2100
Orientation Projects. 1-3 credits, max 3, Lab 2-6. Prerequisite(s): Pre-engineering standing. Enrollment in independent study or small groups. Projects to assist students with special needs to adjust to engineering curriculum.

ENGR 3030
Co-op Industrial Practice II. 1-3 credits, max 6. Prerequisite(s): Junior standing and permission of Co-op coordinator. Pre-engineering industrial practice. *Written reports as specified by adviser. Application of credit to meet degree requirements varies with level and department*.

ENGR 3061
Domestic Scholars Experience. Prerequisite(s): Consent of the coordinator of CEAT Student Services. Participation in the domestic scholars experience.

ENGR 3080
International Experience. 1-18 credits, max 36. Prerequisite(s): Consent of the associate dean of the college. Participation in a formal or informal educational experience outside of the USA.

ENGR 3090
(I)Study Abroad. 1-18 credits, max 36. Prerequisite(s): Consent of the Study Abroad office and associate dean of the college. Participation in an OSU reciprocal exchange program.

ENGR 4010
Engineering Problems and Design. 0-6 credits, max 6. Prerequisite(s): Permission of the instructor. Special projects and independent study.

ENGR 4030
Co-op Industrial Practice III. 1-3 credits, max 6. Prerequisite(s): Senior standing and permission of Co-op coordinator. Pre-engineering industrial practice. Written reports as specified by adviser. Application of credit to meet degree requirements varies with level and department.

ENGR 4060*
Topics in Technology and Society. 1-3 credits, max 6. Problems of society relating to technology and added problems stemming from their solution. Minimal reliance on mathematics; *for engineering and non-engineering students.*

ENGR 4061
CEAT Scholars Study Abroad. Prerequisite(s): Permission of instructor. Comparison of technologies, history, culture and economic systems between the U.S. and another country or countries. Includes both classroom and travel for on-site study.

ENGR 4103*
Impact of Law on Engineering Practice. Prerequisite(s): Junior standing or consent of instructor. Principles and impact of U.S. and international laws and regulations on technical professionals, including the impact of environmental regulations, intellectual property laws, tort claims, and product liability on the design, research and oversight of technologies.

ENGR 4113
(S)Intellectual Property Law for Technical Professionals. Prerequisite(s): Junior standing or consent of instructor. Law and regulations of patents and other intellectual property protection methods. Impact of statutory and common law on the practice of technical professionals and how they can exploit intellectual property in their daily work.

ENGR 4123
(S)Tort and Products Liability Law for Technical Professionals. Prerequisite(s): Junior standing or consent of instructor. Legal liability of the work product and duties of technical professionals to the public. Relevant statutory, regulatory and common law relating to torts, specifically products liability.

ENGR 4133
(S)Environmental Regulation for Technical Professionals. Prerequisite(s): Junior standing or consent of instructor. Environmental laws and regulations are omnipresent in the practice of engineering, science and architecture. Survey of the environmental laws and regulations affecting the practice of these professions.

ENGR 4201
Principles of Nuclear Engineering. The nuclear enterprise, radiation, biological effects of ionizing radiation, nuclear reactor power plants, radioactive waste disposal, the fission process, food irradiation activities, applications of nuclear power in space, approaches to radiation detection, themonuclear fusion, and nuclear weapons and proliferation.

ENGR 4203
Nuclear Technologies in Society: Fulfilling Madame Curie's Dream. Introduction to applications of nuclear science and technology and the radiation principles governing these applications. Problem-based learning environment. *Class assignments are web-based and include reference materials and modules to be completed by students.*

ENGR 4211
Introduction to Nuclear and Radiation Engineering Concepts. Aspects and applications of nuclear and radiation engineering/physics. History of nuclear development, basic concepts of radiation and radioactivity, radioactive waste management, global warming and the impact of nuclear power plants, industrial applications, health physics, nuclear medicine, job opportunities at power plants, graduate school and national labs.

ENGR 4213*
Elements of Nuclear Engineering. Prerequisite(s): 4201, 4211 or 4203 and MATH 2163, PHYS 2114. Nuclear engineering concepts and applications, including nuclear reactions, radioactivity, radiation interaction with matter, reactor physics, risk and dose assessment, applications in medicine, industry, agriculture and research.

ENGR 4223
Nuclear Reactor Engineering. Prerequisite(s): 4213 and MATH 2233. Physics governing nuclear reactors and the design principles for commercial nuclear power plants. Reactor designs currently operating in the power industry. Generation III and Generation IV reactor designs are also discussed.

ENGR 4233*
Energy Systems and Resources. Prerequisite(s): 4213. Energy systems, renewable and non-renewable energy sources, and advances in energy applications.

ENGR 4243*
Radiation Protection and Shielding. Prerequisite(s): 4213 and MATH 2233. Radiation protection, doses, associated risks, and exposure limits; properties of natural and other radiation sources, and evaluation of internal and external doses; and techniques for shield design including ray, point kernal, and transport theories for both neutrons and gamma rays.

ENGR 4253
Nuclear Reactor Analysis. Prerequisite(s): 4213 and MATH 2233. Fundamental physical principles, concepts and modeling techniques for analysis and design of nuclear reactors. Prepares students to analyze nuclear reactors including aspects of performance, dynamics and safety and to either develop new designs or to assess existing or proposed designs based upon fundamental understanding of reactor physics.

ENGR 4263*
Nuclear Reactor Theory. Prerequisite(s): 4243. Introduction to neutron diffusion theory, neutron moderation, neutron thermalization, and criticality conditions of nuclear reactors. *Distance education only.*

ENGR 5103*
Advanced Impact of Law on Engineering Practice. Prerequisite(s): Graduate standing. Principles and impact of U.S. and international laws and regulations on technical professionals, including the impact of environmental regulations, intellectual property laws, tort claims, and product liability on the design, research and oversight of technologies.

ENGR 5113*
Advanced Intellectual Property Law for Technical Professionals. Prerequisite(s): Graduate standing. Law and regulations of patents and other IP protection methods. Impact of statutory and common law has made on the practice of technical professionals and how they can exploit IP in their daily work.

ENGR 5123*
Advanced Tort and Products Liability Law for Technical Professionals. Prerequisite(s): Graduate standing. Legal liability of the work product and duties of technical professionals to the public. Relevant statutory, regulatory and common law relating to torts, specifically products liability.

ENGR 5133*
Advanced Environmental for Law for Technical Professionals. Prerequisite(s): Graduate standing. Environmental laws and regulations are omnipresent in the practice of engineering, science, and architecture. This course will survey the environmental laws and regulations affecting the practice of these professions.

ENGINEERING SCIENCE (ENSC)

ENSC 2113
Statics. Prerequisite(s): MATH 2144 and either PHYS 1114 or 2014. Resultants of force systems, static equilibrium of rigid bodies, statics of structures, and fluid statics. Shear and moment diagrams.

ENSC 2123
Elementary Dynamics. Prerequisite(s): 2113. Kinematics and kinetics of particles, systems of particles, and rigid bodies from a Newtonian viewpoint using vector algebra and calculus. Work-energy and impulse-momentum principles. Planar and three-dimensional kinetics and kinematics of rigid bodies.

ENSC 2143
Strength of Materials. Prerequisite(s): 2113. Bending moments, deformation and displacement in elastic and plastic deformable bodies. Axial, torsional and shear loads. Buckling stress transformations and combined loads.

ENSC 2213
Thermodynamics. Prerequisite(s): CHEM 1314, 1414 or 1515, MATH 2144, PHYS 2014. Properties of substances and principles governing changes in form of energy. First and second laws.

ENSC 2613
Introduction to Electrical Science. Prerequisite(s): MATH 2153 and PHYS 2114. Elements of electrical engineering; AC and DC circuits, mesh and node formulation of network equations, steady-state response to sinusoids, energy, power and power factor.

ENSC 3213
Computer Based Systems in Engineering. Prerequisite(s): CS 1113 or ENGR 1412 and sophomore or higher standing. A comprehensive introduction to technology and application of microprocessors, concepts of computer and computation, interfacing and communication, data acquisition and representation. Applications of general-purpose and embedded processors in various disciplines of engineering and engineering problem solving.

ENSC 3233
Fluid Mechanics. Prerequisite(s): 2113, MATH 2153. The study of fluid properties, statics, conservation equations, dimensional analysis and similitude, viscous flow in ducts, inviscid flow, boundary layer theory, open channel flow, turbomachinery and fluid measurement techniques.

ENSC 3313
Materials Science. Prerequisite(s): CHEM 1314 or 1414 or 1515. Introductory level. Relationship between structure and properties of materials and engineering applications. Atomic, microscopic and macroscopic properties.

ENGINEERING AND TECHNOLOGY MANAGEMENT (ETM)

ETM 5110*
Seminar. 1-6 credits, max 6. Prerequisite(s): Admission to the master's program or consent of instructor. Guided study in a topic area selected to enhance a student's program.

ETM 5111*
Introduction to Strategy, Technology, and Integration. Prerequisite(s): Admission to the MS in ETM program or consent of instructor. The first credit hour of a three-credit hour creative component requirement. The "big picture" of engineering and technology management, emphasizing the importance of strategy, technology, and integration, where timing of products and services are keys to market success.

ETM 5121*
Capstone to Strategy, Technology and Integration I. Prerequisite(s): Admission to the MS in ETM program or consent of instructor. The first part of the capstone and the second credit hour of the creative component requirement. Proposal for a project to be completed for the ETM 5131 course. Substantive use of ETM course material, and a notable and relevant contribution to the student's organization. Participation in formal critique and discussion of other proposals.

ETM 5132*
Capstone to Strategy, Technology and Integration - Part 2. Prerequisite(s): Admission to the MSETM program or consent of instructor. This is the second part of the capstone and the third and final credit hour of the creative component requirement. Students present a project they have completed. This project is intended to make substantive use of MSETM course material and to be a notable and relevant contribution to the student's organization. Students also participate in the formal critique and discussion of other projects.

ETM 5211*
Enterprise Integration. Prerequisite(s): Admission to the MS in ETM program or consent of instructor. Conceptualizing, designing and operating advanced manufacturing systems within an integrated enterprise-wide framework. Recent developments in computer and communication technologies and conceptual breakthroughs regarding the nature and behavior of integrated enterprises.

ETM 5221*
Application and Execution of Engineering Teaming. Prerequisite(s): Admission to the MS in ETM program or consent of instructor. Management and group issues inherent in the application and implementation of high performing work teams. The team's roles in improving organizational performance, along with the best practice procedures and techniques that increase team effectiveness.

ETM 5231*
Benchmarking. Prerequisite(s): Admission to the MS in ETM program or consent of instructor. Benchmarking as an effective approach to study and adopt or adapt methodologies representing best specific practices from any industry; or identify and assess performance based on equivalent and common measures, usually from those in the same or similar industries, including competitors.

ETM 5241*
Strategic Project Management. Prerequisite(s): Admission to the MS in ETM program or consent of instructor. Overview of traditional project management concepts and techniques (i.e., Gantt charts, PERT, CPT) along with several technical issues related to their effective use. Fundamental nature of the problems associated with several technical issues related to their effective use. Fundamental nature of the problems associated with effectively managing and coordination of multiple discrete projects within an overall systems integration initiative. A framework for addressing these problems.

ETM 5251*
Problem Solving and Decision-Making. Prerequisite(s): Admission to the MS in ETM program or consent of instructor. Patterns utilized by successful managers for decision making. Organizational skills, investigation through questioning and logic, decision-making among alternatives, and ensuring the success of decision. Analyzing problems and decisions, appraising situations, managing problems of human performance, and implementing processes.

ETM 5271*
Technology Forecasting and Assessment. Prerequisite(s): Admission to the MS in ETM program or consent of instructor. A framework and analytical tools for developing technological foresight. Technology monitoring, forecasting and assessment in the context of a family of emerging technologies.

ETM 5282*
Comprehensive Planning. Prerequisite(s): Admission to the MSETM program or consent of instructor. Continuous and systematic process of thought about the future, resulting in a plan or specific course of action for communicating, coordinating and controlling activities. Strategic, long-range, tactical, operational, contingency and performance planning.

ETM 5291*
Failure Mode and Effects Analysis in Design. Prerequisite(s): Admission to the MS in ETM program or consent of instructor. A design technique for reducing risk and improving reliability of a system, design or process. Potential failures in any of these studied methodically during design. The concepts, tools and techniques applicable to any product or process.

ETM 5311*
Value Engineering. Prerequisite(s): Admission to the ETM program or consent of instructor. The application of Value Engineering (also known as Value Analysis, Value Methodology) to improve customer value for a project, process, or product during or after engineering design. The development of VE, its objectives, definitions and methodologies, the use of the VE system, and its range of application. VE's use for improving performance reducing life cycle cost.

ETM 5321*
Understanding Variation I. Prerequisite(s): One college-level statistics course; admission to MS in ETM program or consent of instructor. The use of data analysis tools to understand variation in engineered processes and products. Understanding and applying, with the assistance of modern and widely available software, those analysis techniques used frequently by engineers and scientists to evaluate measurement systems, compare alternative approaches, analyze and interpret data from experiments, determine desirable sample sizes, and perform tolerancing and sensitivity analysis.

ETM 5331*
Understanding Variation II. Prerequisite(s): One college-level statistics course; admission to MS in ETM program or consent of instructor. The use of design and data analysis tools to understand contribution to total variation in engineered processes and products. Understanding and applying, with the assistance of modern and widely available software, those design and analysis techniques used frequently by engineers and scientists. Screening and modeling designs and response surfaces used to relate key input variables to key output variables. Statistical process control and process capability analysis used to assess performance.

ETM 5341*
Leadership Strategies for Technical Professionals. Prerequisite(s): Admission to the ETM program or consent of instructor. Leadership strategies, principles, styles and dynamics that must be understood by technical professionals engaged in the creation of products, processes, and services in technology-based organizations.

ETM 5351*
Planning Technical Projects. Prerequisite(s): Admission to the MSETM program or consent of instructor. Techniques and tools for project definition, staffing, scheduling, resource allocation, and time estimation. Behavioral and quantitative dimensions of project management. Performance measures of project progress and completion.

ETM 5361*
Managing Virtual Project Teams. Prerequisite(s): Admission to the MSETM program or consent of instructor. The management and group issues inherent in the application and implementation of effective teamwork in virtual work- spaces. The appropriate use of virtual team issues and challenges associated with effective teamwork; virtual team structures, process, and technology facilitation skills; group dynamics; and team motivation.

ETM 5371*
Ethics for Practicing Engineers. Prerequisite(s): Admission to the MSETM program or consent of instructor. A values-based approach to professional ethics and its application to the decision-making in a technology-intensive environment. Ethical concerns related to the expectations of stakeholders.

ETM 5381*
Design and Implementing Change in Technical Management. Prerequisite(s): Admission to the MSETM program or consent of instructor. Major issues, principles, and processes associated with successfully implementing change in technical workgroups and organizations. Case study examples of successful and not-so-successful implementation efforts highlight and demonstrate fundamental principles. Strategy and techniques to increase the probability of effective implementation and use.

ETM 5391*
New Product Introduction and Commercialization. Prerequisite(s): Admission to the MSETM program or consent of instructor. Elements of the new product introduction (NPI) process and its impact or business strategy and planning. Organizational resources required for NPI and tools for determining commercial viability.

ETM 5411*
Engineering Economic Analysis. Prerequisite(s): Admission to the MSETM program or consent of instructor. Quantitative evaluation of investment alternatives. Basis for comparison of alternatives, including present worth, annual worth, rate of return and payout period methods. Decision-making among capital constrained and unequal-life projects. Benefit-cost and cost effectiveness analysis.

ETM 5421*
Technology Organization and Structure. Prerequisite(s): Admission to the MSETM program or consent of instructor. The structure and processes by which an engineering or technology organization applies and integrates functional expertise to achieve business objectives. The interplay between business strategy and structure, the utilization of technical personnel and resources, and comparison of various organizational design and management structures.

ETM 5431*
Managing Technical Functions. Prerequisite(s): Admission to the MSETM program or consent of instructor. Issues, concepts, theories, and insights of technical management. Unique characteristics of managing engineering and technical functions, the management process in technical settings, and individual- and group-level performance measurement and improvement.

ETM 5451*
Legal Side of Technical Personnel Management. Prerequisite(s): Admission to MS in ETM program or consent of instructor. The technical manager's role and legal issues involved in personnel decision-making so as to avoid legal problems and litigation. Hiring, discipline and discharge, discrimination, health and safety and right to privacy.

ETM 5461*
Intellectual Property Management. Prerequisite(s): Admission to MS in ETM program or consent of instructor. Overview of intellectual property law and management of intellectual property. Exploration of ways to manage intellectual property from conception through production and licensing. Types of intellectual property and associated legal issues and management processes.

ETM 5471*
Introduction to System Safety. Prerequisite(s): Admission to the MSETM program or consent of instructor. System safety as a discipline in research, development and acquisition of systems, sub-systems and components. The history and methodologies of mishap prevention including the development of system safety management and engineering processes.

ETM 5481*
Sustainable Enterprise Strategies. Prerequisite(s): Admission to the MSETM program or consent of instructor. The principles of sustainability in the context of industrial enterprises. The implications of sustainability in design of products, industrial systems and infrastructure. The importance of life cycle cost analysis as a key engineering economy tool.

ETM 5913*
Six Sigma Tools I. Prerequisite(s): Admission to the MSETM program or consent of instructor. This course provides an introduction to the six sigma body of knowledge as defined by the American Society of Quality (ASQ). Examines the foundations of six sigma and the statistical tools used in the initial stages of the DMAIC problem solving methodology.

ETM 5923*
Six Sigma Tools II. Prerequisite(s): 5913 and admission to the MSETM program or consent of instructor. Provides detail on the "analyze, improve and control" portions of the DMAIC problem solving methodology in addition to quality function deployment (QFD) techniques, failure mode and effects analysis (FMEA) and basic robust design processes, including noise strategies, tolerance design and process capability tools.

ETM 5933*
Lean Tools I. Prerequisite(s): Admission to the MSETM program or consent of instructor. Introduces lean thinking and tools for continuous improvement. Lean enterprise concepts. Identification of non-value-added elements. Implementation of 5S, TPM, set-up reduction and Value Stream Mapping (VSM).

ETM 5943*
Lean Sigma Implementation. Prerequisite(s): 5913, 5933 and admission to the MSETM program or consent of instructor. Introduction to implementation skills necessary to successfully combine lean manufacturing and six sigma concepts into a small to mid-sized firm and manage continuous improvement efforts. Successfully combining leadership, organizational dynamics and customer expectation. Planning, deploying and monitoring.

ENGINEERING TECHNOLOGY

(See specific technology programs listed alphabetically)

ENGLISH (ENGL)

ENGL 0003
Academic English for Graduate Students. Study and practice of English listening, reading and speaking skills required for graduate study. *Graded on satisfactory-unsatisfactory basis.*

ENGL 1010
Studies in English Composition. 1-2 credits, max 2. Special study in composition to allow transfer students to fulfill general education requirements as established by Regent's policy.

ENGL 1113
Composition I. The fundamentals of expository writing with emphasis on structure, development and style.

ENGL 1123
International Freshman Composition I. Restricted to students whose native language is not English. Expository writing with emphasis on structure and development. Special attention to problems of English as a second language. *This course may be substituted for 1113.*

ENGL 1213
Composition II. Prerequisite(s): 1113 or 1123 or 1313. Expository composition with emphasis on technique and style through intensive and extensive readings.

ENGL 1223
International Freshman Composition II. Prerequisite(s): 1113 or 1123. Restricted to students whose native language is not English. Expository composition with emphasis on technique and style in writing research papers. *May be substituted for 1213.*

ENGL 1313
Critical Analysis and Writing I. Expository writing forms, including summary, critique, and synthesis. Writing assignments based on readings from across the curriculum. *May be substituted for 1113 for gifted writers who seek a more challenging course.*

ENGL 1413
Critical Analysis and Writing II. Critical thinking, research, and writing skills necessary for success in courses across the curriculum. Some sections available for honors credit. *May be substituted for 1213 for gifted writers who seek a more challenging course.*

ENGL 1923
(H)Great Works of Literature. Readings in the great works of the most important writers of Britain and America, such as Shakespeare, Dickens, Twain, Faulkner, and others.

ENGL 2243
(H,I)Language, Text and Culture. Investigation of how human language relates to culture.

ENGL 2413
(D,H)Introduction to Literature. Fiction, drama/film and poetry. Written critical exercises and discussion.

ENGL 2443
(I)Languages of the World. A comprehensive survey of world languages. The essential structural and historical organization of languages. The process of languages as a basic human function. (Same course as FLL 2443)

ENGL 2453
(H)Introduction to Screen Studies. Lab 2. The principles of film form as they affect the art of watching and thinking about motion pictures.

ENGL 2513
(H)Introduction to Creative Writing. Literary composition with emphasis on techniques and style through readings and writings in fiction, poetry and drama.

ENGL 2543
Survey of British Literature I. The beginnings through the Neo-Classic Period.

ENGL 2653
Survey of British Literature II. The Romantic Period to the present.

ENGL 2773
(D)Survey of American Literature I. The Puritans through the Romantic Period.

ENGL 2883
(D)Survey of American Literature II. The Romantic Period to the present.

ENGL 3030
Fiction Writing. 3 credits, max 6. Prerequisite(s): 2513. Directed readings and practice in writing fiction with special attention to techniques.

ENGL 3040
Poetry Writing. 3 credits, max 6. Prerequisite(s): 2513. Directed readings and practice in writing poetry with special attention to techniques.

ENGL 3050
Screenwriting. 3 credits, max 6. Prerequisite(s): 2453. Readings and practice in writing scripts with special attention to form.

ENGL 3123
(H)Mythology. Myths, their cultural context, and their place in world literature.

ENGL 3153
(D,H)Readings in Literature by Women. The collection of literature written by women in England and America, classical and modern figures.

ENGL 3163
(H)World Literature I. Selected literary masterpieces exemplifying ideals and values in Western cultures.

ENGL 3170
Readings in Literature and Other Disciplines. 3 credits, max 6. A study of literature and its historical or thematic connections to one or more of the fine arts or disciplines in the humanities or social sciences.

ENGL 3173
(H,I)World Literature II. Selected literary masterpieces exemplifying ideals and values in non-Western cultures. Emphasis on the study of non-Western literature available in English.

ENGL 3183
(D,H)Native American Literature. Origins and development of a literary tradition in its historical and cultural context.

ENGL 3190
Readings in Postcolonial and Multiethnic Literature. 3 credits, max 6. Principal literary and critical texts written in English either by writers from parts of the world once colonized by the West or by American writers of different ethnic origins whose work bridges cultures.

ENGL 3193
(D,H)African-American Literature. Origins and development of a literary tradition in its historical and cultural context.

ENGL 3200
Special Problems in Language and Literature. 1-3 credits, max 3. Prerequisite(s): 9 credit hours of English. Specialized readings and independent study.

ENGL 3203
Advanced Composition. Prerequisite(s): 9 hours of English. An advanced writing course based on contemporary theories of composition.

ENGL 3223
Technical Communication Theory and Criticism. Study and application of principal critical theories in technical communications.

ENGL 3243
Literary Theory and Criticism. Study of the major works of critical theory and literary criticism.

ENGL 3263
Screen Theory and Criticism. Study of the theory of film, television, and new media.

ENGL 3303
American Sign Language Interpreting Practicum. Prerequisite(s): 12 hours of ASL or permission of Instructor. Observation and supervised interpreting for students who wish to work as professional ASL interpreters.

ENGL 3323
Technical Writing. Prerequisite(s): 1113 or 1213 or 1313 and junior standing. Applied writing in areas of specialization. Intensive practice in professional writing modes, styles, research techniques and editing for specialized audiences and/or publications. *This course may be substituted for 1213 with an "A'' or "B'' in 1113 and consent of the student's college.*

ENGL 3333
(H)Short Story. Origins, development, theory and craft of the short story.

ENGL 3343
Readings in Poetry. Poetry as a genre. The historical development of poetry in English, its major figures, its definitions, its key elements.

ENGL 3353
(H)Image and Text. Lab 2. The theory and practice of the relationship between verbal and visual texts, including adaptation of literary works for the screen, and examinations of the aesthetic industrial, and cultural relationships between visual and literary media.

ENGL 3363
(H)Readings in Drama. Close study of representative plays of various periods (for example, Classical, Renaissance, Restoration, Modern, and others) and of the main formal categories (tragedy, comedy).

ENGL 3373
Readings in Nonfiction. Theory and practice of creative nonfiction in English, including autobiography, travel writing, literary journalism, correspondence and the essay.

ENGL 3383
Readings in Narrative. Readings in narrative of different periods and different genres.

ENGL 3410
Popular Fiction. 3 credits, max 6. Study of certain popular genres of fiction including science fiction, detective fiction, Western fiction, horror and the grotesque, the romance, American humor. Course content varies by semester. Exploration of the characteristics and evolution of the genre while developing skills in reading, writing and thinking critically.

ENGL 3430
Topics in Television Studies. 3 credits, max 6. Lab 2. Prerequisite(s): 2453.Examination of the study of television in the U.S., including narrative and visual practices, genres, political economy and social effects, and comparison with television in other national settings and other forms of media.

ENGL 3443
(H)Studies in Film Genre. Lab 2. A comparative study of types of films both inside the Hollywood system and in other national cinemas. The western, the film noir and the musical, as well as genres from such countries as France, Germany and Japan. Focused knowledge of selected genres, a sense of the economic imperatives that necessitate generic "contracts" between film producers and viewers and knowledge of the history of specific genres.

ENGL 3453
(H)History of American Film. Lab 2. Introduction to the history of the American cinema, the principal eras in American film history, key directors, and the main genres. Basic approaches to film history.

ENGL 3463
(H,I)History of International Film. Lab 2. Introduction to the history of international cinema and the principal eras in film history, focusing on the moments when different national cinemas flourished.

ENGL 3813
(D,H)Readings in the American Experience. Life in the New World from the colonial to the postmodern era using a multiplicity of interdisciplinary texts that demonstrate the emergence and ongoing evolution of distinctive American identities. (Same course as AMST 3813)

ENGL 3903
One-to-One Writing Instruction: Theory and Practice. Lab 4. Prerequisite(s): Six hours English or consent of instructor. Students will learn why and how to effectively instruct writing one-to-one through observation and participation in the OSU Writing Center. Introductory understanding of composition theory; knowledge of writing center research; familiarity with tutoring strategies; and insight into the composition process.

ENGL 3933
(H)Shakespeare. Recurring themes and their variations in Shakespeare's work. Nature of these genres in the period and Shakespeare's innovations. The structure and language of the plays, occasional examination of historical documents and contexts, modern performances, and critical essays.

ENGL 4003*
History of the English Language. The growth of the English language.

ENGL 4013*
English Grammar. The traditional terminology and concepts of English grammar leading or evolving into the several current systems of description.

ENGL 4043
Teaching English to Speakers of Other Languages. Designed to develop the skills and techniques needed in teaching English to speakers of other languages (TESOL). Examines the theoretical issues behind the practice and methodologies and classroom techniques, including the testing of English and the selection and preparation of teaching materials.

ENGL 4063*
Descriptive Linguistics. The methodology of linguistic analysis.

ENGL 4080*
Studies in Sociolinguistics. 3 credits, max 6. Study of a topic in sociolinguistics, chosen at the instructor's discretion.

ENGL 4083*
Applied Linguistics. The study of topics in psycholinguistics, including language and the brain, animal communication and language acquisition.

ENGL 4093*
Language in America. Historical development of American English. Regional, social and cultural language differences.

ENGL 4100
Studies in Medieval British Literature. 3 credits, max 6. Special topics encompassing the many different ethnic traditions and genres found in medieval British literature.

ENGL 4110
Studies in 16th Century British Literature. 3 credits, max 6. Literature themes of the English Renaissance focusing on related authors and topics. Authors include Shakespeare, Spenser, Sidney, Marlowe, Raleigh, Wyatt, and Surrey.

ENGL 4120
Studies in 17th Century British Literature. 3 credits, max 6. Obtaining an understanding of 17th century British literature while developing skills as a critical thinker, a reader of literary texts and a writer of expository prose.

ENGL 4130
Studies in 18th Century British Literature. 3 credits, max 6. Selected topics in British literature from 1660-1800. Various writers and their works and themes and literary developments of the period. Topics vary by semester.

ENGL 4160
Studies in 19th Century British Literature. 3 credits, max 6. Exploration of the literary culture of nineteenth-century Britain. Topics might range from romantic poetry to the Victorian novel.

ENGL 4170
Studies in 20th Century British Literature. 3 credits, max 6. Various topics focusing on the literature and culture of Britain and Ireland, such as 20th century British and Irish fiction, poetry, or drama; The City; The Irish Renaissance.

ENGL 4200
Studies in Early American Literature. 3 credits, max 6. Readings and topics in early American literature and culture.

ENGL 4210
Studies in 19th Century American Literature. 3 credits, max 6. Themes in 19th century American literature with attention to social and cultural contexts.

ENGL 4220
Studies in 20th Century American Literature. 3 credits, max 6. Topics focusing on the literature and culture of the United States, such as 20th century American fiction, poetry, or drama; alienation and activism; the impact of science and technology.

ENGL 4223*
Introduction to Old English. The basics of pronunciation, vocabulary, and grammar, enabling students to read short works in prose and poetry.

ENGL 4233*
Old English Poetry: Beowulf. Prerequisite(s): 4223. A close reading of the poem, taking into account the original Old English manuscript and recent translations.

ENGL 4263
(H)Aesthetics of Film. Lab 2. Prerequisite(s): 2453. The form, meaning and value of American and international motion pictures.

ENGL 4300
Studies in Romanticism. 3 credits, max 6. Principle works of Romanticism, reflecting the cultural, social, and political developments.

ENGL 4310
Studies in Modernism. 3 credits, max 6. Selected topics in literature of the early twentieth century. Texts and themes will vary by semester.

ENGL 4320
Studies in Postmodernism. 3 credits, max 6. Approaches to the exploration of postmodernism in literature, other art forms, and culture. The analysis of representative postmodern texts from various genres such as fiction, poetry, drama, film and mass media.

ENGL 4343
Studies in American Sign Language. Prerequisite(s): 6 hours of ASL or permission of Instructor. An examination of psycholinguistic and sociolinguistic research on ASL and its speakers, to familiarize students with current theory and practice in applied linguistics.

ENGL 4350
Contemporary International Cinema. 3 credits, max 6, Lab 2. Examines major trends in contemporary international cinema of the last fifteen years. National cinema may include France, Germany, Italy, Spain, Sweden, China, Taiwan, India, South Korea, and Russia, amongst others.

ENGL 4353
Linguistics of American Sign Language. Prerequisite(s): 6 hours of ASL or permission of instructor. Linguistic analysis of American Sign Language, including referential and locative features, morphology, syntax, and semantics. Students will gain an understanding of ASL structure.

ENGL 4400
Studies in Regional Literature. 3 credits, max 6. Literature of a nation such as Ireland or Canada, or of a region such as the American Southwest. Topic varies by semester.

ENGL 4433
British Poetry Post 1900. Genre development. Major writers and their works.

ENGL 4450
Culture and the Moving Image. 3 credits, max 9. Prerequisite(s): 2453. The study of the moving image in a social or cultural context, including genre, auteur and auteurism, film and feminism, television and other media.

ENGL 4460
Creative Nonfiction. 3 credits, max 6. Theory and practice of creative nonfiction in English, including autobiography, memoir, travel writing, literary journalism, correspondence, and the essay.

ENGL 4520*
Problems in English. 1-3 credits, max 6. Prerequisite(s): 12 credit hours of English. Specialized readings and independent studies.

ENGL 4523*
Technical Writing Internship. Prerequisite(s): Six credit hours of English, including 3323. Practice in writing resumes, proposals, abstracts and articles. Concentrated review of mechanics, proofreading, editing and interviewing techniques. Second eight weeks will include internship experience.

ENGL 4533*
Advanced Technical Writing. Prerequisite(s): Six credit hours of English, including 3323. Specialized writing projects growing out of areas of specialization with emphasis on practical and marketable skills.

ENGL 4543*
Technical Editing. Prerequisite(s): Nine credit hours of English. Scientific and technical editing skills; emphasis on editing project.

ENGL 4553*
Document Design. Prerequisite(s): Six credit hours of English, including 3323. Design theories and practice for hard copy, computer screens and visuals. Students will learn about design standards, page layout, instructional design, desktop publishing, typography, reading theory, and current research in visual design.

ENGL 4563
Scientific and Technical Literature. Prerequisite(s): Six credit hours of English. Scientific and technical style.

ENGL 4600
Studies in Chaucer or Milton. 3 credits, max 6. Various topics focusing on the works of Chaucer or Milton.

ENGL 4630*
Advanced Fiction Writing. 3 credits, max 6. Prerequisite(s): 3030. Intensive practice in fiction writing.

ENGL 4640*
Advanced Poetry Writing. 3 credits, max 6. Prerequisite(s): 3040. Intensive practice in poetry writing.

ENGL 4650*
Advanced Screenwriting. 3 credits, max 6. Prerequisite(s): 3050. Discussion of professional screenplays and critiquing peers' work; completion of exercises on structure, visualization, and characterization; and writing a fictional screenplay.

ENGL 4700
Single Author or Work Pre-1800. 3 credits, max 6. Study of a single author or work prior to 1800 along with supporting literature. Chosen at the instructor's discretion.

ENGL 4710
Single Author or Work Post-1800. 3 credits, max 6. Study of a single author or work after 1800 along with supporting literature. Chosen at the instructor's discretion.

ENGL 4723
(H)Studies in Shakespeare. Focus on advanced topics in major plays and selected criticism.

ENGL 4893*
Research Writing for International Graduate Students. Prerequisite(s): Graduate standing or permission of the instructor. Analysis and practice in the grammar and rhetorical structures specific to writing research papers in the disciplines.

ENGL 4901*
Tutor Training. Lab 3. Training to become effective writing tutors and teachers through face-to-face conferences with writing students, weekly seminar presentations, and discussions of current writing center theory and practice.

ENGL 4993
Senior Honors Thesis. Prerequisite(s): Admission to Arts and Sciences Honors Program and 3.50 cumulative GPA. For Honors students in their final semester. Thesis written on a topic of student's choice and directed by a faculty member. Final approval of thesis requires oral defense.

ENGL 5000*
Thesis. 1-9 credits, max 12. MA thesis.

ENGL 5013*
Introduction to Graduate Studies. Principles and procedures in scholarly research.

ENGL 5043*
Traditions in Literary Criticism and Theory. A survey of the major documents in literary theory and criticism from Plato to 1965.

ENGL 5063*
Seminar in Shakespeare. Intensive study of a limited number of plays. Assignment of problems to individual students.

ENGL 5093*
Seminar in Milton. Poetry, major prose and criticism.

ENGL 5120*
Studies in Teaching English as a Second Language. 1-3 credits, max 6. Selected topics in teaching English as a second language; e.g. cross-cultural communication, materials preparation, bilingual education.

ENGL 5123*
Social and Psychological Aspects of Language. An introduction to language acquisition, processing, and production, and their interaction with social contexts.

ENGL 5130*
Studies in English Grammar. 3 credits, max 6. Selected study of current topics in grammatical theory as it applies to the teaching of English.

ENGL 5140*
Seminar in Linguistics. 3 credits, max 6. Selective study of current topics in linguistics.

ENGL 5143*
Seminar in Descriptive Linguistics. An introduction to phonology, morphology, syntax and semantics.

ENGL 5163*
Middle English Literature. Major works in Middle English.

ENGL 5210*
Seminar or Directed Study. 1-6 credits, max 9. Specialized readings or independent studies.

ENGL 5213*
Composition Theory and Pedagogy. Materials and methods of instruction in composition.

ENGL 5223*
Teaching Technical and Business Writing. Materials and methods of instruction in teaching technical and business writing.

ENGL 5243*
Teaching English as a Second Language. Theories of second language acquisition. Materials and methods of instruction.

ENGL 5293*
Interdisciplinary Uses of English. Interdisciplinary study with emphasis on multiple uses of English: for example, literature, writing for scholarly publication, new media, and American studies.

ENGL 5313*
Internship, Teaching English as a Second Language. Supervised teaching of beginning through advanced English as a second language courses.

ENGL 5333*
Seminar in TESL: Testing. Standardized testing for teaching English as a second language.

ENGL 5340*
Studies in Discourse Analysis. Selected topics in the study of language in use in spoken or written contexts.

ENGL 5353*
Studies in the History of Rhetoric. An exploration of selected topics and texts in the history of Western rhetoric from Plato to the present.

ENGL 5360*
Seminar in Screen Studies. 3 credits, max 9. The exploration of key aesthetic issues of analysis and evaluation as they pertain to film criticism.

ENGL 5363*
Critical Approaches to Screen Studies: Theory and History. Designed to provide students with an overview of fundamental theoretical and historical scholarship in film and television studies.

ENGL 5370*
Studies in Television and New Media. 3 credits, max 9. Exploration of aesthetic, cultural, and ideological aspects of television and new media in the United States and abroad.

ENGL 5410*
Seminar in British Literature of the 16th Century. 3 credits, max 6. Selected writers and their works, themes and literary developments of the 16th century.

ENGL 5420*
Seminar in British Literature of the 17th Century. 3 credits, max 6. Selected writers and their works, themes and literary developments of the 17th century.

ENGL 5440*
Seminar in British Literature of the 18th Century. 3 credits, max 6. Selected writers and their works, themes and literary developments of the 18th century.

ENGL 5460*
Seminar in British Literature of the 19th Century. 3 credits, max 6. Selected writers and their works, themes and literary developments of the 19th century.

ENGL 5480*
Seminar in Modern Literature. 3 credits, max 6. Selected writers and their works, themes and literary developments of modern literature.

ENGL 5503*
Technical Documentation Production. Practical considerations to managing professional publications—paper-based, web-based or any of many electronic forms.

ENGL 5513*
Introduction to Technical Communications. Development of critical cognitive skills of analysis, synthesis, and interpretation from the perspective of "consumer of research."

ENGL 5520*
Internship in Technical Writing. 1-6 credits, max 6. Practice in writing appropriate documents such as proposals, manuals (software, hardware, reference, training), articles, functional specifications in job-simulation situations. Review of academic materials as appropriate.

ENGL 5523*
New Genres in Technical Writing. Theoretical and practical considerations in specialized writing projects that include manuals, proposals and visual aids used to communicate technical information delivered in an online medium or as a combination of online and print documents.

ENGL 5553*
Information Design for Professional Publication. Study of information design theories to design and integrate textual and visual information using appropriate tools.

ENGL 5563*
History of Scientific Rhetoric. Structural, stylistic and rhetorical analysis of selected scientific and technical works.

ENGL 5573*
Theories of Communication. Survey of a broad range of theories of communication and application of those theories to technical communication.

ENGL 5583*
Environmental Writing. Consideration of the historical, political, cultural, and ethical contexts of modern environmentalism and examination of the rhetorical strategies in several types of environmental discourse, including risk communication, environmental impact statements, scientific papers and research reports, EPA communications, and other forms of environmental writing directed toward the general public. Major writing project tailored to individual research interests and career goals with the aim of producing a publishable document.

ENGL 5593*
Technical Style and Editing. An intensive study of writing style and editing. Study of style from the sentence level (including diction and grammatical arrangement) up to the levels of genres of technical communication. Writing assignments on style for different audiences.

ENGL 5630*
Seminar in Early American Literature. 3 credits, max 6. Selected writers and their works, themes and literary developments of the 17th and 18th centuries.

ENGL 5660*
Seminar in American Literature of the 19th Century. 3 credits, max 6. Selected writers and their works, themes and literary developments of the 19th century.

ENGL 5680*
Seminar in Contemporary Literature. 3 credits, max 6. Selected writers and their works, themes and literary developments in contemporary literature.

ENGL 5723*
Craft and Forms of Poetry. Theory and practice of the poetic forms.

ENGL 5730*
Seminar in Fiction Writing. 3 credits, max 9. Writing fiction at the professional level.

ENGL 5740*
Seminar in Poetry Writing. 3 credits, max 9. Writing poetry at the professional level.

ENGL 5750*
Seminar in Scriptwriting. 3 credits, max 6. Scriptwriting at the professional level.

ENGL 5763*
Craft and Forms of Fiction. Theory and practice of the fictional films.

ENGL 5990*
Special Problems. 1-3 credits, max 6. Investigation into a designated area of English leading to material for creative component option (MA). *Graded on a pass-fail basis.*

ENGL 6000*
Dissertation. 1-9 credits, max 60. PhD dissertation.

ENGL 6130*
Studies in Fiction Writing. 3 credits, max 9. Prerequisite(s): 5730. Individual projects in fiction.

ENGL 6140*
Studies in Poetry Writing. 3 credits, max 9. Prerequisite(s): 5740. Individual projects in poetry.

ENGL 6210*
Seminar or Directed Study. 1-6 credits, max 9. Specialized readings or independent studies.

ENGL 6220*
Seminar in Genre. 3 credits, max 9. The development, traditions, concerns or characteristics of genre in selected texts. Major genres and subgenres considered.

ENGL 6240*
Studies in Literature. 3 credits, max 9. Advanced topics in literature and literary research.

ENGL 6250*
Seminar in Race, Region or Gender. 3 credits, max 9. A study of the complex relations between race, region or gender and the texts that represent them.

ENGL 6260*
Studies in Literary Criticism. 3 credits, max 9. Selected work in literary criticism, for example ancient and neo-classical, 19th century, 20th century.

ENGL 6350*
Topics in Rhetorical Theory. 3 credits, max 6. Study of advanced topics in rhetorical theory and research. May focus on an important thinker, or a specific theme, or some combination of thinkers and themes.

ENGL 6360*
Seminar in Film and Society. 3 credits, max 9. Social conduct and value systems as they affect the role of media in culture.

ENGL 6410*
Topics in Linguistics. 3 credits, max 9. Prerequisite(s): 5143. Study of advanced topics in linguistic theory and research.

ENGL 6420*
Topics in Second Language Acquisition. 3 credits, max 9. Prerequisite(s): 5243. Study of topics in second language theory and research.

ENGL 6500*
Studies in Technical Writing. 1-3 credits, max 9. Selected topics in technical writing.

ENTOMOLOGY (ENTO)

ENTO 2003
(N)Insects and Society. A course for non-majors that emphasizes the impact of insects on society. Influence of arthropods in beliefs, culture and fears and the view of insects in folklore and mythology from ancient times to present. Focus on the use of insects as model systems in biological research. Exposure to the use of insects in teaching, music, art, literature and the cinema.

ENTO 2091
Livestock Entomology. Lab 2. Prerequisite(s): 2992. Economic importance, biology and control of pests affecting domestic animals.

ENTO 2223
(N)Insects and Public Health. Biology of diseases carried by arthropods, including their historical and societal impacts focusing on the intersection of arthropod and human biology.

ENTO 2991
(L,N)Introduction to the Science of Entomology. Lab 2. Prerequisite(s): 2992. Laboratory-based course focused on insect structure, function and classification. Biology and ecology of insects are demonstrated in both laboratory and field settings. Designed to reinforce and supplement concepts introduced in ENTO 2992 through practical application.

ENTO 2992
(N)Introduction to the Science of Entomology. Basic biology and classification of insects and closely related animals. Overview of the ecological roles of insects in both natural and managed ecosystems.

ENTO 3021
Postharvest Insect Pests. Lab 2. Prerequisite(s): 2991 & 2992 concurrent enrollment or 2091. The biology and management of insect pests of bulk-stored grains, flour, feed, dried fruits and nuts, and those of quarantine significance for export of fresh fruits and vegetables within food processing plants, warehouses, wholesale and retail distribution systems.

ENTO 3044
Insect Physiology. Lab 2. Prerequisite(s): 2991 & 2992; one course in organic chemistry and nine credit hours of biology. Functions of organ systems and demonstration of selected techniques for study of insect physiology. *Offered in combination with 5044. No credit for both 3044 and 5044.*

ENTO 3331
Insect Pests of Agronomic Crops. Lab 2. Prerequisite(s): 2991 & 2992 or concurrent enrollment. Sampling and decision-making processes for evaluation and control of insect pest populations in agronomic crops. Coverage of identification of pests and beneficials and damage symptoms resulting from insect feeding in crops.

ENTO 3421
Horticultural Insects. Lab 2. Prerequisite(s): 2991 & 2992 or concurrent enrollment. Identification, biology and control of pests attacking horticultural crops. Emphasis on pests injurious to vegetables, fruits, pecans, greenhouse plants, turf and ornamental trees and shrubs.

ENTO 3461
Insects in Forest Ecosystems. Lab 2. Prerequisite(s): 2991 & 2992 or concurrent enrollment. Identification and seasonal life history of insect pests and beneficial insects on shade trees in urban settings, in commercial forests, and in forest products.

ENTO 3501
Entomology for Educators. Lab 2. Hands-on laboratory course designed to provide educators (teachers, FFA or 4H leaders, etc.) with all of the resources and background information needed to use insects as a model to teach scientific concepts.

ENTO 3644
Insect Morphology. Lab 4. Prerequisite(s): 2991 & 2992 or equivalent. Insect development and comparative morphology. *Offered in combination with 5644. No credit for both 3644 and 5644.*

ENTO 3663
Turfgrass Integrated Pest Management. Lab 2. Prerequisite(s): 2991, 2992, PLP 3344. The biology, ecology, and identification of fungal, nematode, and insect turfgrass pests. Contemporary concepts and applications of integrated control practices available for managing turfgrass pests along with decision-making tools for use in turfgrass pest management programs. (Same course as PLP 3663)

ENTO 4223*
Ecological Methodology. Lab 2. Prerequisite(s): One course in either ecology or general biology. Use of insects and other invertebrates for describing and evaluating interactions of individuals and populations with their environments. Coverage of behavioral and physiological ecology on consequences to individuals; population and community ecology considered in dynamics of groups of organisms in ecosystems.

ENTO 4400
Special Topics. 1-3 credits, max 3. Prerequisite(s): Consent of instructor. Special topics in plant pathology, entomology or related fields. (Same course as PLP 4400)

ENTO 4464*
Insect Biology and Classification. Lab 4. Prerequisite(s): 2992 and 2991 or ZOOL 1604. Insect phylogeny, taxonomy, behavior, morphology and physiology in the context of ecosystem function. Major roles of insects in shaping ecosystem diversity, as indicators of environmental integrity, and as vectors of plant and animal pathogens and parasites.

ENTO 4483
Aquatic Entomology. Lab 2. Prerequisite(s): 2991 and 2992 or ZOOL 1604. Biology, taxonomy and ecology of insects and other invertebrates, inhabiting freshwater environments. Emphasis is placed on identification and biology of individual taxa. Roles of insects in aquatic ecology, as a forage base, and as indicators of biotic integrity of aquatic systems. Linkages between aquatic systems and terrestrial systems are also examined. *No credit for students with credit in ENTO 5483 or ZOOL 5483.* (Same course as ZOOL 4483)

ENTO 4800
Entomology Practicum. 1-6 credits, max 6. Prerequisite(s): Consent of practicum coordinator and adviser. Supervised research or extension experience with faculty in the Entomology/Plant Pathology Dept. or with approved governmental agencies or private employers. *Written report required at close of practicum. Graded on pass-fail basis.*

ENTO 4854*
Medical and Veterinary Entomology. Lab 4. Prerequisite(s): 2992 and 2991 or 2091. Biology and control of arthropod vectors of disease and the diseases carried by arthropods.

ENTO 4922*
Applications of Biotechnology in Arthropod and Pathogen Control. Prerequisite(s): Introductory biology and chemistry or equivalent. Applications of biotechnology in controlling arthropod pests of plants and animals and plant pathogens. Introduction to underlying technology, products being deployed, their effectiveness and associated problems or concerns resulting from their use. (Same course as PLP 4922)

ENTO 5000*
Master's Research and Thesis. 1-6 credits, max 6. Research in entomology.

ENTO 5003*
Insect Biochemistry. Prerequisite(s): Consent of instructor. Biochemical processes in insects and closely related arthropods with emphasis on metabolic pathways unique to this group. Biochemical aspects of arthropod host interactions.

ENTO 5020*
Special Problems. 1-8 credits, max 8. Prerequisite(s): Graduate standing. Selected studies in the area of entomology, acarology or araneology.

ENTO 5044*
Insect Physiology. Lab 2. Prerequisite(s): 2991, 2992 or equivalent; one course in organic chemistry and nine credit hours of biology. Functions of the organ systems and demonstration of selected techniques for study of insect physiology. *Offered in combination with 3044. No credit for both 3044 and 5044.*

ENTO 5464*
Systematic Entomology. Prerequisite(s): 3553 or equivalent. Classification and comparative biologies of terrestrial insects.

ENTO 5483*
Aquatic Entomology. Lab 2. Prerequisite(s): 2991 and 2992 or ZOOL 1604. Biology, taxonomy and ecology of insects and other invertebrates, inhabiting freshwater environments. Emphasis is placed on identification and biology of individual taxa. Roles of insects in aquatic ecology, as a forage base, and as indicators of biotic integrity of aquatic systems. Linkages between aquatic systems and terrestrial systems are also examined. Graduate students will be expected to complete additional collection requirements and biotic integrity analyses. *No credit for students with credit in ENTO 4483 or ZOOL 4483.* (Same course as ZOOL 5483)

ENTO 5501*
Entomology for Educators. Lab 2. Hands-on laboratory course designed to provide educators (teachers, FFA or 4H leaders, etc.) with all of the resources and background information needed to use insects as a model to teach scientific concepts. *No credit given for students who have taken ENTO 3501.*

ENTO 5513*
Biological Control. Lab 2. Prerequisite(s): 2991 & 2992 or equivalent or consent of instructor. The ecological principles and applied practices of biological control of insects, weeds and plant pathogens. Epizootiology including the scientific basis of biological control; natural enemies and their biology; biological control methods; and biological control in integrated pest management programs.

ENTO 5524*
Integrated Management of Insect Pests and Pathogens. Lab 4. Prerequisite(s): 2991, 2992 and PLP 3344 or equivalent or consent of instructor. Modern theory and practices for management of insect pests and pathogens in plant production systems, emphasizing an ecologically-based, integrated approach. Basic concepts of pest management, decision-making, cost/benefit analysis and risk/benefit analysis. (Same course as PLP 5524)

ENTO 5550*
Advanced Agronomic Entomology. 1-5 credits, max 5. Prerequisite(s): 4523. Special problems in advanced agronomic entomology.

ENTO 5613*
Host Plant Resistance. Lab 2. Prerequisite(s): 2991, 2992 and PLP 3344 or equivalent and a general genetics course; or consent of instructor. Interactions of plants and the herbivorous insects and pathogenic micro-organisms that attack them. Development and deployment of multiple-pest resistant cultivars in crop management systems. (Same course as PLP 5613)

ENTO 5623*
Advanced Biotechnology Methods. Lab 3. Prerequisite(s): BIOC 3653, BIOL 3023 or equivalent or consent of instructor. Overview of current theory and principles of biotechnology and laboratory experience with contemporary techniques and experimental methods used in biotechnology, including genome analysis, gene transfer, identification and isolation of genes and their products and regulation of gene expression in plants and arthropods. (Same course as PLP 5623)

ENTO 5644*
Insect Morphology. Lab 4. Prerequisite(s): 2991, 2992 or equivalent. Insect development and comparative morphology. *Offered in combination with 3644. No credit for both 3644 and 5644.*

ENTO 5700*
Teaching Practicum in Entomology. 1-6 credits, max 6. Prerequisite(s): Graduate student standing. Variable credit offering for graduate students who wish to develop skills in teaching, assessment and curriculum development working in conjunction with a primary instructor.

ENTO 5710*
Advanced Medical and Veterinary Entomology. 1-5 credits, max 5. Prerequisite(s): 4854. Special problems in methods of disease transmission, animal parasite control and the relationships existing between parasite and host.

ENTO 5733*
Insect Chemical Ecology. Prerequisite(s): BIOL 1114, CHEM 3015 or equivalent. Ecological interactions among organisms mediated by naturally produced chemicals. An interface of ecology, behavior, physiology and chemistry with examples from animals, plants and microorganisms. Origin, function, significance and utilization of semiochemicals such as pheromones and allelochemicals.

ENTO 5753*
Insecticide Toxicology. Prerequisite(s): Organic chemistry or 15 credit hours biology. Properties and mode of action of the major insecticidal materials. Assessment of their impact on the environment.

ENTO 5833*
Insect Molecular Biology. Prerequisite(s): 2991, 2992 and BIOL 3024 or equivalent or consent of instructor. Concepts and methods in molecular biology with emphasis on genetics of insects. Application of molecular techniques in insect biology.

ENTO 5850*
Epidemiology of Arthropod-borne Diseases. 1-4 credits, max 4, Lab to be arranged. Prerequisite(s): 4854 or equivalent. The relationships existing between the hosts, arthropod vectors and causal agents of disease and the principles of disease prevention or suppression by the intelligent use of biological principles.

ENTO 5870*
Scientific Presentations. 1 credit. Prerequisite(s): Consent of instructor. Preparation and delivery of scientific presentations including 50-minute seminars, 10-minute talks, and posters. (Same course as PLP 5870)

ENTO 5992*
Career Skills and Professionalism for Scientists. Prerequisite(s): Graduate standing. For graduate students majoring in science-based fields, especially those nearing graduation. Skills needed for effective job application and interviewing, career development and advancement, communication with professional colleagues and the public, and personal professional development. (Same course as PLP 5992)

ENTO 6000*
Doctoral Research and Dissertation. 1-10 credits, max 30. Prerequisite(s): MS in entomology or consent of major professor. Independent investigation under the direction and supervision of a major professor.

ENTO 6100*
Advanced Insect Physiology. 1-5 credits, max 5. Prerequisite(s): 3044 or 5044 or equivalent. Special problems in advanced insect physiology.

ENTREPRENEURSHIP AND EMERGING ENTERPRISE (EEE)

EEE 3023
Introduction to Entrepreneurship. Prerequisite(s): Sophomore standing. Overview of entrepreneurship and its role in our lives. Examination of what it takes to start and sustain new ventures. Central focus is on the issues surrounding effective implementation of the entrepreneurial process.

EEE 3033
Women and Minority Entrepreneurship. The course covers race, gender, and ethnicity as factors that impact entrepreneurship. Students look at the theoretical underpinnings of minority and women's entrepreneurship and their opportunities, challenges, and strategies when creating ventures.

EEE 3263
Entrepreneurial Marketing. Prerequisite(s): 3023, MKTG 3213 and completion of business core classes or instructor permission. Examination of the roles of marketing in entrepreneurial ventures and entrepreneurship in the marketing efforts of any organization. Emphasis on marketing as it relates to risk management, resource leveraging and guerrilla approaches. *No credit for students with credit in EEE 5223 or MKTG 5223.* (Same course as MKTG 3263)

EEE 3513
Growing Small and Family Ventures. Prerequisite(s): 3023 or instructor permission. Exploration of unique challenges involved when growing small and family-owned ventures. The life stages of emerging enterprises are examined. Issues addressed include resource needs, skill requirements, functional area development, and work-life balance.

EEE 3663
Imagination in Entrepreneurship. Prerequisite(s): 3023 or instructor permission. Exploration of creativity and ideation as they relate to entrepreneurship. Perspectives on opportunity discovery and assessment are examined. Theoretical and conceptual foundations for the application of creativity to business problem solving are investigated. *No credit for students with credit in 5663.*

EEE 4010
Special Topics in Entrepreneurship. 1-6 credits, max 6. Examination of entrepreneurship issues. Specific topics vary from semester to semester.

EEE 4113
Dilemmas and Debates in Entrepreneurship. Designed around a series of critical dilemmas confronted by entrepreneurs when creating and growing a venture. Entrepreneurs explore with students the issues surrounding these dilemmas in a structured format.

EEE 4263
Corporate Entrepreneurship. Prerequisite(s): 3023 or instructor permission. Examination of the application of entrepreneurship concepts and behaviors within established organizations, assessment of factors contributing to a company's entrepreneurial orientation, and identification of ways to foster high levels of entrepreneurship within firms. *No credit for students with credit in 5263.*

EEE 4313
Emerging Enterprise Consulting. Prerequisite(s): 3023 and junior standing. Students nearing the end of their studies work in teams in addressing problems and opportunities within existing entrepreneurial ventures. Using an established methodology, teams work with local entrepreneurs in establishing priorities and producing tangible deliverables that solve business needs. *No credit for students with credit in 5313.*

EEE 4483
Entrepreneurship and New Technologies. Prerequisite(s): 3023 or instructor permission. Assessment of technologies and their marketplace potential. Issues in technology commercialization are examined from an entrepreneurial perspective. Students work on implementation issues surrounding actual emerging technologies originating at the university and in the surrounding community.

EEE 4513
Strategic Entrepreneurial Management. Prerequisite(s): Senior standing. The capstone integrative experience required of all business students, culminating in the development of a comprehensive plan for a new business or nonprofit venture. All students compete in the Capstone Competition at the end of the semester.

EEE 4610
Entrepreneurship Practicum. 1-6 credits, max 6. Prerequisite(s): 3023 and instructor permission. Transfer of knowledge from entrepreneurship course work into practice through hands-on experiences, such as business development consulting projects, management of a venture capital fund and creation of a student-owned business.

EEE 4653
Venture Capital. Prerequisite(s): 3023 or instructor permission. Approaches to raising and managing working capital in emerging enterprises. Examination of the many sources of financing for start-up and early stage ventures. Attention devoted to determining financial needs of new ventures and formulating, determining valuations and formulating deal structures.

EEE 5113*
Entrepreneurship and Venture Management. Prerequisite(s): Admission to MBA program or instructor permission. Enterprise creation and problems faced by entrepreneurs in early growth stages of business ventures. An interdisciplinary problem-solving approach with emphasis on case studies and plans for new business ventures.

EEE 5133*
Dilemmas and Debates in Entrepreneurship. Prerequisite(s): Graduate standing. Designed around a series of critical dilemmas confronted by entrepreneurs when creating and growing a venture. Entrepreneurs explore with students the issues surrounding these dilemmas in a structured format.

EEE 5200*
Special Topics in Entrepreneurship. 1-6 credits, max 6. Prerequisite(s): Graduate standing. Examination of entrepreneurship issues. Specific topics vary from semester to semester.

EEE 5223*
Entrepreneurial Marketing. Prerequisite(s): Admission to MBA program or instructor permission. Interplay of entrepreneurship concepts and marketing concepts, including the role of marketing in entrepreneurial ventures, and the role of entrepreneurship in a firm's marketing efforts. Emphasis is placed on how to address the significant changes taking place in markets and the modern marketing function. (Same course as MKTG 5223)

EEE 5263*
Corporate Entrepreneurship. Prerequisite(s): Admission to MBA program or instructor permission. Examination of the application of entrepreneurship concepts and behaviors within established organizations, assessment of factors contributing to a company's entrepreneurial orientation, and identification of ways to foster higher levels of entrepreneurship within firms.

EEE 5313*
Emerging Enterprise Consulting. Prerequisite(s): Admission to the MBA program or instructor permission. Using an established methodology, student teams work with local entrepreneurs in establishing consulting priorities within their ventures and producing tangible deliverables that solve business challenges. All facets of business are addressed.

EEE 5610*
Advanced Entrepreneurship Practicum. 1-6 credits, max 6. Prerequisite(s): 5113. Transfer of knowledge from entrepreneurship course work into practice through hands-on experiences, such as business development consulting projects, management of a venture capital fund, and creation of student-owned business.

EEE 5653*
Venture Capital. Prerequisite(s): 5113, admission to MBA program or instructor permission. Venture capital investing and the business development process. Exploration of how startups and early stage firms determine money needs, obtain financing and structure deals. *No credit for students with credit in 4653.*

EEE 5663*
Imagination in Entrepreneurship. Prerequisite(s): Graduate standing. Exploration of creativity and ideation as they relate to the entrepreneurial process. Perspectives on opportunity discovery and assessment are examined. Theoretical and conceptual foundations for the application of creativity to business problem solving are investigated.

EEE 6213*
Doctoral Seminar in Innovation Management. Prerequisite(s): Doctoral student standing and consent of instructor. Focuses on the context of innovation as well as on its processes and practices. Emphasis is placed on learning, applying and adapting various frameworks designed to capture and explain the nature of innovation and its management.

EEE 6263*
Theoretical Foundations in Entrepreneurship. Prerequisite(s): Doctoral student standing and consent of instructor. Broad survey of major topics in the field of entrepreneurship. The primary theoretical underpinnings of the field are covered as well as some of the common and/or promising methodological approaches to the study of entrepreneurial phenomena.

EEE 6343*
PhD Seminar in Entrepreneurship. Prerequisite(s): Doctoral student standing and consent of instructor. Current research that addresses important entrepreneurial questions and assesses "gaps" in those literatures. Strategies will be proposed to address these gaps. Focuses on refining students' skills in "mapping out" and writing research papers.

ENVIRONMENTAL SCIENCE (ENVR)

ENVR 1113
Elements of Environmental Science. Application of biology, chemistry, ecology, economics, geology, hydrology, mathematics, physics, and other agricultural sciences to environmental issues. Addressing environmental problems from the standpoint of ethics, risk, and scientific and social feasibility. Emphasis on agricultural systems and natural resources.

ENVR 4010
Internships in Environmental Science. 1-6 credits, max 6. Prerequisite(s): Junior standing in environmental science or consent of instructor. Supervised internships with business, industry, or governmental agencies in environmental assessment and remediation.

ENVR 4112
Land Measurement and Site Analysis. Lab 2. Prerequisite(s): MATH 1513 or equivalent. Methods and techniques used to locate sites and evaluate physical conditions. Includes map interpretation and land description, use of Global Positioning System, Rectangular System Land Description and determination of land elevations, areas and slopes. (Same course as MCAG 4112)

ENVR 4500
Environmental Science Problems. 1-6 credits, max 6. Prerequisite(s): Upper-division standing, GPA of 2.50 or better, and consent of instructor. Individual or small group study of selected problems in environmental science. Course may be used twice for up to six credit hours to meet degree requirements.

ENVR 4512
Environmental Impact Analysis. Outline of the National Environmental Policy Act (NEPA) documentation of potential environmental impacts for decision makers. Development of environmental assessment, environmental impact statements, and categorical exclusion documents that result from the NEPA processes. *Graded on a pass/fail basis.*

ENVR 4573
Ethical Issues in Agriculture and the Environment. Application of ethical concepts and economics theory to real-world agricultural and environmental issues. Recognition of the moral, ethical, and economic dimensions of value that aid in understanding and resolving the controversial aspects of these private and public issues.

ENVR 4813
Environmental Science Applications and Problem Solving. Lab 2. Prerequisite(s): AGEC 3503, BISC 3034, FOR 4813, GEOL 3073, POLS 4363, senior standing, or consent of instructor. Integrated problem solving applied to environmental issues using physical, biological, economic, quantitative, policy and administrative principles. Primarily for environmental science majors.

ENVR 5000*
Research for Thesis or Report. 1-6 credits, max 6. Prerequisite(s): Approval of advisory committee and departmental steering committee. Research leading to master's thesis or report.

ENVR 5050*
Readings in Environmental Science Topics. 1-3 credits, max 9. Prerequisite(s): Consent of the instructor. This course provides an avenue for masters students to extend their knowledge of Environmental Science topics not covered in other courses. *This course is not available for doctoral students.*

ENVR 5123*
Environmental Problem Analysis. Prerequisite(s): 5303. This course reviews the process of environmental problem analysis using current practical examples. This course draws on theories from various disciplines and applies appropriate techniques of analysis.

ENVR 5200*
Special Topics in Environmental Science. 1-4 credits, max 10. Prerequisite(s): Graduate standing. Topics and issues in the broad field of environmental science. Group discussions and projects not covered by existing courses such as ecological risk assessment, water chemistry and environmental law.

ENVR 5210*
Seminar in Environmental Science. 1-3 credits, max 6. Prerequisite(s): Consent of the instructor. This seminar is offered as a special topics course for masters students. The theme of the seminar will vary in accordance with recent advances in environmental science and the interests of the faculty instructor.

ENVR 5303*
Issues in Environmental Sustainability. Prerequisite(s): 3000 or 4000 level ecology course. The course reviews human-nature relationships and how they affect the ability of future generations to sustainably improve their quality of life. The course also considers methods of environmental stewardship that can contribute to sustainability. In-class and/or online discussions of issues, guest presentations by outside experts, and reports on selected topics are included.

ENVR 5503*
Environmental Management Practicum. Prerequisite(s): 18 credit hours, which must include one environmental compliance course (POLS 5633 or CIVE 5123), and one environmental risk course (POLS 5643, POLS 5653, or CIVE 5823); OR comparable courses as approved by the instructor. This course explores methods of analyzing sustainable solutions to complex environmental, safety and health problems using an integrated team approach. This approach combines technical, legal, economic, and sociopolitical information into a coherent analytical framework. *Required for masters students pursuing a plan of study in environmental management.*

ENVR 5510*
Environmental Management Internship. 3 credits, max 6. Prerequisite(s): 5503 and consent of program director. The student must identify and solve an environmental problem under the supervision of a competent professional environmental manager, and submit and defend a formal report presenting the problem, solution analysis methodologies, and recommended solution. *The internship must involve at least 240 contact hours with the manager. The course is required of all masters students pursuing a plan of study in environmental management.*

ENVR 5523*
Industrial Ecology for Environmental Scientists. Prerequisite(s): General biology. Provides students with an overview and broad understanding of ecology principles as applied to an industrial setting. The course begins with an overview of general ecological principles such as ecosystem components and structures, biogeochemical cycles, energy flows, and properties of populations. The course concludes with a consideration of industrial ecology principles such as sustainability, pollution prevention, life cycle assessment and waste minimization.

ENVR 5543*
Environmental Management Systems. Prerequisite(s): 5303 or equivalent knowledge with consent of instructor. This course introduces strategies for the design and operation of environmental management systems that reduce environmental impacts in conformance with ISO 14000 standards. Topics include aspect identification, impact assessment, impact reduction strategies, and management oversight. Other topics such as training, internal and external auditing, and integration with other management programs will also be addressed.

ENVR 5703*
Chemical Aspects of Environmental Science I. Prerequisite(s): CHEM 1225, MATH 2155. For non-chemists with a basic understanding of industrial environmental chemistry. For the environmental professional student in the calculations required for permitting, such as the Clean Air Act, the Clean Water Act, release reporting (CERCLA), RCRA and Industrial Hygiene. The chemical interpretation of MSDS sheets and review of basic chemistry for individuals sitting for professional examinations. Fundamental scientific basis required for dealing with any environmental area.

ENVR 5713*
Chemical Aspects of Environmental Science II. Prerequisite(s): 5703. A continuation of 5703. Applications of statistical methods for environmental monitoring, environmental sampling, chemical wastewater treatment, fugacity (air emission calculations) and environmental chemical analysis.

ENVR 5733*
Environmental Site Assessment. This course introduces concepts associated with conducting environmental site assessments (ESAs) and contaminant remediation. Topics include review of federal regulations regarding site assessments, an overview of Phase I and Phase II ESA methodologies, proper soil/water sampling techniques, soil/geology/hydrogeology principles relating to environmental assessments, and various remediation strategies. The course includes field exercises simulating Phase I and Phase II ESA investigations, interpretation of historical aerial photos, and wetland identification.

ENVR 5743*
Environmental Impact Assessment. The course teaches students how to understand and apply the National Environmental Policy Act to evaluate and document potential environmental impacts for decision makers. The course reviews the development of environmental assessment, environmental impact statement and categorical exclusion documents that result from the NEPA process. Emphasis is placed on the development of an environmental assessment program.

ENVR 5823*
Watershed Management. Prerequisite(s): 5813. This course provides an overview of watershed management that integrates law, politics, economics, watershed science, engineering, education, social marketing, and conflict resolution. Students will also learn how to critically evaluate watershed management programs. *Field trips to watersheds are included.*

ENVR 6000*
Research for Dissertation. 1-12 credits, max 24. Prerequisite(s): Approval of advisory committee. Research leading to the PhD dissertation.

ENVR 6011*
Survey of Environmental Science. This course introduces newly admitted environmental science students to environmental research conducted by faculty at OSU. The course also helps students prepare interdisciplinary plans of study that support their professional and research goals. *It is required of all ES doctoral students during their first year of enrollment. The course may also be taken by ES master's students, but is not required.*

ENVR 6023*
Interdisciplinary Research Proposal Preparation. Prerequisite(s): Permission of student's research adviser. This course teaches students how to prepare and defend interdisciplinary research proposals and offers suggestions for preparing for qualifying exams. Students will learn how to frame research questions, conduct literature reviews, select among interdisciplinary research methods, organize research proposals, and present results. *Enrollment in the course requires permission of the student's research adviser. This course is required of all ES doctoral students before they intend to prepare and defend a dissertation prospectus and take the doctoral candidate qualifying exam.*

ENVR 6031*
Interdisciplinary Research Report Preparation. Prerequisite(s): 6023 or AGED 5983 and permission of the student's research adviser. This course teaches students how to prepare and defend interdisciplinary dissertations. Students will learn how to interpret results, articulate findings, justify conclusions, and identify implications. They will also learn how to deliver professional conference presentations and write professional papers. *The course requires permission of the student's research adviser. The course is required of all ES doctoral students just before they intend to prepare and defend their dissertations. ES master's students who want to learn more about preparing and defending a thesis may also enroll.*

ENVR 6050*
Advanced Readings in Environmental Science. 1-3 credits, max 9. Prerequisite(s): Consent of the instructor. This course provides an avenue for doctoral students to extend their knowledge of environmental science topics not covered in other courses.

ENVR 6210*
Advanced Seminar in Environmental Science. 1-3 credits, max 9. Prerequisite(s): Consent of the instructor. This course is offered as a special topics course for doctoral students. The theme of the course will vary in accordance with recent advances in environmental science and the interests of the faculty instructor. *No masters student may enroll in this course.*

ENVR 6310*
Advanced Topics in Environmental Science. 1-3 credits, max 6. Prerequisites: 24 credit hours of graduate credit and permission of instructor. This course covers current topics and issues in environmental science. Though the topics will vary, each course will typically include environmental assessment, environmental sustainability and environmental policy. *Group discussions and team projects may be required.*

ENVR 6503*
Advanced Environmental Management Practicum. Prerequisite(s): 30 credit hours, which must include one environmental compliance course (POLS 5633 or CIVE 5123), and one environmental risk course (POLS 5643, PLS 5653, or CIVE 5823); OR comparable courses as approved by the instructor. This course discusses and compares advanced methods of analyzing sustainable solutions to complex environmental, safety and health problems. A framework for integrating technical, legal, economic, and sociopolitical analysis into a risk-based model will be developed and applied to a real-world case study. Required for doctoral students pursuing a plan of study in environmental management.

ENVR 6516*
Advanced Environmental Management Internship. 6 credits. Prerequisite(s): 6503 and consent of program director. The student must identify and solve an environmental problem in collaboration with a competent professional environmental manager, and submit and defend a formal report presenting the problem, problem and solution analysis methodologies, and recommended solution. *The internship must involve at least 480 contact hours with the manager. The course is an experience for all ES doctoral students pursuing a plan of study in environmental management.*

ENVR 6623*
Social Aspects of Environmental Planning. This course develops students' theoretical and practical understanding of social aspects of environmental planning. The course addresses topics such as social impact assessment, the role of public involvement, environmental justice, and other social considerations in the implementation of environmental programs. It will also demonstrate the application of social science techniques in environmental planning and prepare students for the application of social perspectives in environmental decision-making - in both the public and private sectors.

FINANCE (FIN)

FIN 2123
Personal Finance. A first course in the management of the individual's financial affairs. Budgeting, use of credit, mortgage financing, investment and estate planning.

FIN 3113
Finance. Prerequisite(s): ACCT 2203 or concurrent enrollment; and ECON 2203 or concurrent enrollment; and STAT 2023 or equivalent or concurrent enrollment or consent of instructor. Operational and strategic financial problems including allocation of funds, asset management, financial information systems, financial structure, policy determination and analysis of the financial environment.

FIN 3613
General Insurance. Prerequisite(s): 3113. Introduction to the theory and general principles of insurance. A broad analysis of the elements and operation of property, casualty, health and life insurance.

FIN 3713
Real Estate Investment and Finance. Prerequisite(s): 3113. An introductory course in real estate investment and finance. Financing real estate, financial leverage and financial planning, the institutional structure of mortgage lending, managing risks, investment strategies and decisions.

FIN 4063
Applied Financial Studies. Prerequisite(s): Consent of the instructor. Structured internship or field project with supporting academic study.

FIN 4113
Financial Markets and Institutions. Prerequisite(s): 3113, and ECON 3313 or concurrent enrollment in ECON 3313. Money and capital markets, flow-of-funds, commercial banks and other financial intermediaries.

FIN 4213
International Financial Management. Prerequisite(s): 3113 or consent of instructor. Financial management topics unique to business firms operating in an international environment. Topics include global economic and business environments, international monetary system, foreign exchange markets, foreign exchange risk and management, foreign direct investment, and trade finance. Recent and current international financial events.

FIN 4223
Investments. Prerequisite(s): 3113. Various approaches to selecting and timing investment opportunities, e.g., common stocks, bonds, commodities and options. Modern concepts of portfolio theory.

FIN 4333
Financial Management. Prerequisite(s): 3113 or consent of instructor. Theories and practice applicable to the financial administration of a firm. A variety of teaching methods used in conjunction with readings and cases to illustrate financial problems and techniques of solution.

FIN 4363
Energy Finance. Prerequisite(s): 3113. Introduction to basic terminology, industry structure, and supply and demand outlook in the oil, gas and power industries. A broad analysis of applications in the energy industry including financial statement analysis, valuation, risk analysis in capital budgeting, risk management, alternative energy topics and energy specific case studies.

FIN 4443
Banking Strategies and Policies. Prerequisite(s): 3113, and ECON 3313 or concurrent enrollment in ECON 3313. Theories and practices of bank asset management; banking markets and competition.

FIN 4453
Bank Decision Simulation and Analysis. Prerequisite(s): 3113 and 4443. Student teams assume the roles of senior bank officers, making decisions regarding bank assets, funding, product pricing, financial leverage, profit enhancement, risk management, and staffing. Decisions implemented through computer simulation, incorporating the decisions into an environment where the decisions of competing management teams and the local economy determine bank profitability and shareholder value. Evaluation of students' abilities to create shareholder value and effectively communicate planning and analysis through written and spoken reports.

FIN 4550
Selected Topics in Finance. 1-6 credits, max 6. Prerequisite(s): 3113 or consent of instructor. Advanced topics in finance. Topics are updated each semester.

FIN 4653
Bond Markets. Prerequisite(s): 3113 and 4113. Provides a broad introduction to treasury, corporate, municipal, mortgage backed, and asset backed bond markets. The analytical techniques for valuing bonds, quantifying their exposure to changes in interest rate and credit risk exposures and investment decision-making are explored. Concepts are applied through case studies and projects.

FIN 4763
Financial Futures and Options Markets. Prerequisite(s): 3113 and 4223. Foundation in financial futures and options markets. A balance of institutional detail necessary to understand the structure of these markets and the theoretical developments necessary to apply the contracts to various uses. The use of financial futures and options to manage price risk.

FIN 4813
Portfolio Management. Prerequisite(s): 3113 and 4223 with a grade of "C" or better. Overview of portfolio management from the point of view of a trust officer, mutual fund manager, pension fund manager, or other manager of securities. Emphasizes the need of financial managers for an understanding of problems, trends, and theory of portfolio management.

FIN 4843
Risk Management. Prerequisite(s): 3113 and 4223. Introduction to relevant analytical tools necessary for the effective management of risk.

FIN 4913
Advanced Risk Management. Prerequisite(s): 3113, 4223, 4763, and 4843 (with a grade of "C" or better). Applications of risk management concepts and skills for the development of programs to manage risk exposures.

FIN 5000*
Research and Thesis. 1-6 credits, max 6. Prerequisite(s): Good standing in Master of Science in quantitative financial economics program. Consent of program coordinator. Research and thesis for master's students.

FIN 5010*
Finance Projects and Independent Studies. 1-6 credits, max 6. Prerequisite(s): Good standing in a graduate program, consent of project adviser, consent of department head. Graduate projects and independent study in finance.

FIN 5013*
Business Finance. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director or consent of the instructor. Introduction to the major areas of business finance: the financial environment in which business decisions are made and the institutions found therein, the financial management practices of a firm securing financing and allocating resources among competing alternatives, and the valuation of financial assets to the firm and individuals.

FIN 5053*
Theory and Practice of Financial Management. Prerequisite(s): Admission to a SSB graduate program, FIN 5013 or equivalent and prior or concurrent enrollment in ACCT 5183 or equivalent, or the consent of the MBA director or the instructor. Concepts and theories applicable to the financial administration of a firm. Cases, problems and readings to illustrate various financial problems and techniques of solution.

FIN 5153*
Corporate Financial Strategy. Prerequisite(s): Admission to a SSB graduate program, FIN 5013 or equivalent and prior or concurrent enrollment in ACCT 5183 or equivalent, or the consent of the MBA director or the instructor. Strategic financial decisions and their implementation, including capital structure policy, capital budgeting, risk assessment and management, corporate restructuring, management performance assessment, cost of capital, financial resource planning, dividend policy, and capital raising. Familiarity with basic financial tools and techniques including time value of money, asset pricing and security valuation, and financial statement analysis.

FIN 5213*
International Business Finance. Prerequisite(s): 5013. Theories and financial management practices unique to business firms which operate in, or are influenced by, an increasingly global economy.

FIN 5223*
Investment Theory and Strategy. Prerequisite(s): Admission to a SSB graduate program, 5013 or the consent of MBA director or the instructor. Selected investment topics and advanced portfolio management techniques.

FIN 5243*
Financial Markets. Prerequisite(s): 5013. An analysis of the structure of financial markets, the determination and behavior of interest rates, the functioning of and the flow of funds.

FIN 5333*
Corporate Governance. Prerequisite(s): 5013. The theoretical and applied analysis of the governance structure of a corporation. The interconnections of the board of directors, CEO, management and shareholders. Case problems and readings address the advantages and disadvantages of various corporate governance practices.

FIN 5550*
Special Topics in Finance. 1-6 credits, max 12. Prerequisite(s): Consent of instructor. Theoretical and applied aspects of specialized financial areas. Evaluation of models, current trends and problems.

FIN 5763*
Derivative Securities and the Management of Financial Price Risk. Prerequisite(s): 5013 or consent of instructor. Differing amounts of financial price risk for individuals and corporations in volatile financial environment. The development of arbitrage-based models for the pricing of derivative securities, and the use of a full range of derivative securities to manage exposure to financial price risk.

FIN 5773*
Financial Engineering. Prerequisite(s): MATH 4513 and FIN 5763 or consent of instructor. Techniques for the design, development and implementation of innovative financial instruments and processes to the formulation of creative solutions of problems in finance.

FIN 5883*
Quantitative Financial Applications. Prerequisite(s): 5223 and consent of the head of the department. Application of financial solution techniques through directed case work in appropriate business and public sector settings. Simulation, small group instruction and field-based experiences.

FIN 6053*
Financial Theory and Corporate Policy. Prerequisite(s): Consent of the instructor. Theoretical and empirical underpinnings of modern corporate finance.

FIN 6660*
Seminar in Finance. 3-6 credits, max 12. Prerequisite(s): Consent of instructor. Advanced research with emphasis on theoretical problems and solutions. Selected topics covered.

FIRE PROTECTION AND SAFETY TECHNOLOGY (FPST)

FPST 1213
Fire Safety Hazards Recognition. "The Fire Problem'' Physical, chemical and electrical hazards and their relationship to loss of property and/or life. Safe storage, transportation and handling practices to eliminate or control the risk of fire in the home, business and industry.

FPST 1373
Fire Suppression and Detection Systems. Lab 3. The design, installation, maintenance and utilization of portable fire-extinguishing appliances and pre-engineered systems. Operational capabilities and utilization requirements of fire detection and signaling systems. Fire detection and suppression applied in practical laboratory problems.

FPST 2023
Introduction to Occupational Safety Techniques. Lab 3. Occupational facilities, equipment and operations and their inherent hazards. Directed toward worker, machine and environmental control.

FPST 2050
Studies in Loss Control. 1-4 credits, max 6. Prerequisite(s): Consent of instructor and adviser. Problems in applied fire protection technology, occupational safety, industrial hygiene or hazardous materials management of particular interest to the loss control specialist.

FPST 2153
Fire Protection Management. Applied human relations, technical knowledge and skills for achieving optimum effectiveness from a fire protection organization.

FPST 2243
Design and Analysis of Sprinkler Systems. Lab 3. Prerequisite(s): 1373, 2483, ENGR 1322 or GENT 1153. Detailed current standards for selection, design, installation, operation and maintenance of automatic fire suppression systems. Laboratory problems on applicable technological principles.

FPST 2344
Elements of Industrial Hygiene. Lab 3. Prerequisite(s): CHEM 1225. Toxic or irritating substances, physical, biological, ergonomic and other occupational stress factors causing employee illness or discomfort. Environmental pollution sources and controls.

FPST 2483
Fire Protection Hydraulics and Water Supply Analysis. Lab 3. Prerequisite(s): 1373 and MATH 1513. Fluid flow through hoses, pipes, pumps and fire protection appliances. Water supply and distribution analysis using hydraulic calculations. Testing techniques to detect anomalies in design or performance capabilities.

FPST 2650
Technical Problems and Projects. 1-4 credits, max 4. Special problems or projects assigned by advisers with the approval of the department head. A comprehensive written report or equivalent creative effort.

FPST 3013
Industrial Safety Organization. Survey course. Recognition, evaluation and control of occupational health and safety hazards. Accident prevention, accident analysis, training techniques, workman's compensation insurance, guarding and personal protective equipment.

FPST 3113
Advanced Extinguishing Systems Design and Analysis. Prerequisite(s): 2483, 2243. Automatic fixed fire-extinguishing systems and water supply systems. Emphasis upon computer assistance through use of existing design programs.

FPST 3143
Structural Designs for Fire and Life Safety. Lab 3. Prerequisite(s): 1213, 1373, 2243 and GENT 2323 or ENSC 2113. Building construction standards and codes to assure maximum life and property safety from fires, explosions and natural disaster. Egress design specifications, occupancy and construction classifications and fire protection requirements for building construction and materials.

FPST 3213
Human Factors in Accident Prevention. Prerequisite(s): 2344, 3013 and GENT 2323 or ENSC 2113. Human factors and workplace ergonomics as it relates to the prevention of accidents and workplace injuries. Fundamentals and techniques of task analysis.

FPST 3233
Radiological Safety. Lab 2. Ionizing radiation problems; detection and measurement, shielding and exposure limiting, radiation health aspects, storage, handling and disposal.

FPST 3373
Fire Dynamics. Lab 3. Prerequisite(s): CHEM 1225, CHEM 1515 and MATH 2123 or MATH 2145. Fundamental thermodynamics of combustion, fire chemistry and fire behavior. The physical evidence left by fire for investigation. Use of computer models to study fire behavior.

FPST 3383
Building Electrical Systems. Prerequisite(s): 1373. Detail current standards for design, selection and installation of electrical distribution ad utilization equipment. Emphasis on personnel safety and fire prevention using current codes and standards.

FPST 3713
Hydraulic Design of Automatic Sprinkler Systems. Prerequisite(s): 1373, 2483, MATH 1513. Hydraulic calculation technique for the design and analysis of automatic sprinkler fire extinguishing systems.

FPST 3723
Industrial Fire Pump Installations. Prerequisite(s): 2483, MATH 1513. Applications, design and analysis of industrial fire pump installations. Graphical analysis of fire pump contributions to existing fire protection water supply systems emphasized.

FPST 3733
Sprinkler System Design for High Piled and Rack Storage. Prerequisite(s): 2243, MATH 1513. Specific design techniques for sprinkler system protection of commodities stored in solid piles or racks over 12 feet in height.

FPST 4050
Special Problems in Loss Control. 1-4 credits, max 6. Prerequisite(s): Consent of department head. Special technical problems in fire protection and safety.

FPST 4133
Industrial Hygiene Instrumentation. Lab 3. Prerequisite(s): 2344, CHEM 1225, PHYS 1114. Description, operation and application of quantitative instruments in general use in industrial hygiene.

FPST 4153
Issues in Local Government and Fire Services. Prerequisite(s): 2153, MGMT 3013. Issues relating to the proper operation of a fire department and the fire department's role within the structure of local government.

FPST 4333
System Safety Analysis. Lab 3. Prerequisite(s): 2344, 3013, 3143 and STAT 2013 or 4013 or 4033. Fire and safety techniques to anticipate, recognize and control hazards. Fault Tree, HazOp, FMEA and other process safety techniques.

FPST 4403
Hazardous Materials Incident Management. Lab 3. Prerequisite(s): 2023, 2344, CHEM 1225. An interdisciplinary approach to hazardous materials incident management. Legislative requirements. Emphasis on comprehensive safety and health program compliance relating to hazardous materials incidents or waste sites. Regulatory code activities, transport-related inspections, incident modeling, and use of environmental safety software for problem solving and documentation.

FPST 4684
Industrial Loss Prevention. Lab 3. Prerequisite(s): Prior or concurrent enrollment in all other required FPST courses and ENGL 3323 or consent of instructor. Specific industrial processes, equipment, facilities and work practices for detecting and controlling potential hazards.

FPST 4993
Advanced Fire and Safety Problems. Prerequisite(s): Prior or concurrent enrollment in all other required FPST courses. Selected problems in the fire, occupational safety, occupational health and industrial security areas. Research or state-of-the-art technologies to prevent or correct such problems.

FOOD SCIENCE (FDSC)

FDSC 1133
Fundamentals of Food Science. Food industry from producer to consumer and the current U.S. and world food situations.

FDSC 2253
Meat Animal and Carcass Evaluation. Lab 2. Prerequisite(s): ANSI 1124. Evaluation of carcasses and wholesale cuts of beef, pork, and lamb. Factors influencing grades, yields, and values in cattle, swine, and sheep. (Same course as ANSI 2253)

FDSC 3033
Meat Technology. Lab 3. The basic characteristics of meat and meat products as they relate to quality. Product identification, economy, nutritive value, preservation, and utilization. *No credit for students with credit in ANSI 2253 or 3333.*

FDSC 3113
Quality Control. Lab 2. Prerequisite(s): Introductory microbiology and organic chemistry. Application of the principles of quality control in food processing operations to maintain the desired level of quality.

FDSC 3154
Food Microbiology. Lab 4. Prerequisite(s): Introductory microbiology and organic chemistry. Relationship of microorganisms to food manufacture and preservation, to food spoilage and microbial food poisoning and to various aspects of primary food production. (Same course as MICR 3154)

FDSC 3182
Meat Grading and Selection. Lab 4. Prerequisite(s): ANSI 2253. Classifying and grading carcasses and wholesale cuts of beef, pork and lamb; factors influencing quality and value. (Same course as ANSI 3182)

FDSC 3210
Animal and Product Evaluation. 1-2 credits, max 2, Lab variable. Prerequisite(s): Consent of instructor. Advanced instruction in evaluating slaughter and breeding animals and grading and evaluating meat, poultry, and dairy products. (Same course as ANSI 3210)

FDSC 3333
Meat Science. Lab 3. Prerequisite(s): ANSI 2253, CHEM 1215 or equivalent. Anatomical and basic chemical and physical characteristics of meat animals studied. The application of scientific principles to the processing and economical utilization of meat animals, as well as in the manufacture of meat products emphasized in the laboratory. (Same course as ANSI 3333*)

FDSC 3373
Food Chemistry I. Lab 2. Prerequisite(s): ANSI 3543 or organic chemistry. Basic composition, structure, and properties of foods and the chemical changes or interactions that occur during processing and handling.

FDSC 3603
Processing Dairy Foods. Lab 2. Prerequisite(s): Organic chemistry. Theory and practice in formulation and processing: butter and margarine, cottage cheese, blue and processed cheeses, evaporated and sweetened condensed milk, ice cream, ice milk, and other frozen desserts.

FDSC 4333*
Processed Meat. Lab 3. Prerequisite(s): ANSI 3033 or 3333. Meat and meat product composition. Techniques in the molding and forming of meat; sausage formulation; curing; quality control; and cost analysis. (Same course as ANSI 4333*)

FDSC 4373
Food Chemistry II. Lab 2. Prerequisite(s): 3373. Chemical/biochemical mechanisms that affect the structure and properties of foods during processing and handling. *No credit for FDSC 5373.*

FDSC 4763*
Analysis of Food Products. Lab 2. Prerequisite(s): Organic chemistry. Application of quantitative chemical and physical methods of analysis to the examination of foods.

FDSC 4910
Food Industry Internship. 3-12 credits, max 12. Prerequisite(s): Consent of instructor. Full-time internship at an approved production, processing or agribusiness unit or other agency serving the food industry. Maximum credit requires a six month internship in addition to a report and final examination. *Graded on a pass-fail basis.*

FDSC 5000*
Research and Thesis in Food Science. 1-6 credits, max 6, Lab 2-12. Prerequisite(s): Consent of major adviser. Research for Master of Science degree in Food Science planned, conducted and reported under guidance of major adviser.

FDSC 5120*
Special Topics in Food Science. 1-4 credits, max 8. Prerequisite(s): Graduate standing and consent of instructor. Advanced topics and new developments in food science especially with reference to foods of animal origin.

FDSC 5213*
Advances in Meat Science. Prerequisite(s): BIOC 4113 and ZOOL 3204 or equivalent. Development of muscle and its transformation to meat. Properties of meat and their influence on water-binding, pigment formation, texture, and fiber characteristics. (Same course as ANSI 5213*)

FDSC 5300*
Food Science Seminar. 1 credit, max 3. Prerequisite(s): Graduate standing. Maximum two credit hours for MS degree. Maximum three credit hours for PhD degree. Critical reviews or studies of the scientific research literature related to the field of food science. Oral reports or group discussions.

FDSC 5333*
Carcass Value Estimation Systems. Prerequisite(s): Graduate classification. Analysis of scientific literature regarding carcass composition, quality and palatability. Overview of technology used to evaluate carcass quality factors. (Same course as ANSI 5333)

FDSC 5373*
Advanced Food Chemistry. Lab 2. Prerequisite(s): FDSC 3373. Chemical/biochemical mechanisms that affect the structure and properties of foods during processing and handling.

FDSC 5553*
Interpreting Animal and Food Science Research. Prerequisite(s): STAT 5013 or concurrent enrollment. Critical evaluation and knowledgeable communication on the design, analyses, and reporting of animal science and food science research. (Same course as ANSI 5553)

FDSC 6000*
Research and Thesis in Food Science. 1-10 credits, max 30, Lab 2-20. Prerequisite(s): MS degree or consent of major adviser. Independent research for PhD degree in Food Science planned, conducted and reported in consultation of a major professor.

FOREIGN LANGUAGES AND LITERATURE (FLL)

The Department of Foreign Languages and Literatures offers courses under the prefix FLL, and in the following languages each of which has its own prefix: French, German, Greek, Japanese, Latin, Russian and Spanish. These languages are listed in alphabetical order.

FLL 1000
Special Studies in Foreign Languages and Literatures. 1-10 credits, max 10. Special studies in areas not regularly offered; basic level.

FLL 2000
Special Study in Foreign Languages and Literatures: Intermediate. 1-5 credits, max 10. Prerequisite(s): 10 hours or equivalent in target language (applies only to language course). Special study in areas other than those offered in regular program; intermediate level.

FLL 2103
(H)Masterworks of Western Culture: Ancient and Medieval. Ideas and values of Western culture as revealed through literary, artistic, historical, and philosophical contexts from Greek, Roman, and Medieval periods.

FLL 2203
(H)Masterworks of Western Culture: Modern. Ideas and values of Western culture as revealed through literary, artistic, historical, and philosophical contexts from the Renaissance to the Modern period.

FLL 2443
(I)Languages of the World. A comprehensive survey of world languages. The essential structural and historical organization of languages. The process of languages as a basic human function. (Same course as ENGL 2443)

FLL 3103
(H)Hispanic Literature in Translation. Readings of significant works from Spanish and Spanish-American literatures in English translation. Does not apply to major or minor in Spanish.

FLL 3500
Specialized Study in a Modern Foreign Language. 1-20 credits, max 20, Lab 1-5. Prerequisite(s): Consent of instructor. Instruction and/or tutorial work in a modern foreign language other than those offered in a major program.

FLL 4000
Specialized Studies in Foreign Languages and Literatures. 1-9 credits, max 9, Lab 1-9. Prerequisite(s): Junior standing or consent of instructor. Individual guided study, tutorial or seminar on specially selected topics in a foreign language or literature.

FLL 4993
Senior Honors Thesis. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis under the direction of a senior faculty member with second faculty reader, both of whom will be present at an oral defense of the thesis. Required for graduation with departmental honors in any foreign language major.

FLL 5210*
Graduate Studies in Foreign Languages. 1-6 credits, max 20. Prerequisite(s): 15 upper-division hours in the language. Graduate studies in foreign languages.

FORENSIC SCIENCES (FRNS)

FRNS 5000*
Research and Thesis. 1-6 credits, max 6, Lab 1-6. Prerequisite(s): Consent of major adviser. Research in forensic sciences for MS degree.

FRNS 5013*
Survey of Forensic Sciences. Prerequisite(s): Consent of instructor. Predominantly online class providing overview of various forensic sciences and how they relate to presentation of evidence and to civil and criminal procedures involved in solving problems of law. Law and ethics, forensic pathology, forensic dentistry and anthropology, forensic toxicology and molecular biology (DNA), forensic nursing and death scene investigation, forensic psychology, criminalistics, questioned documents, forensic engineering and technology, forensic accounting, and management techniques in forensic sciences. A review of current guidelines for knowledge, procedures, quality assurance and control, and certification/accreditation from national standards boards and scientific and technical working groups.

FRNS 5023*
Questioned Document Examination. Lab 2. Prerequisite(s): 5013 or concurrent enrollment. Functions of questioned document examiners, beyond document analysis to relating services and issues. History of questioned documents, handwriting and handprinting, process for obtaining exemplars, types of document examination (e.g., typewriting, mechanical processes, indented writing, obliterated writing, inks, currency, erasures, physical matches, and post marks.) Collection and preservation of evidence as well as courtroom procedures. (This course does not train the student as a document examiner and in no way certifies or qualifies the student to conduct questioned document analysis at the conclusion of this course.

FRNS 5033*
Theory and Practice of Forensic Handwriting Examination. Prerequisite(s): 5023. Theoretical and practical aspects of handwriting as forensic evidence. Production of normal and false handwriting, variables in handwriting production, standards of comparison, identification theories, examination methodologies, expression of conclusions, characterization and validation of examiner skills, legal admissibility of handwriting expertise, and challenges to professional practice.

FRNS 5043*
Technical Aspects of Forensic Document Examination. Prerequisite(s): 5023. Basic theory in visual examination of questioned documents. Visual and color theory, measuring tools, instruments, simple microscopy, and photographic techniques. Technical description, theory, operation and practical use of various instrumentation used in the field such as the Electrostatic Detection Apparatus (ESDA) and Video Spectral Comparator (VSC).

FRNS 5053*
The Historical Aspects of Forensic Document Examination. Prerequisite(s): Graduate standing. This course presents historical aspects of forensic document examination. It covers development of handwriting, the acceptance of document examination expertise in Britain and North American, the early luminaries and famous cases.

FRNS 5063*
Scientific Research, Writing and Presentation. Prerequisite(s): Permission from research advisor. Develops scientific and individual writing abilities, especially relative to thesis development around a scientific question. Explores responsible conduct of research; organization and design of various types of scientific writing; effective use of media; prescriptive activities for individual writing problems; and other aspects of presenting research. Some assignments require guidance from the student's research advisor.

FRNS 5073*
Quality Assurance in Forensic Science. Prerequisite(s): Admission to program. Preparation for the forensic scientist to develop and implement quality assurance and quality control procedures to ensure the excellence of a laboratory. Preparation of laboratory procedures ad policies, use of appropriate standards and controls, and validation methods for establishing an effective quality assurance program in the laboratory.

FRNS 5083*
Ethics in Forensic Leadership. Focuses on leadership development for managers of forensic organizations, including examination of leadership and ethics theories, application to theories to problems in forensic settings, tasks and relational skills for developing effective teams and groups within an ethical framework.

FRNS 5213*
Molecular Biology for the Forensic Scientist. Prerequisite(s): Admission to the program. Develops a solid foundation of knowledge in molecular biology for understanding the concepts of genetic marker analysis, especially DNA typing.

FRNS 5223*
Forensic Biology. Prerequisite(s): 5013 and 5213 or Instructor permission. Covers derivation of forensic evidence from biological sources for criminal and civil investigations. Includes progression of laboratory testing to identify human body fluid and its source, detection and characterization of stains or fluids and genetic marker testing.

FRNS 5242*
Population Genetics for the Forensic Scientist. Prerequisite(s): 5513. Population genetics relevant to DNA analysis technologies to identify perpetrators of crime. Includes foundation of statistical knowledge in forensic DNA analysis and family relatedness testing, history and application of statistical and population genetic theory to assigning weight to matches in DNA profiles for the court.

FRNS 5282*
Methods in Forensic Biology and Forensic Toxicology. Lab 4. Prerequisite(s): Permission of instructor. Advanced-level laboratory course in which students apply knowledge from earlier course work in a hands-on setting and employ fundamental techniques and methodologies pertinent to forensic biology and forensic toxicology.

FRNS 5313*
Forensic Engineering and Technology. Lab 2. Prerequisite(s): 5013; college-level chemistry and biology; knowledge of physics, calculus, and spreadsheet calculations. Review of disciplines of chemistry, biology, physics, math and computer science as regularly applied in support of forensic engineering and technology analysis. Case studies ranging from complex "multi-event" accidents to small but individually serious accidents.

FRNS 5413*
Forensic Pathology and Medicine. Prerequisite(s): Consent of instructor. Medico-legal investigation of death and injury due to natural causes, accidents and violence. Transportation injuries, homicides, suicides, blunt- or sharp-force injuries, gunshot wounds, asphyxia, drowning, and thermal and electrical injuries. Pediatric deaths; rape investigation; injury analysis; interpretive toxicology; identification by dental means; anthropologic studies for determining age, sex and race; and conducting of independent medical examinations. Demonstrations and data analysis from actual cases. Review of current guidelines for knowledge, procedures, quality control/assurance, and certification/accreditation from national standards boards and scientific/technical working groups.

FRNS 5513*
Forensic Bioscience. Prerequisite(s): 5013; college-level chemistry and biology. Concepts of toxicology and identity testing, the two areas representing the most extensive application of the fields of chemistry, biology and genetics to forensic science. History, theory, application and quality assurance concepts to the material. Working knowledge of how toxic compounds affect human physiology and how they are identified in the laboratory. Basic concepts in genetics and their application to tracing origin of biological samples in civil or criminal investigations as well as resolving disputed family relationships.

FRNS 5523*
Forensic Toxicology. Introduction of fundamental aspects of forensic toxicology and emphasis on major subfields of postmortem forensic toxicology, human performance toxicology and forensic drug testing. Examination of methodologies and analyses associated with these three major subfields.

FRNS 5533*
Drug Toxicity. Introduces fundamental aspects of abused drugs from a toxicological perspective and examines major disciplines of toxicology. Also covers basic principles of toxicology applied to different classes of commonly abused drugs.

FRNS 5613*
Criminalistics and Evidence Analysis. Lab 2. Prerequisite(s): Admission to program. Introduction to techniques and tools used for crime scene investigations and analysis of evidence. Introduction to the forensic laboratory, its operation and function, forensically applied scientific concepts, analytical instrumentation and microscopy, and documentation, collection and preservation of physical evidence. Review of FBI-sanctioned working group guidelines for evidence gathering, evidence handling, quality control and accreditation.

FRNS 5622*
Advanced Criminalistics. Lab 4. Prerequisite(s): 5073, 5613, 5653 and basic course work in specialty. Application of strategies/techniques for effective crime scene investigation in laboratory or mock crime scene setting. Covers the duties of the first officer at the crime scene, the crime scene investigator/evidence collector, and analysis of evidence in the forensic laboratory. Builds on concepts from prerequisite courses for hands-on exercises.

FRNS 5653*
Scientific Evidence. Prerequisite(s): Admission to program. Review of ways that the law, particularly the law of evidence, affects the work of the forensic scientist. The beginning of the case, most often the crime scene, through the legal process, through trial and including appeals and motions for a new trial. Legal doctrines of interest to the forensic scientist, such as chain of custody, work product privileges, laying of the proper foundation, exhibits, and the standards necessary to obtain a new trial.

FRNS 5713*
Forensic Psychology. Lab 2. Prerequisite(s): Consent of faculty. Introduction to the relationship between the disciplines of law and psychology via examination and contrast of the issues at the interface of both disciplines. Various legal terminology that calls for psychological input; legal and ethical responsibilities of forensic psychologists, criminal behavior, punishment and deterrence, violence and mental illness, competency to stand trial, the insanity defense, eyewitness testimony, the death penalty, and polygraph testing. Exploration of the role of legal and mental health systems in social control, impact of psychological knowledge on functioning of the legal system. Examination of psychological topics and paradigms relevant to study of particular legal subsystems or topics.

FRNS 5723*
Advanced Forensic Psychology. Prerequisite(s): 5013 & 5713. Expands on topics covered in FRNS 5713. Covers function of the mental health professional in criminal cases, nature and impact of mental illness on individual life and freedom, reasons behind crimes, gender differences in the criminal justice system, and laws pertinent for mental health professionals.

FRNS 5913*
Forensic Accounting and Fraud Investigation. Prerequisite(s): 5013. Introduction of concepts and tools used in the fields of forensic accounting and financial fraud investigations. Issues of alter ego, constructive trusts, fraudulent conveyances, accounting liability, business valuations, lost profits, damages, marital dissolution issues and bankruptcy. Aspects of fraud investigation, including overview of fraud in U.S., types and methods of fraud perpetration, red flags of fraud perpetrators, money laundering, and international fraud investigations. *(Upon completion student will have an understanding of accounting methods used in a litigation services/fraud investigation environment and knowledge of basic requirements for drafting expert reports in accordance with Federal Rules of Civil Procedure.)*

FRNS 6010*
Forensic Specialization. 1-3 credits, max 15. Prerequisite(s): 5013. Preparation for advanced research study in a specialty area of forensics. The study of existing research and methodologies directly related to the individual discipline via computer, literature review, classroom and laboratory experience, and applied training. Courses from OSU-COM and Stillwater campuses may be used to satisfy requirements for this course with the consent of the program director.

FRNS 6043*
Forensic Management and Organizational Development. Prerequisite(s): 5013. Application of managerial and organizational leadership skills to the demands of forensic sciences, including attention to the human resource, relations and development issues. Inter-agency cooperation, quality control and assurance, certification and accreditation issues, and internal security.

FRENCH (FREN)

FREN 1115
Elementary French I. Lab 1.5. Main elements of grammar and pronunciation, with work on the four basic skills of listening comprehension, speaking, reading and writing.

FREN 1225
Elementary French II. Lab 1.5. Prerequisite(s): 1115 or equivalent. Continuation of 1115.

FREN 2112
(I)Intermediate Reading and Conversation I. Lab 1. Prerequisite(s): 1225 or equivalent competence. (May have been gained in high school) Reading and discussion of simpler French texts, mostly cultural. *May be taken concurrently with other 2000-level French courses.*

FREN 2113
Intermediate French I. Lab 1. Prerequisite(s): 1225 or equivalent competence. (May have been gained in high school.) Review and further presentation of grammar and pronunciation; consolidation of basic skills, with additional emphasis on writing. *May be taken concurrently with other 2000-level French courses.*

FREN 2232
(I)Intermediate Reading and Conversation II. Lab 1. Prerequisite(s): 2112 or equivalent competence. (May have been gained in high school.) Reading and discussion of more advanced French texts, mostly literary. *May be taken concurrently with other 2000-level French courses.*

FREN 2233
Intermediate French II. Lab 1. Prerequisite(s): 2113 or equivalent competence. (May have been gained in high school.) Continuation of 2113. *May be taken concurrently with other 2000-level French courses.*

FREN 3073
French Conversation. Prerequisite(s): 2232 and 2233 or equivalent. Colloquial speech, with discussion of French newspapers and magazines. Practice in brief public address in French.

FREN 3203
Advanced Written Expression. Prerequisite(s): 20 hours of French or equivalent. Practice in composition and stylistics, designed to bring students up to a high level of proficiency in writing.

FREN 3213
Advanced Grammar. Prerequisite(s): 20 hours or equivalent proficiency. Conceptual framework and presentation of the finer points of French grammar.

FREN 3343
Business French. Prerequisite(s): 2232 and 2233 or equivalent. Applied French for students in commercial and technical fields. Overview and strategies of business and economic climate in France.

FREN 3463
Advanced Diction and Phonetics. Lab 1. Prerequisite(s): 2232 and 2233 or equivalent. Required course for teacher certification. French speech sounds and intonation patterns, with practice to improve the student's pronunciation.

FREN 3853
Introduction to Analysis of French Literature. Prerequisite(s): 2232 and 2233 or equivalent. Close reading of shorter texts in a variety of literary genres, with presentation of French versification and literary terminology.

FREN 4153
History of French Literature I. Prerequisite(s): 20 credit hours of French or equivalent. Historical survey of French literature before 1700, with reading of representative texts.

FREN 4163
History of French Literature II. Prerequisite(s): 20 credit hours of French or equivalent. Historical survey of French literature of the eighteenth century, with reading of representative texts.

FREN 4173
History of French Literature III. Prerequisite(s): 20 credit hours of French or equivalent. Historical survey of French literature of the nineteenth century, with reading of representative texts.

FREN 4183
History of French Literature IV. Prerequisite(s): 20 credit hours of French or equivalent. Historical survey of French literature of the twentieth century, with reading of representative texts.

FREN 4333
Background of Modern French Civilization. Prerequisite(s): 20 credit hours of French or equivalent. General overview of French history, geography, and culture, with emphasis on art, music, and intellectual movements. Capstone course.

FREN 4550
Directed Studies in French. 1-3 credits, max 9, Lab 1-2. Prerequisite(s): 20 credit hours of French or equivalent. Individual or group study of French language or literature.

FREN 4573
Modern French Theater. Prerequisite(s): 20 credit hours of French or equivalent. Analysis of French plays from the 19th and 20th centuries.

FREN 5110*
Advanced Studies in French. 1-3 credits, max 9. Prerequisite(s): 15 credit hours of upper-division French. Discussion or research in specialized topics.

GENDER AND WOMEN'S STUDIES (GWST)

GWST 2113
(S)Transnational Women's Studies. Introduction to research on women and gender in transnational contexts. Interpersonal relationships, socioeconomic status, power and authority as women experience them, myths and realities among women of different races, classes, ethnicities, sexual orientation, nationalities, ages, and physical ability.

GWST 2123
(H)Introduction to Gender Studies. Introduction to critical thinking about the construction of gender and the intersections of gender with race, ethnicity, class, and sexuality. Basic methods of studying gender from an interdisciplinary humanities perspective.

GWST 3450
Topics in Gender Studies. 1-3 credits, max 12. Prerequisite(s): 2113 or 2123 or permission of instructor. Suggested topics include: women and health, women and science, women and religion.

GWST 3513
(D)Theorizing Sexualities. Prerequisite(s): 2113 or 2123. Examination of poststructuralist and/or feminist theories of sexualities in contexts of film, literature, history, or popular culture. Likely theorists include Foucault, Butler, D'Emilio, Lorde, Kristeva, Anzaldua, Chow, and/or Chauncey.

GWST 3613
(D)Race and Reproduction in the U.S. Prerequisite(s): 2113 or 2123 recommended. An interdisciplinary examination of the inextricable relationship between race relations and reproductive politics. Issues explored include malthusianism, sterilization abuse, criminalizing pregnancy, natalism and nationalism, eugenics, the role of women of color in campaigns for reproductive justice, and representations of motherhood.

GWST 3713
(D)Gender and Representation. Cultural analysis of gender representation and gender relations. Using cultural texts and practices in several areas such as children's culture, sport, music, film and TV.

GWST 4013*
Approaches to Feminist Research. Prerequisite(s): 2113 or 2123 or consent of instructor. Examines the ethics and epistemologies of methodologies and theoretical frameworks most conducive to feminist analysis. This course prepares students to conceptualize their own research projects.

GWST 4113*
Feminist Theories. Prerequisite(s): 2113 or 2123 or consent of instructor. Examines the different types of feminist theories and the role theory plays in the production of knowledge. A variety of feminist theories will be considered from an interdisciplinary perspective.

GWST 4503*
Theorizing Men and Masculinities. Prerequisite(s): 4113 or permission of instructor. Examines the roles of men in various cultural contexts, the historical development of manhood as an ideal, and theories of masculinities.

GWST 4950*
Special Topics in Global Feminism. 3 credits, max 6. Prerequisite(s): 2113 or 2123 or permission of instructor. Selected topics in the problems and issues of global women's and feminist activism. Highlights the continuing fight to secure gender equality, especially in developing nations. Exploration of the women's movement links with other human rights struggles across the globe.

GWST 4990*
Directed Readings in Gender Studies. 1-3 credits, max 12. Prerequisite(s): Permission of instructor. Examines gender studies issues and topics.

GENERAL ENGINEERING (GENG)

GENG 4010
Senior Design Project. 2-4 credits, max 4. Prerequisite(s): Senior standing in general engineering. Capstone design project through independent application of engineering principles and concepts from the disciplines covered in earlier course work.

GENERAL TECHNOLOGY (GENT)

GENT 1153
Engineering Graphics. Lab 2. Sketching, manual drafting and CAD generation of engineering drawings to ANSI standards. Interpreting typical industrial drawings. Students with two years high school or one year practical ANSI drafting/CAD may substitute an advanced course in mechanical engineering technology with consent of their advisors.

GENT 1223
Manufacturing Processes. Lab 3. Basic methods and processes of fabrication with emphasis on manufacturing operations, metrology and conventional machining.

GENT 2323
Statics. Prerequisite(s): MATH 1613, 2123 and PHYS 1114. Forces acting on bodies at rest; forces, moments of force, distributed forces, reactions, free-body diagrams, friction, internal forces and moments of inertia. Applications.

GENT 2650
Technical Projects. 1-4 credits, max 4. Prerequisite(s): Completion of three semesters' work in a technical institute curriculum. Special projects assigned by advisers with the approval of the director. A comprehensive written report must be prepared and an oral examination may also be required.

GENT 3123
Applied Analysis for Technology. Prerequisite(s): MATH 2133 or equivalent. Applications of elements of matrix algebra, ordinary differential equations, and infinite series to problems in engineering technology.

GENT 3323
Strength of Materials. Prerequisite(s): GENT 2323 and MATH 2123. Stress and strain and their relation to loads. Axial, torsional and bending loads, beam deflection, columns and combined stresses. Applications emphasized.

GENT 3433
Basic Thermodynamics. Prerequisite(s): MATH 2123. Basic scientific principles of energy and the behavior of substances as related to engines and systems. Gas laws, vapors and engine cycles.

GENT 4433
Heat Transfer. Prerequisite(s): MATH 2123 or equivalent. Conduction, convection, radiation, condensation and boiling heat transfer. Heat exchangers. Prediction of heat transfer rates. Retardation and enhancement of heat transfer.

GENETICS (GENE)

GENE 5102*
Molecular Genetics. Prerequisite(s): BIOC 3653 or MICR 3033 and one course in genetics or consent of instructor. An introduction to molecular genetics on the graduate level.

GEOGRAPHY (GEOG)

GEOG 1113
(I,S)Introduction to Cultural Geography. A thematic approach to the study of human groups and activities around the world, including agricultural practices, demographic trends, political behavior, religious beliefs, language patterns, folk and popular cultures, ethnicity and ethnic landscapes, urbanization and industrialization.

GEOG 1114
(L,N)Physical Geography. Lab 2. Distribution and analysis of natural features of the earth. Landforms, soils, minerals, water, climates, flora and fauna. Emphasis on human-environment relations where appropriate.

GEOG 2253
(I,S)World Regional Geography. The world's major culture regions, with emphasis on geographic aspects of contemporary economic, social and political relationships with the physical environment.

GEOG 2323
Introduction to Remote Sensing. Lab 2. Basic introduction to remote sensing focusing on image processing, sensor characteristics, and image classification. Lab assignments provide students with hands-on experience with common techniques and computer packages.

GEOG 2343
Introduction to Geographic Information Systems. Lab 2. Survey of a variety of resource management and socioeconomic applications using geographic information systems (GIS) technology.

GEOG 3023
(N)Climatology. Characteristics and distribution of world's climate. Patterns and associations of temperature, precipitation, pressure and winds. Regional climates of Earth. Climate change.

GEOG 3033
(N)Meteorology. A non-quantitative introduction to weather. Physical elements that cause and influence weather. Interpretation of weather maps and satellite imagery.

GEOG 3053
(I,S)Introduction to Central Asian Studies. A comprehensive view of newly-emerged Central Asian states, examining the history, politics, economics, geography, and culture of Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan as reflected in their thoughts, religion, literature, and architecture in the past, and the strategic importance of their natural wealth for the present and future. (Same course as HIST 3053, POLS 3053 & RUSS 3053)

GEOG 3063
Economic Meteorology. Economic impact of weather ranging from consumer spending to agriculture and energy commodity markets. Specific weather events, and their associated economic impact, weather and climate forecasting and methods for eliminating weather risk.

GEOG 3123
(D,S)Urban Geography. Locational aspects of urbanization; functions of and relations among cities and between cities and rural areas; internal structure of urban areas.

GEOG 3133
(I,S)Political Geography. Political structures, relationships and geopolitical implications of location, boundaries, culture and the natural environment of nations and states. Global patterns of political behavior, political history, international law and geostrategy.

GEOG 3153
(S)Conservation of Natural Resources. Problems and corrective methods of conservation of land, water, forests, wildlife, minerals and people.

GEOG 3163
(S)Economic Geography. Processes significant to the spatial structure of economic systems. Production, consumption and exchange activities examined in regard to location, distribution, aerial differentiation and spatial interaction patterns. Attention given to processes of change as well as to steady states.

GEOG 3173
(S)Cultural Geography. Geographic impact of human cultures. Emphasis on the concepts of social space, density, crowding, territoriality, diffusion, migration, environmental perception and cultural landscape.

GEOG 3183
Transportation Geography. Basic concepts and theories of transportation geography, selected transportation models and analysis methods related to spatial interactions, network analysis, allocation, and urban transportation planning.

GEOG 3243
(S)Geography of Indian Country. Systematic analysis of geographic patterns, processes, and issues peculiar to the lands of the indigenous peoples of the United States including American Indians, Alaska Natives, and Native Hawaiians. Spatial interaction of federal policy and indigenous sovereignties.

GEOG 3333
Spatial Analysis. Prerequisite(s): STAT 2013. The utility and application of modeling and statistics to spatial problem solving. The role of quantitative methods in geographic research.

GEOG 3703
(S)Geography of Oklahoma. Geographic interpretation of physical, economic, historical and scenic features.

GEOG 3713
(D,S)Geography of the United States and Canada. A regional analysis of the United States and Canada, including physical and cultural landscapes, population and migration trends, regional development, natural resources, U.S.-Canada relations and global relations.

GEOG 3723
(I,S)Geography of Europe. Analysis of the physical and human geography of Europe, including the distribution of physical features and natural resources, patterns of population change, and the geographic background to Europe's major contemporary social, political, economic, and environmental problems.

GEOG 3733
(I,S)Geography of Russia and Its Neighbors. A regional analysis encompassing cultural, economic and physical features.

GEOG 3743
(I,S)Geography of Latin America. A real distribution and analysis of physical, cultural and economic features of Latin America.

GEOG 3753
(I,S)Geography of Asia. Systematic interpretation of significant spatial patterns of man and natural environment. (Exclusive of the USSR.)

GEOG 3763
(I,S)Geography of Africa. General patterns and impact of population, cultural heritage, and natural resources in Africa. Historic and contemporary relationships between Africa and Western civilization. Divergent perspectives (debate) on development, government and conflict in Africa.

GEOG 3783
(I,S)Geography of the Middle East and Southwest Asia. A regional analysis of the Arab, Persian and Turkic lands, including the biophysical environment, agriculture, resource use, cultural patterns, urbanization, economic development, hydropolitics and conflict.

GEOG 3793
(I,S)Geography of Australia and the Pacific Realm. Systematic survey of Australia, New Zealand, and the island regions of Micronesia, Melanesia, and Polynesia including a study of human and environmental relations, factors affecting the spatial distribution of human groups and the activities, cultural diversity, and the way in which external involvement, both in the past and present, has shaped this region.

GEOG 3910
Applied Geographical Topics. 1-3 credits, max 6. Specialized physical, human, regional, or technical issues and trends in geography.

GEOG 4023
(N)Geography of Arid Lands. Analysis of the physical process shaping the landscapes of deserts and areas around them, emphasizing the causes and effects of climatic change and human activities.

GEOG 4053
(N)Biogeography. Distribution of plants and animals and processes causing distribution. Human impact on biotic resources considered along with policy and management practices.

GEOG 4063
Geoarchaeology and Environmental History. Theoretical and methodological aspects of geoarchaeology, a discipline that aims at recovering field data for reconstructing environment-society relationships of the past. Key themes include climate change and human-induced land transformation as demonstrated through interdisciplinary research in different geomorphic contexts and cultural groups (hunter gatherers, agriculturalists, and urbanites) from around the world. *Meets with 5063. No credit for students with credit in 5063.*

GEOG 4103
(H)Historical Geography of the United States. Examination of the spatial dynamics of frontier encounter and settlement, regional development, and cultural landscape evolution in the United States from pre-European to modern times.

GEOG 4113*
Cultural and Political Ecology. Focus on the relationship between culture and environment, people and place and how environments are politicized. Competing theories of human-environment interactions throughout history. The first half of the course focuses on theories of human agency, diffusion, migration, adaptation, decision-making and agricultural change. The second part of the course focuses on cultural landscapes, perception, and politicized environments to explain current environmental issues.

GEOG 4143*
Geography of Travel and Tourism. A systematic and comprehensive analysis of the geographical dimensions of tourism, illustrating the relevance of a spatial perspective to tourism planning, development, and management. Economic, social, and environmental impact of both domestic and international tourism considered.

GEOG 4153*
Geography of Outdoor Recreation. Analysis of patterns of outdoor recreation with an emphasis on land-use planning in park and wildland areas. Demand forecasting methods, the analysis of the socioeconomic and spatial impacts of recreation facilities provision and visitor management practices.

GEOG 4163
Resource Management in the National Parks. Contemporary resource management issues in U.S. National Park units. The role of human and natural processes in the management of water, air, biotic and cultural resources. *No credit for students with credit in GEOG 5163.*

GEOG 4213
(S)Sport, Place and Society. Spatial analysis of sport; its origin and diffusion, geographical organization and regional variation. Geographical movements and interaction associated with sport. Application of geographical solutions for reorganization and reform. Focus on both U.S. and international scene.

GEOG 4223
(H)Geography of Music. Geographical and historical analysis of music as a cultural trait. The cultural significance of music and how it varies from place to place as well as how it helps shape the character of a place.

GEOG 4233
Human Dimensions of Global Environmental Change. Discusses the current global environmental science research agendas called for by the international community, explores the arguments set forth regarding global environmental change, and looks at the current explanations and theories explaining the human dimensions of land-use/cover-change (lucc). Special emphasis is on alternative, competing visions, and needs of developing countries within the context of economic development and global environmental change. *Meets with 5233. No credit for students with credit in 5233.*

GEOG 4253
(H,D)Geographic Perspectives on American Women's Travel Accounts Then and Now. Examination of American women's travel writing both past and contemporary to understand social practices involving both geography and gender associated with travel and tourism. Topics include: geographic imaginaries, identities, social norms and transgressions, constructing the "Other" and the tourist "gaze," ideas of "home" and "away,"and mobilities of women, situating these ideas with place and "race."

GEOG 4303*
Applications of the Global Positioning System in Field Research. Prerequisite(s): 2343. Theory and applications of the Global Positioning System (GPS), focusing on accuracy issues in field data collection and integration with geographic information systems (GIS). Use of both recreation and mapping grade receivers.

GEOG 4313*
Field Techniques and Geodata Collection. Modern concepts and techniques for geographical analysis and research, including data acquisition and manipulation from field and secondary sources. Field trips.

GEOG 4323*
Computer Cartography. Lab 2. Prerequisite(s): 2343 or consent of instructor. Fundamentals of map compilation and design using computers. Thematic mapping of both socioeconomic and natural resource information. Discussion and application of various map input techniques involving digitizers, scanners, and global positioning system receivers. 2-D and 3-D terrain representation.

GEOG 4333
Remote Sensing. Lab 2. Prerequisite: 2323. Intermediate course in remote sensing focusing on image processing techniques and their applications. Includes enhancements, vegetation indices, transformations, and classifications. Discussions will include applications to resource management, advanced image classifications and accuracy assessments. Hands-on exposure to various image processing techniques using current image processing software. *Meets with 5333. No credit for students with credit in 5333.*

GEOG 4343
Geographic Information Systems: Resource Management Application. Lab 2. Prerequisite(s): 2343. Provides a theoretical and practical understanding of geographic information systems and its applications in natural resource management. Introduces industry popular GIS software for spatial and aspatial data analysis. Explores specific conditions, requirements, and processing considerations that allow geospatial data to be manipulated for problem solving. *Meets with 5323. No credit for students with credit in 5323.*

GEOG 4353*
Geographic Information Systems: Socioeconomic Applications. Lab 2. Prerequisite(s): 2343. Theory and principles of geographic information systems (GIS) applied to socioeconomic problems, including location-allocation, market area determination, network analysis and analysis of demographic characteristics.

GEOG 4373*
Spatial Analysis of Public Health. Prerequisite(s): 2343. Qualitative and quantitative analysis of public health issues from two geographic perspectives: human environment and spatial. Topics include medical geography, disease mapping, spatial data for public health, and basics and applications of spatial statistics, geographic information system and remote sensing. Lectures are combined with case studies and lab illustrations throughout the course.

GEOG 4510
Senior Project. 1-3 credits, max 3, Lab 1-3. Prerequisite(s): Senior standing and consent of instructor. Individually designed projects involving laboratory work, field work, library research or a combination of these.

GEOG 4910
Topics in Geography. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Specialized physical, social and methodological topics in geography.

GEOG 4930
Readings in Geography. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Directed readings on selected topics, regions or methods in geography.

GEOG 4940
Undergraduate Cooperative Education Internship. 1-3 credits, max 3. Prerequisite(s): Consent of departmental internship coordinator and undergraduate committee. Practical experience in applying geographical concepts and tools to business or governmental problems. Emphasis on educational aspects of applying discipline-related tools to real-world problems. *Credit not available for regular employment positions; must have fixed start/end dates.*

GEOG 4993
Senior Honors Thesis. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis under the direction of a senior faculty member, with second faculty reader, both of whom will be present at an oral defense of the thesis. Required for graduation with honors in geography.

GEOG 5000*
Thesis. 1-6 credits, max 6. Prerequisite(s): Consent of adviser or major professor. Open only to students working on the master's degree in geography.

GEOG 5023*
Geography of Arid Lands. Analysis of the physical processes shaping the landscapes of deserts and areas around them, emphasizing the causes and effects of climatic change and human activities and including research and writing components.

GEOG 5063*
Geoarchaeology and Environmental History. Theoretical and methodological aspects of geoarchaeology, a discipline that aims at recovering field data for reconstructing environment-society relationships of the past. Key themes include climate change and human-induced land transformation as demonstrated through interdisciplinary research in different geomorphic contexts and cultural groups (hunter gatherers, agriculturalists, and urbanites) from around the world. *Meets with 4063. No credit for students with credit in 4063.*

GEOG 5113*
Landscape Ecology. Prerequisite(s): Graduate standing and BIOL 3034 or consent of instructor. Principles of landscape ecology, including structure and function of landscape elements such as patch, corridor, boundary, and matrix. Role of geographic processes, climate, biota, disturbance, and human influences in landscape structure and function. Interaction among landscape elements and role of landscape structure in ecosystem and landscape dynamics. Applications of landscape ecology to biodiversity conservation, wildlife management, and landscape planning. Survey of quantitative methods used in landscape ecology.

GEOG 5123*
International Resource Management. Prerequisite(s): Graduate standing. Spatial perspectives on the assessment and management of natural resources. The role of resources in world trade, security and international environmental concerns.

GEOG 5140*
Cultural and Historical Geography Seminar. 1-3 credits, max 9. Prerequisite(s): Consent of instructor. Development and critical analysis of research and theory in cultural and historical geography.

GEOG 5163*
Resource Management in the National Parks. Contemporary resource management issues in U.S. National Park units. Focus on the role of human and natural processes in the management of water, air, biotic and cultural resources. *No credit for students with credit in GEOG 4163.*

GEOG 5183*
Topics in Transportation Geography. Examination of a selected set of advanced topics in transportation geography, including network analysis, facility location problems, intelligent transportation systems and geographic information systems and logistics.

GEOG 5203*
Writing Across the Discipline: Geographic Theses and Dissertations. Prerequisite(s): Permission of instructor. Addresses writing issues specific to the social sciences, including identifying an audience, finding a voice, engaging with a theoretical framework, organizing data, understanding differences in presenting quantitative and qualitative evidence and effectively communicating both, pacing in an argument, crafting creative introductions and persuasive conclusions, and compiling an effective bibliography.

GEOG 5233*
Human Dimensions of Global Environmental Change. Discusses the current global environmental science research agendas called for by the international community, explores the arguments set forth regarding global environmental change, and looks at the current explanations and theories explaining the human dimensions of land-use/cover-change (lucc). Special emphasis is on alternative, competing visions, and needs of developing countries within the context of economic development and global environmental change. *Meets with 4233. No credit for students with credit in 4233.*

GEOG 5243*
Geography of the World's Indigenous Peoples. Prerequisite(s): Graduate standing and consent of instructor. A regional survey of indigenous assertions of cultural, political and economic self-determination outside the United States. Native land claims, impact of regional development and environmental issues upon indigenous communities, and their efforts to establish geo-political autonomy.

GEOG 5303*
Geographical Analysis I. Prerequisite(s): One course in statistics. Application of models and statistics to geographic problem solving.

GEOG 5323*
Geographic Information Systems: Resource Management Application. Lab 2. Prerequisite(s): 2343. Provides a theoretical and practical understanding of geographic information systems and its applications in natural resource management. Introduces industry popular GIS software for spatial and aspatial data analysis. Explores specific conditions, requirements, and processing considerations that allow geospatial data to be manipulated for problem solving. *Meets with 4343. No credit for students with credit in 4343.*

GEOG 5333*
Remote Sensing. Lab 2. Prerequisite(s): Consent of instructor. Intermediate course in remote sensing focusing on image processing techniques and their applications. Includes enhancements, vegetation indices, transformations, and classifications. Discussions will include applications to resource management, advanced image classifications and accuracy assessments. Hands-on exposure to various image processing techniques using current image processing software. *Meets with 4333. No credit for students with credit in 4333.*

GEOG 5343*
Advanced Geographic Information Systems: Resource Management Applications. Lab 2. Prerequisite(s): 4343. Advanced theory and applications of geographic information systems (GIS) applied to resource management problems using both raster and vector data structures. Individual projects, presentations and group discussion sessions.

GEOG 5353*
Advanced Geographic Information Systems: Socioeconomic Applications. Lab 2. Prerequisite(s): 4353. Advanced theory and applications of geographic information systems (GIS) applied to socioeconomic problems including location allocation, market area determination, network analysis, and analysis of demographic characteristics. Individual projects, presentations and group discussion sessions.

GEOG 5363*
Enterprise Geographic Information Systems. Prerequisite(s): 4353 or equivalent. Basic setup and creation of online geodatabases and Internet mapping services as would be used in a large scale GIS operation or enterprise. Geodatabase design and Internet mapservice Web site development.

GEOG 5393*
Remote Sensing of Water Resources. Prerequisite(s): 2323 or 4333. Advanced theories and techniques of remote sensing applied to various issues in water resources management. Sensor characteristics, theoretical algorithms, digital image processing, and field methods to extract information of multiple aspects valuable for both hydrological modeling and decision-making. Advantages and limitations of remote sensing compared to traditional methods will be explored.

GEOG 5403*
Current Geographic Research. Prerequisite(s): Graduate standing in geography. Review of recent literature in light of current human and physical geography research themes.

GEOG 5413*
History and Philosophy of Geography. Prerequisite(s): Graduate standing in geography. Identification and evaluation of major themes in geographical research and teaching.

GEOG 5423*
Geographic Renderings in Qualitative Methods. Prerequisite(s): SCFD 5913 or SCFD 6123 or SOC 5273 or consent of instructor. Seminar engages with geographic facets in qualitative research and provides students with experience in collecting and working with qualitative data. Students explore avenues of qualitative inquiry in cross-cultural, community participation, and storytelling/testimonial/oral history/life history, and ethnographic research with special consideration to space, place, scale, context, body, and senses. Course addresses issues involved with analysis, interpretation, and "writing-up" research.

GEOG 5450*
Seminar in Geography. 1-6 credits, max 6. Prerequisite(s): Graduate standing in geography or consent of instructor. Specialized topics in geography.

GEOG 5510*
Research Problems in Geography. 1-3 credits, max 6. Prerequisite(s): Consent of instructor.

GEOG 5940*
Graduate Cooperative Education Internship. 1-3 credits, max 3. Prerequisite(s): Consent of departmental internship coordinator and graduate committee. Practical experience in applying geographical concepts and tools to business or governmental problems. Emphasis on educational aspects of applying discipline-related tools to real-world problems. Credit not available for regular employment positions; must have fixed start/end dates.

GEOG 6000*
Doctoral Dissertation Research. 1-12 credits, max 30. Prerequisite(s): Admission to candidacy and consent of major professor.

GEOG 6013*
Seminar in Quaternary Paleoecology. Prerequisite(s): Graduate standing in geography or consent of instructor. Analysis and discussion of various aspects of research on the Quaternary period, emphasizing the roles played by climate, geomorphic processes, vegetation, soil and fauna.

GEOG 6110*
Seminar in Cultural and Political Ecology. 3 credits, max 6. Prerequisite(s): Graduate standing in geography or consent of instructor. Study of the relationship between culture and environment and competing theories of human-environment interactions. Traces the roots of cultural ecology starting with classic ecological systems and adaptation theory, to criticisms leading to the development of "political" and "hybrid" ecologies. Course focuses on Marxist influences, inequalities of third world development, gender and resource management, social and environmental movements, indigenous knowledge, natural disasters and environmental vulnerability.

GEOG 6120*
Seminar in Urban Geography. 3 credits, max 6. Prerequisite(s): Graduate standing in geography or consent of instructor. Analysis of research on urban systems, internal morphology, urban problems and urban spatial behavior. Review and analysis of student research efforts.

GEOG 6130*
Seminar in Political Geography. 3 credits, max 6. Prerequisite(s): Graduate standing in geography or consent of instructor. Theoretical foundations of political geography from MacKinder and Hartshorne to recent writings by Smith, Anderson and other modern theorists. Nationalism, national identity, state formation and cohesion considered in a spatial context.

GEOG 6180*
Seminar in Transportation Geography. 3 credits, max 6. Prerequisite(s): Graduate standing. Examination of transportation systems, emphasizing their effects on trade, land use, location issues, and development. Review of trends, problems, and methods related to transport issues.

GEOG 6210*
Seminar in Historical Geography. 3 credits, max 6. Prerequisite(s): Graduate standing. Current epistemological issues and archival methodologies in historical geography.

GEOG 6303*
Geographic Analysis II. Prerequisite(s): 5303. Advanced methods of spatial analysis, including spatial autocorrelation, geographically weighted regression and related spatial analysis methods.

GEOG 6313*
Advanced Geodata Collection. Prerequisite(s): Graduate standing in geography or consent of instructor. Advanced field methods course emphasizing spatial and attribute capture of natural resource and socioeconomic data. Student projects and use of geographic information systems (GIS) for analysis and presentation.

GEOG 6333*
Advanced Techniques in Image Analysis/GIS. Prerequisite(s): 4333 or 5333. Advanced techniques and applications of image processing and geographic information systems (GIS). Special topics include image registration, georeferencing, advanced image enhancements, advanced classifications, and accuracy assessments. Specific issues and problems pertaining to data capture, preprocessing and analysis of semester-long projects will be discussed.

GEOG 6910*
Topics in Geography. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Specialized physical, social and methodological topics in geography.

GEOG 6930*
Readings in Geography. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Directed readings on selected topics, regions or methods in geography.

GEOLOGY (GEOL)

GEOL 1014
(L,N)Geology and Human Affairs. Lab 2. The influence of geology and related earth sciences on the human environment. Energy and material resources, beneficial and hazardous natural processes, and the planetary and biological evolution of earth. Lab investigations environmentally oriented.

GEOL 1114
(L,N)Physical Geology. Lab 2. Composition and structure of the earth and the modification of its surface by internal and external processes. Mineral resources, sources of energy, and environmental aspects of geology. *A background in pre-college science and math is recommended. Field trip required.*

GEOL 1224
Evolution of the Earth. Lab 2. Prerequisite(s): 1014 or 1114 or BIOL 1114. A survey of the physical and biological history of the Earth from the coalescence of the solar system to the present. *Field trips required.*

GEOL 1613
Inquiry-based Earth Science. Lab 3. Prerequisite(s): CHEM 1413 and PHYS 1313 recommended. Natural earth systems and their influence on the human environment. Essential aspects of astronomy, meteorology, hydrology and geology. Taught using inquiry methods. Intended for prospective elementary teachers as a model that can be adapted for use in the classroom. *Field trip required.*

GEOL 2254
Practical Mineralogy. Lab 2. Prerequisite(s): 1014 or 1114 and CHEM 1314. Hand-specimen identification of minerals using physical and chemical properties. Introductory optical identification of common rock forming minerals. Society's utilization of mineral resources. *Field trips required.*

GEOL 2364
Elementary Petrology. Lab 3. Prerequisite(s): 2254. Origin, occurrence and classification of rocks; hand-specimen identification. *Field trips required.*

GEOL 3004
Earth Science for Teachers. Lab 3. Prerequisite(s): 1114 or equivalent. Teaching natural earth systems and their environmental impact. Use of an adaptation approach in organizing, presenting, and evaluating earth science concepts in the curriculum. *Field trips required.*

GEOL 3014
Structural Geology. Lab 3. Prerequisite(s): 1224, PHYS 2014 or consent of instructor. Behavior of earth materials during various deformational processes and analysis of the resulting structural features such as folds, faults and fractures. *Field trips required.*

GEOL 3034*
Principles of Stratigraphy and Sedimentology. Lab 3. Prerequisite(s): 1224. Principles of stratigraphy and their applications. Laboratory emphasizes realistic practical problems undertaken in the field and in the laboratory. *Field trips required. Non-majors may receive graduate credit.*

GEOL 3043
(N)Scenic Geologic Regions. Prerequisite(s): 1014 or equivalent recommended. The geologic characteristics of national parks and scenic regions in North America and throughout the world.

GEOL 3073*
Geomorphology. Lab 2. Prerequisite(s): 1114 and MATH 2144 or concurrent enrollment. Study of land forms and the processes that form them, using topographic maps, air photos, remotely-sensed images, soils maps and field techniques. *Field trips required.*

GEOL 3103
Paleontology. Lab 3. Prerequisite(s): 1224 or consent of instructor. Basic principles of paleontology involving invertebrates, vertebrates and plants. Lab focused on the morphology, identification, paleoecology and biostratigraphy of marine invertebrates. *Field trips required.*

GEOL 3413
Petroleum Geology for Engineers. Prerequisite(s): MATH 2114 and CHEM 1414 or 1314 and PHYS 2114. Examination of the fundamental concepts of petroleum geology with an emphasis on applications to drilling and reservoir engineering. Topics include reservoir architecture, traps and seals, the subsurface environment, wireline logs, geophysics and depositional systems.

GEOL 3503
Environmental Geology. Prerequisite(s): 1114 or consent of instructor. Application of geologic principles to environmental issues, including human use of the surface and subsurface of the earth and human interaction with extreme natural events such as earthquakes, floods and landslides. *Field trip is required.*

GEOL 3546*
Field Geology. Lab 12. Prerequisite(s): 2364, 3014, 3034, 3073. Six weeks of field methods in geology. *Required of all geology majors. Transportation and room and board fees required.*

GEOL 4023*
Petroleum Geology. Prerequisite(s): 3014 and 3034. Origin, migration and accumulation of petroleum, requirements for source rock, reservoir rock and traps. Structure and stratigraphy of selected oil fields. *Field trips required.*

GEOL 4030
Geologic Field Investigation. 1-3 credits, max 3. Prerequisite: 1014 or 1114. One to three weeks of required field study at sites of geological interest and significance. *Field trip charges apply. Does not substitute for GEOL 3546. No credit for students who have credit in 5030.*

GEOL 4103*
Introduction to Geophysical Exploration. Lab 2. Prerequisite(s): PHYS 2014 and 2114; upper-division standing; MATH 2103 recommended. An overview of geophysical methods and their applications to exploration, environmental and engineering problems. Seismic reflection and refraction methods, gravity, magnetic, resistivity and electromagnetic methods. *A field trip required.*

GEOL 4203*
Seismic Interpretation. Prerequisite(s): 4103. Examination of the reflection seismic interpretation methods with emphasis on the oil and gas industry. Both structural and stratigraphic methods. Hands-on interpretation using a standard industry software package.

GEOL 4213*
Plate Tectonics. Prerequisite(s): 1114. Principles and major concepts of plate tectonics, the unifying theory of earth sciences. Geology and plate tectonics evolution of the major mountain chains of North America; Ouachitas, Appalachians and Cordillerans. *Field trip required.*

GEOL 4300
Geology Colloquium. 1 credit, max 2. Prerequisite(s): 15 credit hours in geology and junior status. Discussion of selected topics in the geological sciences with emphasis on professional presentation practices.

GEOL 4303*
Geophysical Field Methods. Lab 2. Prerequisite(s): 4103. Hands-on field investigations using the different geophysical surveying methods including electrical resistivity/induced polarization, self potential, electromagnetic, ground penetrating radar, gravity, magnetic, and seismic reflection and refraction. Instrumentation, field data acquisition, and interpretation will be emphasized. *Several field trips and field projects required.*

GEOL 4403*
Geochemistry. Lab 2. Prerequisite(s): 1014 or 1114 or consent of instructor; CHEM 1314; CHEM 1515 or concurrent enrollment; MATH 1513 or above. Application of chemical principles to geological processes. Processes affecting the composition of surface and ground waters.

GEOL 4453
Hydrogeology. Prerequisite(s): PHYS 2114. The water cycle and ground-water systems as well as general problems related to ground-water occurrence, quantity, quality and pollution. *Field trip required.*

GEOL 4463*
Physical Hydrogeology. Lab 2. Prerequisite(s): 4453 or similar; PHYS 2114. Physical ground-water systems. Realistic problems to acquaint students with ground-water occurrence and movement. Geologic, geophysical, hydraulic testing and modeling techniques used to define an actual ground-water system. Ground-water regulations. *Field trips required.*

GEOL 4513
Marine Geology. Prerequisite(s): CHEM 1314 or equivalent; PHYS 1114 or 2014 or equivalent; GEOL 3034 or equivalent. Comprehensive examination of the geology of the oceans. Topics include techniques of data collection and interpretation, physical oceanography, origin of marine sediments, marine tectonics and ocean history. *No credit for students who have previously taken 5513.*

GEOL 4663*
Global Geologic Resources. Distribution and analysis of global mineral, energy and water resources. Economic, environmental, social and political impact of selected resources on local to global scales.

GEOL 4990*
Special Problems in Earth Science. 1-8 credits, max 8. Prerequisite(s): 25 hours of geology and permission of instructor. Individually designed study projects involving assigned reading, library work, field work, laboratory work or a combination of these. *Field trips may be required.*

GEOL 4993
Senior Honors Thesis. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis under the direction of a senior faculty member, with second faculty reader and oral examination. Required for graduation with departmental honors in geology.

GEOL 5000*
Thesis. 1-6 credits, max 6. Prerequisite(s): Approval of graduate committee. Work toward master's thesis in geology.

GEOL 5030*
Geologic Field Investigation. 1-3 credits, max 3. One to three weeks of required field study at sites of geological interest and significance. Emphasis will be placed on applicability to graduate research. *Field trip charges apply. No credit for students who have credit in 4030.*

GEOL 5050*
Problems in Economic Geology. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Individually-designed problems in economic geology. *Field trips may be required.*

GEOL 5073*
Fluvial Geomorphology. Prerequisite(s): 3073 or consent of instructor. Landforms and processes related to the action of running water in stream channels and on hillslopes. *Field trips required.*

GEOL 5083*
Glaciers and Antarctica. Prerequisite(s): 3034 and 3073; consent of instructor. A survey of glacial, periglacial, and glacial marine processes with emphasis on examples from Antarctica and their use in reconstructing the glacial history of the continent.

GEOL 5093*
Quaternary Methods and Geochronology. Prerequisite(s): 3034 and 3073; MATH 1715; PHYS 2014 and 2114; or equivalents. A rigorous study of methods used to obtain numerical age dates from Quaternary deposits. Includes discussions of optical stimulated luminescence, radiocarbon dating, dendrochronology, the use of oxygen isotopes in marine sediments, cosmogenic nuclides, and lichonometry. A significant portion of the course (~1/3) will involve the sampling and age dating of deposits using optical stimulated luminescence.

GEOL 5100*
Problems in Hydrogeology. 1-4 credits, max 8. Prerequisite(s): 4453. Advanced problems in hydrogeology with emphasis on quantitative methods. *Field trips may be required.*

GEOL 5183*
Paleontology of Depositional Sequences. Lab 2. Prerequisite(s): Graduate standing or permission of instructor. Paleoecology and biostratigraphy of depositional sequences. *Evenly divided on lecture and laboratory components and field trips are mandatory.*

GEOL 5203*
Structural Styles in Oil and Gas Exploration. Lab 2. Prerequisite(s): 3014. The theoretical, experimental and descriptive approach to structural styles formed by different tectonic stresses (i.e., extensional, contractional, strike-slip and salt tectonics) and their importance in oil and gas exploration. *Field trips required.*

GEOL 5223*
Advanced Methods in Structural Geology. Lab 3. Prerequisite(s): 3014. Advanced geometric techniques and analysis of complex structural terrains. Elucidation of geometry and history of geological structures by interpreting seismic reflection profiles and constructing balanced cross-sections. *Field trips required.*

GEOL 5233*
Trace Elements in Hydrogeology. Lab 2. Prerequisite(s): CHEM 1515. Examination of the behavior of various trace elements in the aqueous environment. Availability and mobility of selected trace elements, the characterization of geochemical environments, pe-pH stability fields, adsorption and other parameters that affect element mobility. Introduction to thermodynamic water-equilibrium computer programs.

GEOL 5243*
Research Methods and Techniques in Sedimentology and Stratigraphy. Methods and techniques for solving practical scientific problems in sedimentary rocks and stratigraphy. Scientific method, definition of a research problem, sampling. Techniques for characterizing sedimentary rocks focused on rock mineralogy/texture, porosity/permeability and associations/stacking patterns of stratigraphic sequences.

GEOL 5253*
Petrology and Diagenesis of Clastic Rocks. Lab 3. Prerequisite(s): 2364, 3034. Examination of petrology and depositional facies of sandstones and shales. Identification of detrital and diagenetic constituents and determination of paragenetic sequence of diagenetic events. The effect of burial and thermal history on reservoir quality. *Field trips required.*

GEOL 5263*
Electron Microprobe Analysis. Lab 2. Prerequisite(s): CHEM 1515, PHYS 2414, or GEOL 2254. Practical course for operators of the electron microprobe. Basic principles of X-ray microanalysis and hands-on training using the electron microprobe.

GEOL 5273*
Depositional Systems. Prerequisite(s): 3034, 3546. Examination of the processes within depositional environments and the facies they form. Focus on the environmental interpretation of rocks, cores and seismic profiles based on their composition, texture, character, stacking pattern and sedimentary structures. Emphasis on clastic systems. *Field trips required.*

GEOL 5283*
Subsurface Geologic Methods. Lab 2. Prerequisite(s): 3014, 3034. Use of subsurface geologic information from cores and well logs to prepare maps and identify oil and gas prospects. *Field trips required.*

GEOL 5300*
Geology Colloquium. 1 credit, max 2. Prerequisite(s): Graduate standing. Discussion of selected topics in the geological sciences with emphasis on professional presentation practices.

GEOL 5353*
Advanced Well Log Analysis. Lab 3. Prerequisite(s): 3034. The geologic interpretation of a variety of well logs, emphasized, as well as quantitative methods. Some exercises involve concurrent interpretation of well logs and core samples, or well logs and bit cuttings. *Field trips required.*

GEOL 5363*
Carbonate Sedimentology and Petrology. Lab 2. Prerequisite(s): 2364 and 4403. Systematic study of carbonate and associated sedimentary rocks including depositional environments, stratigraphic occurrence, and diagenesis. Application of petrographic, geochemical and field methods. *Field trips required.*

GEOL 5383*
Sequence Stratigraphy. Lab 2. Prerequisite(s): 5253, 5353, 5363. Principles of sequence stratigraphy including carbonate and siliciclastic dominated intracratonic basins. Integration of surface and subsurface data in projects. *Field trips required.*

GEOL 5443*
Environmental Geophysics. Lab 2. Geological aspects of problems associated with environmental engineering, ground-water pollution and regional and urban planning. Problem assessment and field methods. Two required field projects include geophysical surveys using resistivity and seismic refraction methods. *Field trip required.*

GEOL 5453*
Advanced Hydrogeology. Lab 3. Prerequisite(s): 4453, CS 2113 or equivalent, MATH 2144, MATH 2153 and 2163 or equivalent. Advanced quantitative techniques used to address ground-water management and pollution. Advanced field and laboratory techniques as well as management and chemical transport models applied to actual field problems and case studies. *Field trips required.*

GEOL 5503*
Advanced Environmental Geology. Prerequisite(s): 3503 or consent of instructor. Utilization of geologic principles to resolve environmental issues in land use, land management and development. Methods of acquiring, compiling, and applying geologic information for site assessment and environmental impact. Application of these methods to an interdisciplinary project. *Field trips required.*

GEOL 5513*
Marine Geology. Prerequisite(s): CHEM 1314 or equivalent; PHYS 1114 or 2014 or equivalent; GEOL 3034 or equivalent. Comprehensive examination of the geology of the oceans. Topics include techniques of data collection and interpretation, physical oceanography, origin of marine sediments, marine tectonics and ocean history. *No credit for students with credit in 4513.*

GEOL 5523*
Environmental Organic Geochemistry. Prerequisite(s): CHEM 1314 and 1515 or equivalent; GEOL 3034 or equivalent; GEOL 4403 or equivalent or permission of instructor. Introduction to some environmental aspects of organic geochemistry. Soils and sediments as pollutant receptors, sources of pollutants and selected aspects of environmental health.

GEOL 5533*
Organic Geochemistry. Prerequisite(s): CHEM 1314 and 1515 or equivalent; GEOL 3034 or equivalent. Chemistry of organic matter in sediments and rocks with an emphasis on marine and petroleum systems.

GEOL 5553*
Environmental Geochemistry. Lab 3. Prerequisite(s): Introductory chemistry. Origin and evolution of natural water quality. Distribution and mobility of elements in the secondary environment. Computational methods for the interpretation of water analyses.

GEOL 5603*
Basin Evolution. Prerequisite(s): 3014, 3034, 4403. Advanced topics in sedimentary basin studies, including tectonics, sequence stratigraphy, facies analysis, regional diagenesis, thermal evolution, regional hydrogeology, and distribution of natural resources.

GEOL 5710*
Advanced Studies in Geology. 1-4 credits, max 8. Prerequisite(s): Consent of instructor. Individual library, laboratory and/or field projects on facets of geology not covered by existing courses. *Field trips may be required.*

GEOL 5773*
Planetary Geology. Lab 2. Prerequisite(s): GEOL 1114; upper-division standing in the natural sciences; ASTR 1014 recommended. Geophysics and tectonics of planetary interiors; geomorphology and sedimentology of planetary surfaces; geochemistry and mineralogy of planetary materials; geologic factors that could affect life on other planets; interpretation of geologic data from planetary exploration. *Field trips required.*

GEOL 6000*
Doctoral Dissertation Research. 1-12 credits, max 60. Work toward doctoral dissertation in Geology.

GEOL 6103*
Gravity and Magnetic Methods. Lab 2. Prerequisite(s): 4103. Principles of gravity and magnetic methods applied to petroleum, mineral, and groundwater exploration. Engineering applications will also be discussed. Data acquisition, processing and modeling using standard industry software will be emphasized.

GEOL 6133*
Unconventional Petroleum Reservoirs. Prerequisite(s): 4023. Review of unconventional sources of oil and gas production including coalbed methane, tight gas-sandstones, gas and oil-bearing shales and transition zone, high-water saturation sandstones and carbonates.

GEOL 6283*
Geology of Shales. Lab 2. Prerequisite(s): Graduate standing or permission of instructor. Team-taught course that combines different geological techniques towards gaining a better understanding of shales as source and reservoir rock. These include petrography, XRD, SEM, Organic and Inorganic chemistry, geophysical logs, paleoecology and biostratigraphy. *This course will involve lecture as well as laboratory techniques.*

GEOL 6303*
Electrical and Electromagnetic Methods. Lab 2. Prerequisite(s): 4103. Principles of the different geoelectrical methods, including electrical resistivity, induced polarization, self potential, electromagnetic, and ground penetrating radar will be emphasized. Geophysical instrumentation, laboratory measurements of physical properties, field procedures, and basic interpretation and near surface geophysical applications will be discussed. Recent advances in geoelectrical methods and case studies will be examined by reviewing current literature. *Field trip required.*

GEOL 6386*
Sequence Stratigraphy of Shales. Lab 12. Prerequisite(s): Graduate standing. Intensive field course focusing on hydrocarbon-bearing shales of the Midcontinent. Advanced field techniques including high resolution spectral gamma ray analysis and highly detailed measured sections will be taught. Fifty localities including Devonian-Early Mississippian (Woodford and Chattanooga shales), Upper Mississippian (Barnett, Caney, and Fayetteville shales) and Pennsylvanian-Lower Permian shales will be analyzed.

GEOL 6403*
Biogeophysics. Lab 2. Prerequisite(s): 5443 or 4103 or 6303. Introduces students to the important role that microbes play in geologic processes and explores current cutting-edge research available to investigate these processes. Interactions of microorganisms with earth materials (soils, rocks, water, etc.) and geophysical methods used to investigate microbial processes will be emphasized.

GERMAN (GRMN)

GRMN 1115
Elementary German I. Lab 1.5. Main elements of grammar and pronunciation, with work on the four basic skills of listening comprehension, speaking, reading and writing.

GRMN 1225
Elementary German II. Lab 1.5. Prerequisite(s): 1115 or equivalent. Continuation of 1115.

GRMN 2112
(I)Intermediate Conversation and Composition I. Lab 1. Prerequisite(s): 1225 or equivalent competence. (May have been gained in high school.) Colloquial speech patterns and grammar. *May be taken concurrently with other 2000-level German courses*.

GRMN 2113
(I)First Readings in German. Prerequisite(s): 1225 or equivalent competence. (May have been gained in high school.) Selections from German newspapers and other contemporary material. *May be taken concurrently with other 2000-level German courses.*

GRMN 2222
(I)Intermediate Conversation and Composition II. Lab 1. Prerequisite(s): 2112 or equivalent competence. (May have been gained in high school.) Continuation of 2112, with further work in composition, conversation and grammar. *May be taken concurrently with other 2000-level German courses.*

GRMN 2223
(I)Introduction to German Literature. Prerequisite(s): 1225 or equivalent competence. (May have been gained in high school.) Reading and analysis of prose, drama and poetry; literary appreciation. *May be taken concurrently with other 2000-level German courses.*

GRMN 3013
German for Reading Requirements I. Reading in the humanities and the sciences. Translation from German to English.

GRMN 3023
German for Reading Requirements II. Prerequisite(s): 3013 or equivalent. Intermediate and advanced reading in the humanities and sciences. Translation from German to English.

GRMN 3333
Modern Germany. Prerequisite(s): 20 credit hours of German or equivalent. The major cultural, social and political forces that have shaped the Germany of today.

GRMN 3343
Business German. Lab 1. Prerequisite(s): 2222 and 2223 or equivalent. Introduction to business practices and economic environment in Germany. Study of specialized vocabulary.

GRMN 3463
Advanced Diction and Phonetics. Lab 1. Prerequisite(s): 20 credit hours of German or equivalent. German speech sounds and intonation patterns. Practice to improve the student's pronunciation. *Required course for teacher certification.*

GRMN 3803
Advanced Conversation. Lab 1. Prerequisite(s): 2222 and 2223 or equivalent. Colloquial speech forms and sentence structure. Practice in brief public address in German.

GRMN 3813
Advanced Grammar and Composition. Prerequisite(s): 2222 and 2223 or equivalent. Practice in original composition in German. Problematic points of German grammar and stylistics.

GRMN 3902
Orientation to Internship Abroad. Lab 1. Prerequisite(s): 2222 and 2223 or equivalent. Preparation for residential internship in a German-speaking country. Culture, civilization, and contemporary conditions, and communication for students accepted for international cooperative education program.

GRMN 3903
Internship Abroad. Lab TBA. Prerequisite(s): 2222 and 2223 or equivalent. Practical studies in a German-speaking country. Supervised research papers and reports and oral testing during and following the practicum.

GRMN 4153
Survey of German Literature I. Prerequisite(s): 20 credit hours of German or equivalent. German literature from the beginning to 1785.

GRMN 4163
Survey of German Literature II. Prerequisite(s): 20 credit hours of German or equivalent. German literature from 1785 to the present.

GRMN 4333
Backgrounds of Modern German Civilization. Prerequisite(s): 20 credit hours of German or equivalent. Historical, cultural, political and literary trends in the formation of German civilization. Capstone course.

GRMN 4513
The Age of Goethe. Prerequisite(s): 20 credit hours of German or equivalent. Principal figures of German Classicism and Romanticism.

GRMN 4523
19th Century German Literature. Prerequisite(s): 20 hours or equivalent proficiency. Prose, lyric and drama from Romanticism to Naturalism.

GRMN 4543
20th Century German Literature. Prerequisite(s): 20 credit hours of German or equivalent. Main currents in German literature from Naturalism until present day.

GRMN 4550
Studies in German. 1-3 credits, max 9. Prerequisite(s): 20 credit hours of German or equivalent competence. Reading and discussion of vital subjects in German.

GRADUATE (GRAD)

GRAD 5880*
Graduate Traveling Scholar. 1-24 credits, max 24. Prerequisite(s): Graduate degree candidate. Credit will vary depending on the program of each traveling scholar. Enrollment of graduate traveling scholars in academic or research courses.

GRAD 5981*
ITA Training - Oral Proficiency. Prerequisite(s): Graduate standing. Communication strategies and oral skills necessary for international teaching assistants. Preparation for the SPEAK test. Courses may not be used on a student's plan of study to fulfill minimal degree requirements.

GRAD 5990*
Special Problems in Graduate Education. 1-6 credits, max 6. Prerequisite(s): Graduate standing, permission of instructor. Special problems course with variable content. Topics relevant to graduate education and interdisciplinary studies. Taken with instructor permission only.

GRAD 5991*
ITA Training - Presentation Skills. Prerequisite(s): Graduate standing. Prepares students for the ITA test. Topics include communication strategies, organization of topic, presentation skills. Students will practice making presentations in class. Course may not be used on a student's plan of study to fulfill minimal degree requirements.

GRAD 5992*
Succeeding in the Professoriate. Prerequisite(s): Graduate standing and permission of Director of College Teaching Certificate program. Preparation for doctoral students who wish to pursue careers in academia. Focuses on university-level teaching and scholarship. Serves as foundation course for doctoral students in the University Faculty Preparation Certificate program.

GRAD 6010*
Research or Intern Practicum. 1-9 credits, max 12. Prerequisite(s): Graduate standing. Graduate-level internship program for public administration, service or research. Blends the theoretical and absolute phase of the academic with practical on-the-job experience.

GRAD 6913*
College Teaching Apprenticeship. Lab 6. Prerequisite(s): 5992 and enrollment in College Teaching Certificate program; EPSY 5463 or 6613; EDLE 6713 or 6583. Other EPSY/EDLE courses may be approved by Coordinator of program. Faculty member mentors doctoral student in instructing a university-level course.

GRAD 6921*
College Teaching Practicum. Lab 2. Prerequisite(s): 6913. Student acts as instructor of record for an undergraduate course under the mentorship of a faculty member appropriate to the course taught.

GREEK (GREK)

GREK 1113
Elementary Classical Greek I. Grammar and vocabulary of ancient Greek.

GREK 1223
Elementary Classical Greek II. Prerequisite(s): 1113 or equivalent. A continuation of 1113. Grammar and readings of classical Greek authors.

GREK 2113
Elementary Classical Greek III. Prerequisite(s): 1223 or equivalent. A continuation of 1223. Grammar and readings of classical Greek authors.

GREK 2213
Intermediate Readings. Prerequisite(s): 2113 or equivalent. An introduction to a variety of classical authors to increase reading facility and grammatical comprehension.

GREK 3330
Advanced Readings. 1-6 credits, max 9. Prerequisite(s): 2213. Prose authors, epic poetry, drama, Koine Greek and religious texts.

GREK 4113
(H)Greek Literature in Translation. Readings of significant works from ancient Greek literature and philosophy in English translation, from Homer through Aristotle. Readings and classes conducted in English.

HEALTH CARE ADMINISTRATION (HCA)

HCA 5013*
Survey of Health Care Administration. Overview of current issues in health care administration that relate to planning, legal, ethical and other related topics.

HCA 5023*
Human Resources in Health Care and Public Administration. Review, discuss and analyze current issues, rules, practices and governance of human resources in health care and public administration.

HCA 5033*
Legal Issues in Health Care Administration. Explore, discuss and analyze current legal issues and topics that relate to all aspects of the health care profession.

HEALTH AND HUMAN PERFORMANCE (HHP)

HHP 1713
Introduction to Athletic Training. Lab 1. Prerequisite(s): Admission to the athletic training program. An introduction to the profession of athletic training. The principles of injury prevention and care relative to athletic injuries and development of essential skills and competencies needed to perform selected athletic training procedures. Theory-based course with required laboratory experiences.

HHP 1753
Introduction to Physical Education. The nature, scope and significance of physical education. Historical and philosophical foundations, major sub-disciplines and their interrelationships, and career opportunities.

HHP 1812
Pedagogy of Outdoor Activities. Prerequisite(s): HHP and LEIS majors and minors only. Introduction of selected motor skills, activities, methods and theories within outdoor activities. Analysis of skills concepts, terms, safety issues, teaching strategies and developmental appropriateness.

HHP 1822
Pedagogy of Rhythm and Movement. Prerequisite(s): HHP and LEIS majors and minors only. Introduction of basic fundamentals and methods of movement skills for rhythms including social, creative, developmental, and multicultural dance and activities. Analysis of skills, concepts, terms, safety issues, teaching strategies and developmental appropriateness.

HHP 1832
Pedagogy of Sports Skills. Prerequisite(s): HHP and LEIS majors and minors only. Introduction of selected motor skills, activities, methods and theories of individual, dual and team sports. Analysis of skills, concepts, terms, safety issues, teaching strategies, and developmental appropriateness.

HHP 1842
Pedagogy of Fitness and Wellness. Prerequisite(s): HHP and LEIS majors and minors only. Introduction of concepts, technologies and teaching methods for strength training, aerobic conditioning, fitness assessment and stress management. Analysis of skills, concepts, terms, computer applications, safety issues, teaching strategies, and developmental appropriateness.

HHP 2213
Principles in Health Education and Health Promotion. Introduction to the field of health education and health promotion focusing on health principles, theories, career opportunities and a field experience.

HHP 2222
Introduction to Health Aspects of Gerontology. An introductory course of the physical and physiological aspects of aging combined with common pathology and intervention.

HHP 2323
Drugs and Society. Impact of recreational use of drugs on society. Topics will include stimulant, depressant, and hallucinogenic recreational drugs, erogenic substances and current research regarding addiction. Particular focus will be given to current trends of substance use and abuse. *Cannot be substituted for HHP 3913.*

HHP 2451
Athletic Training Practicum. Lab 1. Prerequisite(s): Full admission into athletic training program. Directed observation in supervised introductory laboratory and clinical experiences in athletic training.

HHP 2461
Athletic Training Practicum II. Lab 1. Prerequisite(s): Successful completion of 2451, 2844. Directed observation in supervised introductory laboratory and clinical experiences in athletic training.

HHP 2553
Basic Athletic Injury Management. Prerequisite(s): 2654. Identification of emergency medical situations and application of basic care for injury occurring in school and athletic setting.

HHP 2602
First Aid. Lab 2. A competency- and performance-based first aid course.

HHP 2603
(S)Total Wellness. Overview of individual, interpersonal, and socio-cultural issues that have an impact on health. Behavioral decision-making, social relations, cultural diversity and environmental sensitivity.

HHP 2654
Applied Anatomy. Lab 2. Prerequisite(s): BIOL 1114. Action and location of individual muscles and muscle groups. Anatomy as applied to a living person. Common anatomical injuries and diseases will be presented with each joint structure. Lab sections will be structured around specific content area for students' discipline.

HHP 2664
Mechanism and Management of Musculoskeletal Pathology. Appropriate prevention of injury and administration of medical care. Didactic theory and practical experience regarding many aspects of health care. Preparation for future health-care professionals to identify and care for injury occurring during physical activity.

HHP 2712
Psychomotor Development. Prerequisite(s): HHP and LEIS majors and minors only. Fundamental aspects of motor development for infants, children, youth and adults.

HHP 2733
Procedures in Athletic Training. Lab 1. Prerequisite(s): 1713, 2654, 2663. Introduction to the psychomotor skills required in the profession of athletic training. Procedures relative to injuries and development of essential skills and competencies needed to perform selected athletic training procedures. Theory-based course with required lab experience.

HHP 2802
Medical Terminology for the Health Professions. Basic knowledge and understanding of medical language and terminology used in allied health and health professions.

HHP 2844
Assessment of Lower-extremity Injuries. Lab 1. Prerequisite(s): 2654, 2663, 2773. Advanced knowledge and skills related to the recognition, assessment and appropriate medical referral of injuries to the spine and lower extremities.

HHP 2854
Assessment of Upper-extremity Injuries. Lab 1. Prerequisite(s): 2654, 2663, 2733, 2844. Advanced knowledge and skills related to the recognition, assessment and appropriate medical referral of injuries to the spine and upper extremities.

HHP 2902
Therapeutic Modalities for Injury I. Lab 1. Prerequisite(s): 2654, 2663, CHEM 1314 and concurrent enrollment ZOOL 3204. Discussion and application of common thermal and mechanical interventions used in the treatment of acute and chronic injuries to the musculoskeletal systems.

HHP 3010
Health and Human Performance Workshop. 1-3 credits, max 6. Concentrated study of selected areas of health and human performance, including problems in instruction and administration not usually addressed in the undergraduate curriculum.

HHP 3112
Radiography Evaluation and Assessment. Prerequisite(s): Full admission into ATEP clinical or pre-professional option. Introduction to the fundamental principles, equipment, and common methods and procedures of radiography.

HHP 3114
Physiology of Exercise. Lab 2. Prerequisite(s): MATH 1513. A study of the various bodily systems, including major organs and tissues, and how they respond to acute and chronic exercise of varying intensity, duration and frequency.

HHP 3223
Motor Learning. An in-depth study of motor learning and motor performance. Special emphasis on skilled performance, motor learning theory, motor abilities and individual differences in motor learning.

HHP 3233
General Medical Concepts. Prerequisite(s): 2654, 2663, and ZOOL 3204, CHEM 1314, HHP 3673. Specific pathologies, medical conditions, and possible avenues for treatment of non-orthopedic conditions. Based in current medical research, theory and practical outcomes.

HHP 3431
Early Laboratory and Clinical Experiences in Physical Education. Lab 1. Prerequisite(s): 1753 and declaration of intention to pursue a program in Professional Education. The initial pre-professional clinical experience for schools, kindergarten through grade twelve, with primary duties including assisting in physical education classes. *Required for full admission to Professional Education. Graded on a pass-fail basis.*

HHP 3451
Athletic Training Practicum III. Lab 1. Prerequisite(s): Successful completion of 2461, 3904. Directed observation in supervised intermediate laboratory and clinical experiences in athletic training.

HHP 3461
Athletic Training Practicum IV. Lab 1. Prerequisite(s): Successful completion of 3451, 3924. Directed observation in supervised intermediate laboratory and clinical experiences in athletic training.

HHP 3613
Community Health. Prerequisite(s): 2.75 major GPA, 2.50 overall GPA, 2213, 2603 or consent of instructor. A survey of issues impacting the health of populations from a community health perspective.

HHP 3623
School Health Programs. Prerequisite(s): 2603. The identity and relationships of school health instruction, services and environments.

HHP 3643
Health Behavior Theory. Prerequisite(s): Full admission to HEP and junior standing or consent of instructor. Survey of biopsychosocial behavioral models to determine basis for health risk behaviors, with emphasis on determinants of health/risk behavior and exploring health behavior theories across age, sex, ethnicity, culture and socio-economic status.

HHP 3663
Biomechanics. Prerequisite(s): 2654. The study of anatomical mechanical phenomena underlying human motion. Application of biomechanical concepts to a wide variety of exercise, fundamental movement, sport and physical activity.

HHP 3673
Pathology and Pharmacology in Sports Medicine. Prerequisite(s): 2663, CHEM 1314, ZOOL 3204. Principles of cellular inflammation, immunopathology, tissue growth and circulation. Examination of physiological drug activity in the body, drug disposition and pharmacokinetics in sports medicine.

HHP 3723
Principles of Epidemiology. Prerequisite(s): Full admission to HEP and junior standing or consent of instructor. Survey of epidemiological principles as they relate to the planning of both community and consumer-focused health promotion and disease prevention programs.

HHP 3753
Methods in Teaching Elementary Physical Education. Prerequisite(s): 1753, 1812, 1822, 1832, 2712, and 3430. Theory and practical experience of physical education in the elementary school. Teaching styles and activities needed to meet the needs of children from kindergarten through grade five.

HHP 3763
Health and Physical Education for Elementary Age Children. Methods of teaching health and physical education to elementary age children. Theory and practical experience of health behaviors, movement skills and physical fitness.

HHP 3773
Methods in Teaching Secondary Physical Education. Prerequisite(s): 1753, 1812, 1822, 1832, 3430. Instructional styles, implementation of behavioral goals and objectives through unit and lesson preparation, teaching methods and classroom management.

HHP 3902
Therapeutic Modalities for Injury II. Lab 1. Prerequisite(s): 2902. Discussion and application of common electronic and physiologic devices used in the treatment of acute and chronic injuries to the musculoskeletal systems.

HHP 3913
Alcohol and Drug Education. Prerequisite(s): Full admission to HEP and junior standing or consent of instructor. Examines social, psychological, pharmacological, and cultural aspects of drug use, misuse, and abuse. In addition, the methods, materials, and theories of drug abuse prevention in the school and community will be explored.

HHP 3924
Therapeutic Exercise. Lab 2. Prerequisite(s): 2654, 2664, 3904. Scientific methods used in therapeutic exercise and rehabilitation of injuries. Investigation of mechanisms of injury, anatomical structures involved and methodological approach in designing rehabilitative programs.

HHP 4010
Directed Study. 1-3 credits, max 6. Prerequisite(s): Written approval by department head. Supervised readings, research or independent study of trends and issues related to the area of health, physical education or leisure services.

HHP 4233
Health and Human Sexuality. Prerequisite(s): Full admission to HEP and junior standing or consent of instructor. The study of human sexuality as it relates to the health and well-being of individuals in the community, college, school or worksite settings.

HHP 4243
Research Methods in Athletic Training. Prerequisite(s): STAT 2013. Interactive study of importance and process of conducting ethical research in athletic training and the healthcare professions. Emphasis placed on research design, ethics, collection of data, and the dissemination of results.

HHP 4451
Athletic Training Practicum V. Lab 1. Prerequisite(s): Successful completion of 3461. Directed observation in supervised advanced laboratory and clinical experiences in athletic training.

HHP 4461
Athletic Training Practicum VI. Lab 1. Prerequisite(s): Successful completion of 3233, 4451. Directed observation in supervised advanced laboratory and clinical experiences in athletic training.

HHP 4480
Internship in Health and Human Performance. 1-12 credits, max 12. Prerequisite(s): last semester senior standing with cumulative GPA of 2.50. Supervised experience in school (physical education and health), community, worksite or athletic training settings in order to qualify or prepare for appropriate teaching and professional certification. *Graded on a pass-fail basis.*

HHP 4530
International Athletic Training. 1-3 credits, max 6. Explore and experience the techniques of prevention and care of athletic injuries in a culture outside of the United States. *Course must be taken in two different countries to count as second time credit.*

HHP 4533
Psychosocial Issues in Health Education/Promotion. Prerequisite(s): Full admission to HEP and senior standing or consent of instructor. Psychosocial issues as they relate to the practice of health education/promotion. Personal and professional applications of the course material will be emphasized.

HHP 4643
Methods in School and Community Health Education. Prerequisite(s): 3623; full admission to Professional Education. Conceptual approach to health education through a variety of teaching methodologies.

HHP 4723
Assessment in Physical Education. Prerequisite(s): Full admission to professional education. Evaluation techniques commonly used by physical educators and health professionals to measure knowledge, attitudes, sport skill proficiency and physical fitness.

HHP 4733
Organization, Administration and Curriculum in Physical Education and Athletics. Prerequisite(s): 3753, 3773 or concurrent enrollment; full admission to professional education. Curricular design and management of physical education (P-12) and athletic programs.

HHP 4773
Principles of Exercise Testing and Prescription. Prerequisite(s): 3114. Study of principles of exercise testing including submaximal and maximal tests, exercise and basic electrocardiography, and guidelines for recommending exercise as related to health promotion and exercise science.

HHP 4783*
Health Issues in Gerontology. Prerequisite(s): 2603, or consent of instructor. An in-depth study of physiological aspects, special health concerns, chronic illnesses and services as applied to gerontology.

HHP 4793*
Adapted Physical Education. Prerequisite(s): 3753, 3773, full admission to Professional Education. Cognitive and psychomotor characteristics of disabling conditions, needs and challenges of educating the exceptional learner in the regular physical education program.

HHP 4901
Rehabilitation Seminar. Prerequisite(s): 2844, 2854, 3673, 3904, 3924 and 4451. Capstone course using patient problems to develop clinical decision-making incorporating preceding course work in pathology assessment, therapeutic modalities, exercise and pharmacology.

HHP 4902
Pre-internship Seminar. Prerequisite(s): Full admission to HEP, last semester prior to 4990 or consent of instructor. Capstone course for the health promotion program. Preparation for the health internship experience.

HHP 4933
Administration and Organization of Athletic Training Programs. Prerequisite(s): 4451. The administration and organization of athletic training programs including planning and implementation, certification procedures, code of professional practice, safety standards and resource management.

HHP 4973
Program Design in HEP. Prerequisite(s): Full admission to HEP and senior standing or consent of instructor. A survey of program design principles, including theoretical foundations, planning, marketing, delivering and evaluating.

HHP 4983*
Current Issues in Athletic Training. Prerequisite(s): 3663, 4451 and admission to athletic training program. Development of competencies set by the National Athletic Trainers Association Board of Certification. Current issues facing athletic trainers and the role in today's health care systems.

HHP 4990*
Internship in Health Promotion. 1-12 credits, max 12. Prerequisite(s): Last semester; senior standing with cumulative GPA of 2.50. Supervised field work experience in health promotion or health-related settings. *Graded on a pass-fail basis.*

HHP 5000*
Master's Thesis. 1-6 credits, max 6. Independent research required of candidates for master's degree. Credit awarded upon completion of thesis.

HHP 5010*
Seminar. 1-2 credits, max 4. Selected topics from the profession not covered in other courses. Presentation and critique of research proposals and results.

HHP 5020*
Health and Human Performance Workshop. 1-3 credits, max 6. Workshop in selected areas of health and human performance.

HHP 5030*
Field Problems in Health and Human Performance. 1-3 credits, max 6. Individual investigations of issues in the areas of health and human performance.

HHP 5053*
Research Design in Leisure, Health and Human Performance. Prerequisite(s): PSYC 5303 or STAT 5013. Research design with applicability toward leisure, health and human performance. Conceptual understanding of theory, tools and processes involved in designing research.

HHP 5073*
Psychological Aspects of Sport. Psychological foundations of sport emphasizing performance enhancement by athletes through psychological training techniques.

HHP 5113*
Psychological Aspects of Health. Examination of the interactions of biological, psychological, social, and spiritual factors as they impact human health and disease.

HHP 5233*
Sexuality and Health. The study of human sexuality as it relates to the health and well-being of individuals in the community, college, school, and worksite settings. Particular emphasis will be on examining, developing, or modifying new programming related to sexuality and health.

HHP 5453*
Cultural Issues in Health Education and Promotion. Examination of ways in which culture affects health and health care including perceptions of health, disease, treatments, and the values associated with these factors. The need for cultural sensitivity in health care is emphasized.

HHP 5523*
Current Readings in Health. Contemporary research, literature, projections and views as applied to total health and well-being.

HHP 5530*
International Athletic Training. 1-3 credits, max 6. Explore and experience the techniques of prevention and care of athletic injuries in a culture outside of the United States. *Course must be taken in two different countries to count as second time credit.*

HHP 5593*
Human Electrocardiographic Interpretation. Prerequisite(s): 3114 or consent of instructor. Knowledge concerning the collection and interpretation of the electrocardiogram (EKG) and its relationship to heart anatomy, physiology and electrophysiology.

HHP 5603*
Principles of Performance Enhancement. Prerequisite(s): 2654, 3114, ZOOL 3204. Theoretical foundation of specific tenets of exercise and performance enhancement. Upon successful course completion students will be eligible to sit for the National Academy of Sports Medicine (NASM) examination for NASM Performance Enhancement Specialist certification.

HHP 5613*
Cardiac Rehabilitation. Prerequisite(s): 2653 and 3114 or equivalent. Factors involved in cardiovascular disease. History, implementation and administration of cardiac rehabilitation programs.

HHP 5663*
Philosophical Foundations of Health Education and Promotion. Exploration of key concepts, philosophies, ethical principles, historical events, theories/models, and responsibilities and competencies of health education and promotion of professionals.

HHP 5683*
Theoretical Applications in Health Education and Promotion. Prerequisite(s): 5663. Theories and concepts related to health science and exploration of the application of theories to health education practice and research.

HHP 5733*
Motor Learning. Research in psychology and physical education relevant to the understanding of the nature and basis of motor skill learning.

HHP 5823*
Advanced Applied Anatomy. Prerequisite(s): 2653. Structure and movement of the human body with emphasis on the relationship of physical activity to musculoskeletal and neurological factors.

HHP 5853*
Stress Testing and Exercise Prescription I. Prerequisite(s): 3114, 5593. Theory and practice in resting and exercise EKG, stress test protocols and exercise prescription.

HHP 5863*
Stress Testing and Exercise Prescription II. Prerequisite(s): 5853. Theoretical aspects of evaluating functional capacity through stress testing with the development of exercise prescription for special populations with physiological limitations imposed by age, disease, heredity and environment.

HHP 5873*
Human Bioenergetics. Prerequisite(s): 3114. Human energy production, utilization and storage in response to exercise.

HHP 5894*
Biochemistry of Exercise Lab Methods. Lab 2. Prerequisite(s): Consent of the instructor. Practice using basic laboratory skills which can be applied to sophisticated techniques in biochemical analysis. General biochemistry as it relates to exercise metabolism, laboratory procedures, calculations, common lab problems and solutions and laboratory safety procedures.

HHP 5973*
Program Design in Health Education and Promotion. A survey of program design principles, including assessing, theoretical foundations, planning and marketing.

HHP 5983*
Health Promotion Program Implementation and Evaluation. Prerequisite(s): 5973. An intensive overview of principles of health promotion program implementation and evaluation with special emphasis on application.

HHP 6000*
Doctoral Dissertation. 1-25 credits, max 25. Required of all candidates for the Doctor of Philosophy degree. Credit is given upon completion of the dissertation.

HHP 6010*
Independent Study in Health and Human Performance. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Supervised readings, research or independent study of trends and issues related to the areas of health and human performance.

HHP 6013*
Professional Issues in Health and Human Performance. Introduction of doctoral students to the major areas of higher education relevant to professional preparation in health and human performance curricula. Issues of higher education, roles of the educator, curriculum development, implementation and management, instructional strategies and accreditation.

HHP 6020*
Research Colloquium. 1-3 credits, max 3. Exploration and presentation of selected topics and research in health and human performance.

HHP 6023*
Special Topics in Health and Human Performance. Prerequisite(s): Admission to the Graduate College. Special topics related to health and human performance. Investigation, discussion and analysis of contemporary topics.

HHP 6053*
Advanced Research in Health and Human Performance. Prerequisite(s): Graduate elementary statistical methods course. In-depth study of selected surveys and experimental research in HHP, including questionnaire development, survey methodology and analysis of data.

HHP 6063*
Statistical Computing and Proposal Writing. Prerequisite(s): Consent of instructor. Instruction in the use of SPSS using a personal computer. Preparation of research proposals.

HHP 6723*
Curriculum Development in Health, Leisure and Human Performance. Prerequisite(s): Admission to the Graduate College. Identification and analysis of curriculum theories with emphasis on traditional and innovative approaches to curriculum design for programs in health, leisure and human performance.

HISTORY (HIST)

HIST 1010
Studies in American History. 1-2 credits, max 2. Special study in American history to allow transfer students to fulfill general education requirements as established by Regents' policy.

HIST 1020
Freshman Historical Research Methods. 1-3 credits, max 3. Prerequisite(s): Requires consent of instructor. For lower-division students interested in learning research methods in history while working on a research project with an individual faculty member. *Preference given to students in A&S Freshman Research Seminar.*

HIST 1103
Survey of American History. Meaning, vitality, and uniqueness of United States history since 1492 through a thematic examination of the nation's past. Satisfies, with POLS 1113, the State Regents requirement of six credit hours of American history and American government before graduation. *No credit for students with prior credit in HIST 1483 or 1493.*

HIST 1483
American History to 1865. From European background through the Civil War. Satisfies, with POLS 1113, State Regents requirement of six credit hours of American history and American government before graduation. *No credit for students with credit in HIST 1103.*

HIST 1493
American History Since 1865. May be taken independently of HIST 1483. Development of the United States including the growth of industry and its impact on society and foreign affairs. Satisfies, with POLS 1113, State Regents requirement of six credit hours of American history and American government before graduation. *No credit for students with credit in HIST 1103.*

HIST 1613
(H)Western Civilization to 1500. History of western civilization from ancient world to Reformation.

HIST 1623
(H)Western Civilization After 1500. History of western civilization from Reformation to present.

HIST 1713
(H)Survey of Eastern Civilization. History of three eastern civilizations (East Asia, South Asia and West Asia) from pre-history to the 18th century. Special attention to their origins, development, and contributions to the evolution of world civilization.

HIST 2323
Oklahoma History. Early exploration and establishment of Indian Territory; the rise and demise of the Five Indian Nations; and the organization and development of the 41st state to the present. *Required of all candidates for teacher's licensure/certification in social studies.*

HIST 2333
(H)American Thought and Culture: Survey. Survey of American religious, philosophical, artistic, and scientific ideas and their impact on culture and values.

HIST 2343
(H)Religion in America. Survey of the history of religion in America and its impact on social reform, politics, and intellectual life.

HIST 3013
(H)Ancient Egypt and Israel. The Ancient Near East with a focus on Egyptian and Israelite history, from the earliest times to the 5th century B.C.

HIST 3023
(H)Ancient Greece. The Greek world from the Bronze Age through Alexander the Great with special emphasis on politics, culture and institutions of Classical Greece.

HIST 3033
(H)Ancient Rome. Political, social, economic and cultural history of the Roman Republic and Empire.

HIST 3043
(H)Ancient Mesopotamia: Iraq, Iran & Syria from 4000-333 B.C. From the birth of civilization to the end of the Persian Empire, this course examines the history, archaeology and cultures of the fertile crescent.

HIST 3053
(I,S)Introduction to Central Asian Studies. A comprehensive view of newly-emerged Central Asian states examining the history, politics, economics, geography, and culture of Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan as reflected in their thoughts, religion, literature, and architecture, in the past, and the strategic importance of their natural wealth for the present and future. (Same course as GEOG 3053, POLS 3053 & RUSS 3053)

HIST 3113
(H,I)Germany Since 1815. Creation of a centralized state in Germany; impact of World War I and the subsequent failure of the Weimar Republic; rise of national socialism, totalitarianism, and the Third Reich; German experience in WWII, repression of minorities, and the Holocaust; post-war Germany and modern reunification.

HIST 3133
(H)African Diaspora History. Introduction to the origin, development, and maturation of the African Diaspora in the Americas and the Caribbean, from the transatlantic slave trade to the mid-20th century. Emphasis is placed on a critical reading and discussion of a selection of essays, historiographies and primary materials on diasporic and transnational experiences and identities of Africans, African descendents, and Caribbean transmigrants.

HIST 3153
(H)Russia to 1861. Political, institutional, societal and economic development of Russia from the Kievan period to the Great Reforms.

HIST 3163
(H,I)Russia Since 1861. Modernizations of Russia in the 19th and 20th centuries. Great reforms and their effects and the 1917 revolutions and their consequences.

HIST 3203
(H)Early Medieval Europe, 325-1000. Early Middle Ages in Europe with emphasis on political, economical, religious, and social developments. Considerations of Europe's interactions with Byzantium and Islam.

HIST 3233
(H)Later Medieval Europe, 1000-1450. High and Late Middle Ages in the Europe with emphasis on political, economic, religious, and social developments. Considerations of Europe's interactions with Byzantium and Islam.

HIST 3243
(H)Renaissance, 1350-1517. The development of the Renaissance from the Italian city-states to the New World. Political development, cultural innovation, and the role of disease in history.

HIST 3253
Absolutism and Enlightenment, 1648-1789. Political, economic, social, intellectual and religious transformation of Europe between the Peace of Westphalia and the French Revolution.

HIST 3263
(H)Modern Europe, 1815-1914. Impact of modernization on the character of European society. Factors that transformed the Continent into a battle ground in the 20th century.

HIST 3273
(H,I)Modern Europe Since 1914. Origins, character and impact of the first World War; emergence and consequences of the totalitarian state; nature of political and intellectual terrorism. Effects of worldwide economic depression; dilemmas of modern democracies; political collapse of Europe as a consequence of World War II.

HIST 3323
(H)Modern France, 1789-Present. French politics, economy, society, and culture from the defeat of Napoleon to France's post-World War II "rebirth.''

HIST 3333
(H,I)History of the Second World War. Problems leading to World War II with their international implications and consideration of the war years.

HIST 3343
(H,I)World War I in Modern European Culture. Analysis of the war as the principal event determining the course of twentieth century European history: battles, home fronts, personal, literary and artistic expression.

HIST 3353
Mediterranean World, 1200-1600. Examination of the cultural and social encounters between East and West, Christian and Muslim. The meeting point for three world cultures and three continents explored in the following themes: pilgrimage, commerce, slavery, intellectual exchange, warfare, and minority communities.

HIST 3363
(H)Popular Religion in the West, 1300-1700. The study of the religious experience of both lay people and clergy between 1300 and 1700, when their religious worldview underwent fundamental challenges and changes. The effort to understand the relationship between the secular world and the supernatural will be explored through devotional ideas, practices and religious rituals.

HIST 3373
(H)Medieval England: 55 B.C.-1485 A.D. English History from Roman Britain to the beginning of the Tudor period. Development of the English constitution from the early Germanic state through feudalism to the New Monarchy.

HIST 3383
(H)Tudor-Stuart England. History of England from the War of the Roses through the coming of the House of Hanover in 1714. Development of the centralized state, parliamentary reaction, reorientation of the English society and economy and the English Reformation.

HIST 3393
Modern England: 1714-Present. English history from the arrival of the house of Hanover through the decline of British influence following the Second World War. Political, social, and economic problems encountered as a result of the creation of the first modern industrialized state.

HIST 3403
(H)East Asia to 1800. Traditional Chinese civilization and its impact on Japan, Korea and Southeast Asia.

HIST 3413
(H,I)East Asia Since 1800. Impact of the Occident on China, Japan and Southeast Asia. Problems of trade and diplomacy; political and industrial transformation of Japan; revolutionary process in China; the rise of nationalism in Southeast Asia.

HIST 3423
(H,I)Modern Japan. Modernization process in Japan since 1868.

HIST 3433
(H,I)Modern China. Response of China to the West since 1840, with stress on economic, social and intellectual currents.

HIST 3443
(H)Gender Relations in Chinese History. Men's and women's social, cultural, religious, political, economic, family, and sexual experiences in Chinese history; particularly women's own voices and efforts in pursuing their own goals and aspirations.

HIST 3453
(H)Colonial Latin America. Impact on the Indian cultures of Spanish and Portuguese conquerors, priests, administrators and entrepreneurs in the creation of a new society. Class structure, 18th century reforms, and independence movements.

HIST 3463
(H,I)Modern Latin America. Latin America republics emphasizing the dictators and the liberal reform movements of the 19th century. U.S. involvement and the recent social revolutions of the 20th century.

HIST 3483
(H)Reformation Europe, 1517-1648. Development and impact of religious reform movements, overseas expansion, statebuilding, the Scientific Revolution, and the Thirty Years' War on European civilization.

HIST 3493
(H,I)Scandinavia since 1500. Exploration of Scandinavia from 1500 to the present. Focus on key historical and contemporary questions such as the spread of Lutheran reform, Sweden and Denmark as major European powers, the growth of nationalism and Scandinavian identity, industrialization, the welfare state, and multiculturalism.

HIST 3503
(H)Islamic Civilization 600-1800. Rise of Islam in Arabia and subsequent spread to Africa, Asia and Europe. Nature of Islamic civilization through discussion of political, social, cultural and economic institutions established in the Middle Ages as well as diversity of Islamic traditions.

HIST 3513
(H,I)Modern Middle East Since 1800. Main political events, social institutions, cultural and economic developments, as well as various aspects of everyday life in the Middle East since 1800. Transformation of traditional society, imperialism and independence, Arab nationalism, Arab-Israeli conflict, the impact of oil, westernization, the rise of militant Islam, and the prospects of democratization.

HIST 3543
(H,I)Israel & Palestine in Modern Times. History of 19th and 20th century Palestine, Zionism and the founding of modern Israel. The Palestine-Israeli conflict in local and regional perspectives.

HIST 3553
(H,I)Media and Popular Culture in the Arab Middle East. Popular culture throughout the Arab-speaking world in light of the most important political and economic events of the 19th and 20th centuries.

HIST 3613
(H)American Colonial Period to 1750. Colonization of British and French North America; colonial political, social, cultural, intellectual and economic development; international rivalries; the imperial structure.

HIST 3623
(H)Era of the American Revolution. British imperial problems; the American Revolution; political, cultural, economic, social and religious change; the War for Independence; the Articles of Confederation; the critical years.

HIST 3633
(H)Early National Period, 1787-1828. Drafting and adopting the Constitution, organizing the government, Jeffersonian Republicanism, the War of 1812, territorial expansion, the new West, nationalism and sectionalism.

HIST 3643
(H)The Jacksonian Era, 1828-1850. Development of a modern political system and an entrepreneurial economy; social reform; territorial expansion; and sectionalism.

HIST 3653
(S)Civil War and Reconstruction, 1850-1877. Causes, decisive events, personalities and consequences of the disruption and reunion of the United States.

HIST 3663
(H)Robber Barons and Reformers: U.S. History, 1877-1919. The impact of industrialization upon American society and politics. America's rise to world power, the Progressive movement and World War I.

HIST 3673
(D,H)United States History, 1919-45. The political, economic, social and cultural changes in the United States from 1919 to 1945, the 1920s, the Depression, the New Deal, WWII, and domestic impact of the war.

HIST 3683
(D,H)United States History since 1945. The political, social, and cultural history of the United States since World War II. The Cold War, McCarthyism, 1950s ideals of the nuclear family, the civil rights and other social movements, the Vietnam War, Watergate, the Reagan years and globalization.

HIST 3693
(H)The Modern West. Social, political, economic changes that define the twentieth-century American West.

HIST 3753
(H)Trans-Mississippi West. Emergence of the modern West from Spanish and French settlement and exploration, the Rocky Mountain fur trade, the settlement of Texas, Oregon, California, and Utah, the mining, ranching and farming frontiers, the Indian Wars and transportation.

HIST 3763
(D,H)American Southwest. Southwestern states of Texas, Arizona, New Mexico and California from the Spanish colonial period to the present. Mining, ranching, farming frontiers, Indian wars of the Apache, Comanche and other southwestern tribes, and the emergence of the modern Southwest.

HIST 3773
(S)Old South. Social, political and industrial conditions in the South before the Civil War.

HIST 3793
(H,D)Indians in America. American Indian from Columbus to the present, emphasizing tribal reaction to European and United States cultural contract and government policy.

HIST 3913
(H)History of Medicine. Historical growth of medicine and its relationship to the society in which it develops. Scientific problems, cultural, religious and medicine.

HIST 3953
Religion in Modern Europe. Religions thought and experience as influences on the politics, economy, and general culture of European nations from the 17th century to the present.

HIST 3963
(H)Ideas and Ideologies in Modern Europe. Prerequisite(s): 1623. Intellectual and ideological developments in modern Europe, including political, social, and cultural foundations and impact on modern Europe.

HIST 3980
Studies in History. 1-3 credits, max 9. Presented for general audiences. *Not intended for history majors.*

HIST 4063
Historic Preservation. Focuses on the United States and examines the history and theory of the preservation movement, the legal basis for preservation of the built environment and the methodology of preservation. *No credit for students with credit in 5063.*

HIST 4153
(D,H)African American History, 1619-1865. Overview of the history of African Americans from the onset of slavery and the slave trade to the Civil War. Topics include: African background; interaction between Africans, Indians and Europeans; development of slavery; forms of resistance; rise of the abolitionist movement; and conditions of free blacks.

HIST 4163
(D,H)African American History, 1865-1954. Major issues and actions from the beginning of the Civil War to the 1954 Supreme Court decision. Focus on political and social history: transition from slavery to emancipation and Reconstruction; the Age of Booker T. Washington; urban migrations, rise of the ghettoes; the ideologies and movements from integration to black nationalism.

HIST 4173
(D,H)Black Intellectual History. Examines the nature of black social and political thought from the early 18th to the mid-20th century and the contributions made by black intellectuals to discussions of race, citizenship and nationality. Emphasis is placed on topics of abolitionism, labor movements, populism, socialism, pan-Africanism, feminism, and the civil rights movement.

HIST 4253
(H)American Foreign Relations to 1917. American experience in foreign relations from colonial times to World War I.

HIST 4273
(H)American Foreign Relations Since 1917. America's emergence as the decisive factor in the world balance of power.

HIST 4353
(H)American Military History. Civil-military relations, the military implications of American foreign policy, and the impact of technological advances on warfare since colonial times.

HIST 4453
(H)History of Film. Examines the ways in which historical events are made available to viewers through the medium of the cinema. The primary focus involves examining the relationship between historical events and the ways in which those events are depicted, commemorated, memorialized, remembered and misremembered in film.

HIST 4463
(H)American Cultural History to 1865. American society in nonpolitical aspects: sections, classes, national culture and social structure, immigration, education, religion, reform, world influences; ends with Civil War.

HIST 4483
(H)American Cultural History since 1865. Continuation of 4463; may be taken independently. Emphasis on nonpolitical aspects of American society and thought and on world influences.

HIST 4493
(H,D)Frontier in American Memory. Examination of the ways in which several American frontiers have been remembered, especially in popular culture. These frontiers include those informed by imagery related to Euro-American pioneers, women, people of color, and the tribal peoples of the American West.

HIST 4503
(H)American Urban History. Impact of urbanization upon American communities from 1865 to the present. Evolving political and social institutions, social change, technological innovations and planning theories.

HIST 4513
(S)American Economic History. Economic development and economic forces in American history; emphasis upon industrialization and its impact upon our economic society since the Civil War. (Same course as ECON 3823)

HIST 4523
(H)American Environmental History. Examination of the changing ways society (from Native American to post-industrial) has defined, interpreted, valued, and used nature.

HIST 4543
(H,I)Vietnam War. Origins of the Vietnamese struggle against colonialism, international policy, making of military strategy and diplomacy, anti-war movement, impact on the war on soldiers and civilians, reflections of the war in popular memory and culture.

HIST 4553
(D,H)Gender in America. Cultural, societal and political reflections of American men and women from the colonial era to the present. Examination of the women's movements and their opponents. Exploration of changing notions of masculinity and femininity.

HIST 4563
(H,I)Cold War. International perspectives on the origins, conflicts and ideologies of the Cold War, the nuclear arms race, impact on daily life, cultural reflections, the collapse of communism, victors and losers in the post Cold War world.

HIST 4573
Women in Western Civilization. Women in the development of Western Civilization from the earliest times to the present.

HIST 4583
History of Technology. The development of technology in western civilization. The relationship between science and technology and the effect of technology on society.

HIST 4593
(H)America in International Perspective. Prerequisite(s): 1103 or lower-division survey course in U.S. History, any period. A transnational interpretation of American history from the colonial era to the present day. Uses a variety of interdisciplinary sources to place the history of the United States within a comparative, global framework. (Same course as AMST 4593)

HIST 4903
Senior Seminar. Prerequisite(s): History major or consent of instructor. An introduction to historical research for senior history majors. Students will be required to select, research, and write a seminar paper based on primary documents and use standard footnoting and bibliographical methods.

HIST 4980*
Topics in History. 1-3 credits, max 9. For students interested in pursuing either a research or a reading project. Open to honors students in history and to others by permission of the department head.

HIST 4990
Undergraduate Internship. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. History related internship experience designed to introduce majors to career possibilities.

HIST 4993
Senior Honors Thesis. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis under the direction of a faculty member, with second faculty reader and oral examination. Required for graduation with departmental honors in history.

HIST 5000*
Thesis. 1-6 credits, max 6.

HIST 5021*
Teaching History at the College Level. Survey of objectives and methods in the teaching of history at the college level.

HIST 5023*
Historical Methods. Methods of historical research and the writing of history.

HIST 5030*
Applied History Internship. 3-6 credits, max 6. Prerequisite(s): Consent of graduate committee. Supervised practical experience in applied history.

HIST 5033*
Introduction to Public History. Prerequisite(s): Graduate student standing. Introduction to theory and practice of public history. Includes public history careers, public history as a field in the discipline, and the public perception and use of the past.

HIST 5053*
Museum Studies. Prerequisite(s): Graduate student standing. Introduction to museum theory and practice, especially as it pertains to history museums and sites.

HIST 5063*
Historic Preservation. Prerequisite(s): Graduate student standing. Focuses on the United States and examines the history and theory of the preservation movement, the legal basis for preservation of the built environment, and the methodology of preservation. *No credit for students with credit in 4063.*

HIST 5120*
Reading Seminar in American History. 3 credits, max 15. Historiographical and bibliographical study of special areas of American history.

HIST 5140*
Reading Seminar in European and World History. 3 credits, max 15. Historiographical and bibliographical study of special areas of European and World history.

HIST 5220*
Research Seminar in American History. 3 credits, max 15. Research in selected problems in American history.

HIST 5240*
Research Seminar in European and World History. 3 credits, max 15. Research in selected problems in European and World history.

HIST 6000*
Doctoral Dissertation. 1-19 credits, max 30. Prerequisite(s): Admission to candidacy. Advanced research in history.

HIST 6023*
Historiography. Major writers of history, historical schools and patterns of developments in historical interpretation from the earliest times to present.

HIST 6100*
Directed Readings in History. 1-3 credits, max 36. Prerequisite(s): Graduate student standing. Readings in selected topics in history to develop factual knowledge, analytical skills, and interpretive understanding.

HIST 6120*
Creative Component. 1-3 credits, max 36. Research in designated topic in History resulting in the preparation of a major paper demonstrating historigraphical and bibliographical command of subject. *Required for students in Plan III of MA program.*

HIST 6130*
Graduate Studies in History. 3 credits, max 39. Prerequisite(s): Graduate student standing. Graduate-level work under taken in association with upper-division lecture courses. Added component ordinarily entails a graduate-level research paper or historiographical essay of substantial length.

HONORS COLLEGE (HONR)

HONR 1000
Introductory Honors Topics. 1-3 credits, max 6. Prerequisite(s): Honors Program participation. Introduction to topics in various disciplines by faculty from the undergraduate colleges for freshman and sophomore students in the University Honors Program.

HONR 1013
(H)The Ancient World. Prerequisite(s): Honors Program participation. Interdisciplinary study of art, history, philosophy and literature from ancient Greece and Rome as well as the religious ideas central to Judaism and Christianity. Team-taught by faculty from appropriate disciplines in a lecture and discussion format. For the Honors student. *No credit for students with prior credit in HONR 2113.*

HONR 1023
(H)The Middle Ages and Renaissance. Prerequisite(s): Honors Program participation. Interdisciplinary study of art, history, philosophy and literature from the Middle Ages to the early Renaissance. Team-taught by faculty from appropriate disciplines in a lecture and discussion format. For the Honors student. *No credit for students with prior credit in HONR 2113.*

HONR 1033
(H)The Early Modern World. Prerequisite(s): Honors Program participation. Interdisciplinary study of art, history, philosophy and literature from the late Renaissance to the mid-19th century. Team-taught by faculty from appropriate disciplines in a lecture and discussion format. For the Honors student. *No credit for students with prior credit in HONR 2223.*

HONR 1043
(H)The Twentieth Century. Prerequisite(s): Honors Program participation. Interdisciplinary study of art, history, philosophy and literature from the late 19th century to the present. Team-taught by faculty from appropriate disciplines in a lecture and discussion format. For the Honors student. *No credit for students with prior credit in HONR 2223.*

HONR 1093
(A)Patterns and Symmetry in Mathematics. Prerequisite(s): Honors Program participation. Tesselations, or repetitive patterns in the plane and in space, and the symmetries, or rigid motions, that preserve them. Illustrations from art, architecture, science, and nature. For the Honors student.

HONR 2013
(S)Honors Law and Legal Institutions. Prerequisite(s): Honors Program participation. An introduction to law in American society with reference to its European origins; its political, economic, psychological, and sociological dimensions; and the substantive law in selected areas. Introduction to legal reasoning and legal research techniques. For the Honors student.

HONR 2063
(H)Ethical Issues Across Cultural Perspectives. Prerequisite(s): Honors Program participation. An introduction to reasoned methods of evaluating ideas and arguments as they pertain to ethical issues from a global perspective. Concepts including obligation, justice, and ethnicity from Lao Tzu, Maimonides, Kant, and Indian wisdom stories. Environmentalism, technology, and cultural knowledge. Team-taught by faculty from appropriate disciplines in a lecture and discussion format. For the Honors student.

HONR 2514
(L,N)Honors Scientific Inquiry. Lab 2. Prerequisite(s): Honors Program participation. A team-taught interdisciplinary course dealing with philosophy of science and the application of the scientific method in the natural and social sciences. Selected topics that involve interdisciplinary scientific inquiry. For the Honors student.

HONR 3000
Advanced Honors Topics. 1-3 credits, max 6. Prerequisite(s): Honors Program participation, junior standing. Topical study in various disciplines taught by faculty from the undergraduate colleges for junior and senior students in the University Honors Program.

HONR 3013
(H,I)Holocaust Studies Seminar. Prerequisite(s): Junior standing, Honors Program participation. An interdisciplinary study of one of the problematic events of human history—the Holocaust. Addresses questions of good and evil, divinity and humanity, and truth and responsibility that arise from this event. For the Honors student.

HONR 3023
(H,I)Contemporary Cultures of the Western World. Prerequisite(s): Honors College participation. Interdisciplinary examination of selected cultures of Europe and the western hemisphere. Emphasis will be on identification of main characteristics of "Western" culture and their manifestations in a variety of modern societies on both sides of the Atlantic Ocean. Key values, institutions, and practices will be examined to illustrate the twin themes of commonalities and cultural diversity. *The course is team taught by faculty from appropriate disciplines in a lecture and discussion format.*

HONR 3043
(D,S)Contemporary Cultures of the United States. Prerequisite(s): Honors Program participation. Interdisciplinary study of racial and ethnic diversity in the United States in context of social, political, and economic systems to promote knowledge of racial and ethnic minority groups in the United States and appreciation of their contributions to the mosaic of contemporary American life. Team-taught by faculty from appropriate disciplines in a lecture and discussion format.

HONR 3053
(H,D)Biology, Race, and Gender. Prerequisite(s): Honors College participation. Critical interdisciplinary investigation of relationships between biological theory (especially Darwinism) and social and ethical issues. Attention to views of alleged biological aspects of perceived racial and gender differences and attempts to implement these views socially, legally, and medically in the United States and elsewhere.

HONR 4993*
Honors Creative Component. Prerequisite(s): Honors Program participation, senior standing. A guided creative component for students completing the requirements for college or departmental honors awards leading to an honors thesis, project or report under the direction of a faculty member from one of the undergraduate colleges, with a second faculty reader and oral examination.

HORTICULTURE (HORT)

HORT 1003
Home Horticulture. Offered by correspondence only. An introduction to horticultural practices for the home gardener. Planning and care of home grounds, home orchards and vegetable gardens; selection, use and care of indoor plants. *Non-majors only. Credit will not substitute for required courses.*

HORT 1013
(L,N)Principles of Horticultural Science. Lab 2. Basic physical and physiological processes responsible for plant dormancy, growth, flowering, fruiting, and senescence with respect to the science and art of production, cultivation, utilization, and/or storage of horticultural plants. Current research associated with various horticultural commodity groups.

HORT 2010
Internship in Horticulture. 1-6 credits, max 6. Prerequisite(s): 24 credit hours and consent of adviser. Supervised work experience with approved public and private employers in horticulture and related fields. *Credit will not substitute for required courses. Graded on a pass-fail basis.*

HORT 2513
Herbaceous Plant Materials. Lab 2. Identification, cultural requirements, and use of ornamental garden and indoor herbaceous plants.

HORT 2613
Woody Plant Materials. Lab 2. Identification, cultural requirements, and use of ornamental woody plants including deciduous and evergreen trees, shrubs and vines.

HORT 2652
Basic Floral Design. Lab 2. Fundamentals of floral arrangement and design for the home and the retail shop; basic skills useful to flower shop employment and operation.

HORT 3013
Arboriculture. Lab 2. Prerequisite(s): 2613 or NREM 2134 and SOIL 2124. Theory and practice of selecting, planting and maintaining trees, shrubs and vines in the landscape.

HORT 3084
Plant Propagation. Lab 2. Prerequisite(s): 1013 or PLNT 1213, BIOL 1404 and SOIL 2124. Principles and practices involved in propagation of plants. Anatomical, morphological and physiological aspects of sexual and asexual methods of regeneration and their importance.

HORT 3113
Greenhouse Management. Lab 3. Prerequisite(s): 1013, BIOL 1404, MATH 1483 or 1513 or above. Commercial greenhouse operation with emphasis on floricultural plant production aspects; environment, growing media, fertilizers and application methods, watering, pest and disease control, chemical growth regulators, production costs.

HORT 3153
Turf Management. Prerequisite(s): 1013, SOIL 2124 and 2 hours plant science. Selection, establishment and maintenance of grass species and other plant materials for special use areas.

HORT 3213
Fruit and Nut Production. Prerequisite(s): BIOL 1403. Commercial production of fruits and nuts, with emphasis on pecan, apple, peach, strawberry, blackberry and blueberry. *A two-day field trip is required.*

HORT 3253
Personnel and Financial Management for Horticulture. Prerequisite(s): 1013 or LA 1013 and one upper division HORT or LA course. Preparing and executing an operational budget in a horticultural service industry and methods for maintaining an effective work force.

HORT 3433*
Commercial Vegetable Production. Prerequisite(s): 1013, SOIL 2124 and BIOL 1404. Commercial production and marketing of vegetable crops.

HORT 3513
Landscape Irrigation. Lab 2. Prerequisite(s): 1013 or LA 1013. Basics of landscape irrigation with an emphasis on residential irrigation design, maintenance and installation.

HORT 3612
Bidding and Estimating. Prerequisite(s): 1013 or LA 1013 or NREM 1114 or PLNT 1213. Bid preparation and job cost estimation for landscape related projects including quantity take-offs, plant material and hardscape estimates, budgeting and pricing.

HORT 4313*
Commercial Flower Production and Marketing. Lab 3. Prerequisite(s): 3113. Commercial production of cut flower, pot plant and bedding plant crops. Application of plant physiological principles to crop culture, crop production costs and marketing.

HORT 4453*
Turfgrass Physiology and Ecology. Prerequisite(s): 3153, BOT 1404. A study of the relationship between turf physiology and modern turf management practices. Concepts of stand ecology with emphasis on species dominance in stressful environments.

HORT 4543*
Nursery Production. Lab 2. Prerequisite(s): 2613 and SOIL 2124. Commercial production of field- and container-grown woody ornamental crops.

HORT 4713*
Public Garden Management. Lab 4. Prerequisite(s): 1013. Issues and methods in public garden management, including database management of collections, conservation of native species, grant writing, volunteer coordination, computerized mapping systems, master planning, and other topics pertaining to a career in public horticulture. *Field trips required.*

HORT 4773
Applied Landscape Planning. Lab 3. Prerequisite(s): 2313 or 2413. Concepts of landscape contracting, design and planning. Preparation of plans, and cost estimates with an emphasis on residential landscapes and use of plant materials. *No credit for students in the landscape architecture or landscape contracting programs.*

HORT 4901*
Horticulture in Controlled Environments Laboratory. Lab 2. Prerequisite(s): 4903 or concurrent enrollment. Hands-on experiences and virtual field trips designed to reinforce principles discussed in HORT 4903, and to develop skill sets important to successful implementation of horticultural practices in controlled environments. *Offered through web-based instruction.*

HORT 4903*
Horticulture in Controlled Environments. Prerequisite(s): CHEM 1215 and HORT 3113.Designing, constructing, monitoring, and manipulating controlled environments for efficient horticultural production. *Offered through web-based instruction.*

HORT 4933
Principles of Sustainable and Organic Horticulture. Prerequisite(s): 1013. Principles and practices of sustainable, organic, and alternative horticultural management systems. *Offered through web-based instruction.*

HORT 4943*
International Horticulture. Prerequisite(s): 1013. Overview of the horticulture industry worldwide. Export, marketing, and international trade issues in a global horticulture context. Individual country analyses of specific fruit, vegetable and ornamental crops. *Offered through web-based instruction.*

HORT 4953*
Plant Growth and Development. Prerequisite(s): 1013 and BOT 1404. Plant embryogenesis and organogenesis; growth and development of shoots and reproductive structures; plant developmental processes including shoot expansion and dormancy as influenced by temperature, light, and other environmental factors. *Offered through web-based instruction.*

HORT 4973*
Sustainable Landscape Management. Prerequisite(s): 1013 or LA 1013. The ecological principles and landscape resources supporting decision-making for sustainable landscape management. Retrofits of existing development for enhanced sustainability, including equipment selection, stormwater management, use of successional landscapes, permaculture, and organic methods. *Offered through web-based instruction.*

HORT 4990*
Horticultural Problems. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Problems related to pomology, olericulture, nursery production, landscape design, or the culture, sales and arrangement of flowers.

HORT 5000*
Research and Thesis. 1-6 credits, max 6. Research on thesis problems required of master's degree candidates.

HORT 5020*
Graduate Seminar. 1-2 credits. Prerequisite(s): Graduate standing. Proposal and results seminars for graduate programs.

HORT 5110*
Advanced Horticultural Problems. 1-12 credits, max 20. Selected research problems in horticulture, floriculture, landscape design; nursery production, olericulture and pomology.

HORT 5133*
Temperature Stress Physiology. Prerequisite(s): BIOC 3653, BOT 3463 or consent of instructor. Effects of heat, chilling and freezing stress on plants. Responses to temperature extremes at the molecular to whole plant levels with emphasis on mechanisms of injury and resistance.

HORT 5233*
Experimental Horticulture. Methods of conducting research with horticultural crops, including organization and plans, field plot techniques and analysis of data.

HORT 5412*
Mineral Nutrition in Horticultural Crops. Prerequisite(s): BOT 3463, SOIL 4234. Fertilizer use and plant response in horticultural crops.

HORT 5422*
Flowering and Fruiting in Horticultural Crops. Prerequisite(s): BOT 3463. Environmental, chemical and cultural factors affecting the flowering and fruiting of horticultural crops.

HORT 5433*
Postharvest Physiology. Prerequisite(s): BOT 3463 and 3460. Physiological causes for post-harvest changes in horticultural crops (ripening and senescence) and the basis for certain postharvest treatments (precooling at harvest, controlled atmosphere storage, refrigeration, and packaging techniques). Commodity-specific postharvest phenomena.

HORT 5443*
Basic Laboratory Experimentation. Lab 3. Principles and theory of safe laboratory practice and experimentation. Techniques for developing and optimizing plant sample acquisition, extraction and analysis protocols. Theory of operation and maintenance of common laboratory instrumentation (pH measurement, solid and liquid analytical measurement, temperature measurement, spectrophotometry, HPLC, GC). Laboratory provides hands-on experience for integrated protocol development and instrument use.

HORT 6000*
Research and Thesis. 1-12 credits, max 20 for crop science; max 24 for environmental science; max 30 for plant science. Research on thesis problems required of candidates for the PhD in crop science.

HOTEL AND RESTAURANT ADMINISTRATION (HRAD)

HRAD 1102
Introduction to Hotels, Restaurants, and Tourism in a Global Environment. Study of hotels, restaurants, tourism and the hospitality industry from a global perspective. Emphasizes development and history, ethical issues, and professional opportunities.

HRAD 1114
Introduction to Professional Food Preparation. Lab 3. Prerequisite(s): Restricted to HRAD, NSCI and HDFS (Family and Consumer Sciences Education option) majors. Theory and technique of food preparation using a science-based approach. Includes mis en place, recipe analysis, use and selection of equipment, quality controls, and plate presentation.

HRAD 2021
Food Safety and Sanitation. Prerequisite(s): Restricted to HRAD, NSCI, and HDFS (Family and Consumer Sciences Education option) majors. Principles and theory of food safety and sanitation focused on prevention of food borne illnesses, and ensuring public health and consumer safety.

HRAD 2152
Introduction to Hospitality Accounting. Prerequisite(s): MATH 1483 or 1513. Accounting principles, procedures and transactions used for the compilation of financial reports in hospitality businesses. Theory related to assets, liabilities, owners' equities, revenues and expenses and current hospitality accounting practices.

HRAD 2282
Hospitality Industry Financial Analysis. Prerequisite(s): 2152 or concurrent enrollment. Study of managerial accounting concepts and applications specific to the hospitality industry with an emphasis in analysis of financial reports, ratio analysis, CVP analysis, and operations budgeting.

HRAD 2533
Hospitality Information Technology. Prerequisite(s): Restricted to HRAD majors. Overview of computer systems utilized in the hospitality industry including POS and PMS, databases, file structure, and productivity software. The interaction between technology, oral and written communication at all levels of hospitality organizations.

HRAD 2643
Lodging Operations. Lab 2. Prerequisite(s): 2533, restricted to HRAD majors. The organization and administration of lodging operations including front desk operations, housekeeping, laundry, sales/marketing, management and other positions common to lodging operations. *Includes a laboratory experience in The Atherton Hotel at OSU.*

HRAD 2665
Food Production Management. Lab 5. Prerequisite(s): 1114, 2021, and 2533. Planning and preparation of various foods in food service settings with an emphasis on production systems, food safety and sanitation, quality management, and customer satisfaction.

HRAD 2771
Hospitality Speakers Series. Seminars presented by distinguished hospitality industry professionals. Current issues and implications for the future of the hospitality and service industries.

HRAD 3120
Special Events Management. 1-3 credits, max 12. Prerequisite(s): Restricted to HRAD majors, consent of instructor. Study of special event planning, implementation and evaluation. The interaction between the staff, customer, guests, contractors, and others necessary to implement a successful special event. Additional focus on catering through hotels, restaurants or private companies.

HRAD 3193
Hospitality Training Program Development. Prerequisite(s): 30 credit hours completed. Study of the design, delivery and evaluation of training programs for hospitality and tourism organizations. Needs assessment, performance objectives, instructional design, and a variety of presentation methods. Organizational and individual development.

HRAD 3213
Hospitality Management and Organizations. Prerequisite(s): 30 credit hours completed. Function and methods of management as related to the hospitality industry. Management principles, decision-making, organizations, interpersonal relationships, and production systems.

HRAD 3223
(I)International Travel and Tourism. The study of international travel and tourism for business and pleasure. The management of travel and tourism concepts in the hospitality industry and related businesses around the world. International travel industry financial management, technology, economic planning and policy formulation.

HRAD 3330
Pre-Professional Experience. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Supervised experience in an organization related to a future career in the hospitality industry. Human resource, customer service, management, or supervisory experience in multiple aspects of the unit.

HRAD 3344
Fine Dining and Theme Restaurant Management. Lab 4.5. Prerequisite(s): 3213 and 3575. Management applications to theme and fine dining restaurants; lab practice in Ranchers Club teaching restaurant.

HRAD 3353
Purchasing for Hospitality Organizations. Prerequisite(s): 30 credit hours completed. Procurement of food, supplies, and services utilized in hospitality organizations. Emphasis on food and nonfood materials, specifications, analysis and costing, and management of the purchasing process.

HRAD 3403
Lodging Services Management. The organization and management of guest services in lodging properties. Examination of the principles of concierge, bell staff, retail outlets and business services.

HRAD 3411
Hospitality Pre-internship Seminar. Preparation in written communication, resumes, interviews, securing an internship, professional behavior and ethics in the hospitality industry.

HRAD 3443
Hospitality Industry Internship. Prerequisite(s): 2643, 2665, 3411. Supervised experience in an approved work situation related to a future career in the hospitality industry. Management and supervisory experience in multiple aspects of a hospitality organization.

HRAD 3473
Mechanical Equipment and Facility Management. Prerequisite(s): 30 credit hours completed. Fundamentals of building mechanical systems, maintenance and facilities management. The theory and interaction of illumination electric wiring, plumbing, heating, ventilation, air conditioning systems. Principles of facility management in the hospitality industry related to coordination of the physical space with guest services.

HRAD 3543
Lodging Property Management. Prerequisite(s): 2643. The organization, duties, and administration of hotel support departments. The various jobs in lodging housekeeping, engineering, security, and convention and meeting services. Facilities management, purchasing, and furnishing, fixtures and equipment concepts.

HRAD 3573
Franchising and Quick Service Restaurant Management. Study of the history and transformation of hospitality industry chains. The organization of chains, fundamentals of franchising, sales and growth, evaluation of franchise financial performance, and unit ownership characteristics. Quick service restaurant organization, guest services, cost controls, sanitation, personnel management, purchasing, marketing, and time management.

HRAD 3575
Service Management in Hospitality Operations. Lab 4. Prerequisite(s): 2665. Development of service management skills for the hospitality industry, including leadership behavior, motivation; communication training, staffing and professionalism with an emphasis on food service.

HRAD 3623
Hospitality Cost Control. Prerequisite(s): 2282. Use of accounting information for management decision-making with specific emphasis on expense control, menu engineering, pricing, and labor efficiency in hotels and restaurants.

HRAD 3663
Hotel Food and Beverage Operations. Prerequisite(s): 30 credit hours completed. Examination of the products, production techniques, presentation, and service styles of hotel food and beverage operations. Planning, producing and marketing hotel food and beverage services.

HRAD 3721
Overview of Beverages in the Hospitality Industry. Prerequisite(s): Proof of minimum age 21. Overview of the international dimensions, history, classifications, production techniques, distribution, and quality factors of beverages such as wines, distilled spirits, beers, and non-alcoholic beverages used in the hospitality industry. Responsible alcohol beverage service and management techniques.

HRAD 3783
Hospitality Industry Human Resources Management. Prerequisite(s): 30 credit hours completed. Theories and practices used for personnel management in the hospitality and services industries. The organization of a human resources department, hiring, discipline, compensation, job analysis and performance evaluation.

HRAD 4090*
International Hospitality Studies. 1-18 credits, max 18. Prerequisite(s): 45 credit hours completed. Participation in a hospitality educational experience outside of the U.S. The international aspects of the hospitality industry especially in the country or countries included in the experience. Development of an understanding of local, regional and national customs and cultures through experiential learning.

HRAD 4103*
Hospitality Law and Ethics. Prerequisite(s): 30 credit hours completed. Examination of the laws regulating the hospitality industry. The interrelationships between law, the hospitality industry, and the public. Exploration of ethics, how legal principles apply in a global environment, and fundamental principles of tort and contract law.

HRAD 4120*
Special Events Management. 1-3 credits, max 6. Study of special event planning, implementation, and evaluation. The interaction between the staff, the customer, guests, contractors, and others necessary to implement a successful special event. Catering through hotels, restaurants or private companies.

HRAD 4163*
Hospitality Marketing. Prerequisite(s): 30 credit hours completed. Strategies for marketing and decision-making in the hospitality industry. Customer identification, consumer behavior, competition, and product, promotion, placement and pricing strategy.

HRAD 4213*
Hospitality Sales and Catering. Fundamentals of sales and catering including the sales department, publicity and advertisement, policies, and techniques used to sell the organization in all aspects of the hospitality industry. Includes planning for versatility, customer responsiveness, cost, timing, and follow up for events.

HRAD 4263
Beverage Management and Controls. Prerequisite(s): 3575 and proof of minimum age 21. Foundation in beverage service, operations and management. Strategies to manage beverage and bar operations, control systems and profitability, product selection and marketing, facility requirements and responsible alcohol service.

HRAD 4293*
Hospitality Small Business Development. Prerequisite(s): 3543, 3575, 3623 and 4163. The theories and procedures necessary to develop a small business in the hospitality industry. Financial analysis, feasibility study, pro-forma creation, building and site construction and brand selection.

HRAD 4333*
Hospitality and Tourism Financing. Prerequisite(s): 2282. The theory and practice of operational and strategic financial policy and problems in the hospitality industry. Financial information systems, fund allocation, asset management, financial structure and analysis of the financial environment.

HRAD 4343
Fine Dining and Theme Restaurant Professional Practicum. Prerequisite(s): 3344 and application process successfully completed. Restaurant production or service professional applying management theory to in-depth practice.

HRAD 4413*
Hospitality Information Systems. Prerequisite(s): 2533, 2643 and 2665. Conceptional analysis of hospitality technology systems such as food and beverage service, housekeeping, sales, property management, personnel, accounting, front office, and inter- and intra-departmental functions. The ethical implications of technology.

HRAD 4443*
Advanced Hospitality Management Internship. Prerequisite(s): 3443, 75 credit hours completed, consent of instructor. Management experience in multiple aspects of a hospitality organization. Exploration of human resources, development of an understanding of organizational behavior, conflict resolution, negotiating and communication techniques. Application of critical thinking skills to solve problems. The interaction between the customer and the products and services provided by the organization.

HRAD 4453*
Revenue Management in Hospitality Operations. Prerequisite(s): 3623 or concurrent enrollment. Focus on revenue management in hospitality organizations with specific emphasis on pricing and strategies, forecasting sales and trend analysis.

HRAD 4523*
Integrated Capstone Seminar. Prerequisite(s): 3543, 3575 and 3623. Integration of previous classroom, laboratory, and practical experiences through development of a comprehensive project. Additional focus on application of critical thinking, demonstration of leadership principles, interaction with industry professionals and development of an awareness of societal and ethical issues and their application to the hospitality and tourism industries.

HRAD 4561*
Hospitality Management Seminar. The issues having an impact on the hospitality industry. Exploration of the issues utilizing various strategies and a multi-disciplinary approach. Discussion and interpretation of multiple perspectives with an emphasis on critical thinking, strategic decision making, and the formulation of innovative solutions and processes to enhance the workplace.

HRAD 4573*
Non-commercial, Institutional and Contract Services in the Hospitality Industry. The organization and administration of non-commercial food and hospitality services. Business and industry, athletic venues, colleges and universities, prisons, schools, government services, hospitals, healthcare, assisted living, and other similar facilities. Additional emphasis on self operation and services provided by contract management companies. The principles associated with development of a request for proposals, analysis of proposals, services evaluation, contract liaison activities and communication.

HRAD 4643*
Applied Human Resources in Hospitality. Prerequisite(s): 3783 and concurrent enrollment in 3443 or permission of instructor. Directed learning for effective and legal employee management within hospitality industry operations utilizing strategies for recruiting, minimizing turnover and maximizing productivity and diversity. Also incorporates a Certificate in Human Resource Management and Supervision.

HRAD 4723
Beverage Education. Prerequisite(s): Proof of minimum age 21. Emphasis on the international dimensions of the history, classifications, production techniques, distribution, and quality factors of beverages such as wines, distilled spirits, beers, and non-alcoholic beverages. Emphasis on responsible alcohol beverage service and management techniques.

HRAD 4783*
Critical Issues In the Hospitality and Tourism Industry. Breadth of vision and broad perspective of contemporary issues in the management of hospitality and tourism industry organizations. Awareness of societal, economic, cultural, and international issues and their impact on hospitality and tourism organizations.

HRAD 4833*
Casino and Gaming Management. Prerequisite(s): 2152 and 2282. Focus on the management of casino and gaming operations including the history and trends of gaming, current issues, cultural influences and social consequences of casino, lottery and pari-mutual segments. Also theory and practice in the analysis of gaming operations in the areas of casino management, marketing, accounting/controls, security, human resources and law.

HRAD 4850*
Special Unit Course in Hotel and Restaurant Administration. 1-15 credits, max 15. Prerequisite(s): Consent of instructor. Special unit of study related to specific problems in the hospitality industry.

HRAD 4900
Honors Creative Component. 1-3 credits, max 3. Prerequisite(s): College of Human Environmental Sciences Honors Program participation, senior standing. Guided creative component for students completing requirements for College Honors in College of Human Environmental Sciences. Thesis, creative project or report under the direction of a faculty member in the major area, with second faculty reader and oral examination.

HRAD 4983*
Conference and Meeting Planning. Planning and implementing conferences, teleconferences, conventions, special events, seminars and symposia. Designing, promoting, managing and evaluating educational events, and contract management.

HRAD 5000*
Master's Thesis. 1-6 credits, max 6. Prerequisite(s): Graduate standing and consent of adviser. Individual research interests in hospitality administration fulfilling the requirements for the MS degree.

HRAD 5030*
Master's Creative Component and Independent Study. 1-3 credits, max 3. Prerequisite(s): Graduate standing and consent of instructor. Individual research and study having relevance to the hospitality field and a positive impact on the hospitality industry.

HRAD 5111*
Hospitality Graduate Studies and Research. Systematic introduction to the competencies of graduate education and research in hospitality and tourism education and administration.

HRAD 5213*
Hospitality and Tourism Management. In-depth study of hospitality and tourism management including theory, research, operations and practical experience. Emphasis on lodging operations systems, commercial food service systems, and tourism. Analysis and synthesis of a comprehensive management philosophy consistent with theory.

HRAD 5233*
Convention and Special Event Management. Meeting and event design, working with industry suppliers, on-site management, post-event analysis, computers and technology, and meetings documentation.

HRAD 5243*
Retailing and Franchising in the Hospitality Industry. Entrepreneurial perspective of growth and performance of commercial and noncommercial food service and health care organizations. Challenges relative to operations management, convenience stores, quick service operations, procurement, price analysis, communication, efficient customer response, capital and human resources, competition, governmental influence, and decision-making process.

HRAD 5253*
Critical Issues in Gaming. Focuses on current issues, advanced research and the theoretical constructs of the gaming industry and includes exploration of current issues, cultural influences and social consequences of casino, lottery, racing and pari-mutual segments. Students will also gain theoretical knowledge and learn to apply research skills in the analysis of gaming operations in the areas of casino management, marketing, accounting/controls, security, human resources and law.

HRAD 5313*
Hospitality and Tourism Information Technology. Conceptual analysis of the technology used in the hospitality industry. Investigation of technology applications, ethical implications of technology and system development practice.

HRAD 5323*
Hospitality Accounting and Finance. Understanding the role of the accounting and financial function in hospitality firms. Learn how to read hospitality financial statements, to use analytic concepts as managerial tools to examine the profitability of hospitality firms and to make superior capital investment decisions, and to become familiar with major financial instruments and concepts.

HRAD 5413*
Employee Development Issues in the Hospitality Industry. Recent theories and research in human resource management, employee development, and labor issues affecting the hospitality and tourism industry in maintaining a productive workforce.

HRAD 5423*
Hospitality Customer Development Strategies. Prerequisite(s): Undergraduate marketing course. The concepts and strategies of hospitality and tourism marketing and customer development.

HRAD 5513*
Contemporary Issues in Hospitality and Tourism. Analysis of major and current issues confronting the hospitality and tourism industry.

HRAD 5613*
Service Quality in Hospitality and Tourism Management. Study of contemporary management principles in the hospitality industry. Service improvement and customer satisfaction in the hospitality industry through the use of total quality management. How service industries such as hospitality can use business techniques such as continuous improvement, employee involvement, measurement and organizational change to improve unit operations.

HRAD 5813*
Research Methods in Hospitality and Tourism Administration. Prerequisite(s): REMS 5953 or STAT 5013. Scientific methods and current research methodologies as applied to problems in hospitality and tourism administration. Proposal planning, research design, statistical use and interpretation, and research reporting.

HRAD 5850*
Special Topics in the Hospitality Industry. 1-3 credits, max 9. Special topics related to the hospitality industry. A problem-solving technique to design the research model and investigative procedures. Presentations to faculty, students and industry professionals at specialized workshops with research, instructional and industry project components.

HRAD 5870*
Problems in the Hospitality Industry. 1-3 credits, max 9. Special recurring problems in the hospitality industry. Broad perspective of these issues and their application to the industry. Critical thinking skills to solve operational dilemmas.

HRAD 6000*
Doctoral Thesis. 1-12 credits, max 30. Prerequisite(s): Consent of major professor. Research in hospitality administration for the PhD degree.

HRAD 6113*
Hospitality and Tourism Education. Theoretical and practical components of hospitality and tourism education with emphasis on universities, community colleges and vocational schools.

HRAD 6213*
Advanced Hospitality Purchasing. Development of supply chain management systems for hospitality businesses. Management of hospitality procurement operations.

HRAD 6313*
Tourism Policy and Planning. Examination of current international and national tourism policies, planning and development perspectives and the economic impact.

HRAD 6413*
Leadership in a Diverse Society. Comparing and critiquing leadership and diversity research, theories and practices society. Development of models for future professional practice that integrate leadership an diversity principles.

HRAD 6513*
Hotel and Restaurant Planning and Development. Theories and practices related to the acquisition, development and investment in hospitality-oriented real estate. The undertaking of site analysis, feasibility studies and building construction. Acquisitions, financing alternatives and management contract options. Current trends in hotel investing.

HRAD 6613*
Advanced Research Methodology in Hospitality and Tourism. Advanced research methodologies in hospitality and tourism. Essential concepts in contemporary research, examination of multivariate data analysis techniques in hospitality and tourism research. Development of individual research projects.

HRAD 6680*
Seminar in Food Service Management. 1-3 credits, max 9. Examination of research, practice, and future trends in food service management issues from a strategic perspective.

HRAD 6780*
Seminar in Lodging Management. 1-3 credits, max 9. Examination of lodging management issues from a strategic perspective. Latest developments in research, practice, and future trends in the lodging industry.

HRAD 6880*
Seminar in Travel and Tourism Management. 1-3 credits, max 9. Study of the latest developments in travel and tourism research and management.

HUMAN DEVELOPMENT AND FAMILY SCIENCE (HDFS)

HDFS 1101
Relationships 101. An applied course designed to actively involved students in the exploration of topics which influence the development of positive relationships. Topics include gender differences, relationship principles, family of origin and personal needs. Application to personal and professional settings.

HDFS 1112
Introduction to Human Development and Family Science. Exploration of the philosophy of human development and family sciences grounded in a model of policy, education and practice. *Professional field experience required.*

HDFS 2113
(S)Lifespan Human Development. Study of human development within diverse family systems. Taught from a life span perspective.

HDFS 2114
(S)Lifespan Human Development: Honors. Prerequisite(s): Honors students only. Honors course critically examining the study of human development within diverse family systems. Taught from a lifespan perspective.

HDFS 2211
Early Field Experience in Primary Education. Lab 3. Prerequisite(s): 1112 and 2113. The initial pre-professional clinical experience in schools, grades 1 through 3. *Required for full admission to Professional Education.*

HDFS 2213
Human Sexuality and the Family. Sexual development emphasizing personal adjustment and interaction with family and culture.

HDFS 2223
Foundations in Early Childhood. Lab 3. Prerequisite(s): 1112 and 2113. Introduction to early childhood. Historical background of the profession and its future. Opportunities in early childhood as a professional. Developing an awareness of appropriate contexts for learning through realistic experiences in the early childhood classroom. Professional Education requirements introduced.

HDFS 2233
Development of Creative Expression, Play and Motor Skills in Early Childhood. Prerequisite(s): 2113 and one child development course. Consideration of appropriate experiences in the areas of play, art, music and motor skills for young children from birth through eight years of age with an emphasis upon such experiences as a curricular base in early educational group settings. Observation and participation experiences with young children.

HDFS 2243
Infant-Toddler Programming. Lab 3. Prerequisite(s): 2113, 3413. Program planning, implementation and evaluation of developmentally appropriate programs for infants and toddlers. Directed observation and participation in infant and toddler programs.

HDFS 2850
Special Unit Courses in HDFS. 1-6 credits, max 6. Various units taught by specialists in Human Development and Family Science.

HDFS 3001
HDFS Speaker Series Colloquium. Prerequisite(s): 1112, 2113. Seminars presented by distinguished professionals in the Human Development and Family Science field. Current issues and implications within the profession of HDFS are addressed.

HDFS 3013
(S)Early Adulthood. Prerequisite(s): 2113. Study of the unique characteristics of development during early adulthood. Theories of adult development with emphasis on application to program development and providing services for adults.

HDFS 3103
Social Development and Social Studies in Early Childhood. Prerequisite(s): Concurrent enrollment in 3201, 3213, and 3223; full admission to Professional Education. Application of theories of cognitive development to developmentally appropriate curriculum in social studies.

HDFS 3113
Non-normative Development. Prerequisite(s): 2113. The intersection of biological and environmental influences on atypical development across the life span in multiple contexts in early development. Assumes a basic knowledge of the cultural diversity in normative human development and the research methods employed in human development. Directed observation in non-normative settings.

HDFS 3123
(S)Parenting. Prerequisite(s): 2113 or other life-span development course. Examination of the fundamental issues and special topics in parent child relationships across the life span. Current theory and empirical research in multiple contexts of family, school and community.

HDFS 3201
Field Experience in Primary Education II. Prerequisite(s): Concurrent enrollment in 3203, 3213, and 3223; full admission to Professional Education. Supervised observation and participation in classrooms through third grade. *Concurrent course work in literacy, mathematics, social studies, and science.*

HDFS 3203
(I)Children's Play: A World Perspective. Prerequisite(s): 2113 or equivalent. An examination of children's play in contemporary international cultures. Play in children from birth through late childhood will be reviewed; social and cognitive outcomes will be analyzed as related to complex, modern world systems.

HDFS 3213
Literacy Development in Early Childhood Education. Prerequisite(s): Concurrent enrollment in 3224 and full admission to Professional Education. Theoretical and research based rationale for an integrated language arts and an interdisciplinary approach to literacy development as it addresses writing, reading and oral language for infants through age eight. Use of children's literature.

HDFS 3223
Mathematics and Science in Early Childhood. Prerequisite(s): Concurrent enrollment in 3201, 3203 and 3213 and full admission to Professional Education. Application of theories of cognitive development to developmentally appropriate curriculum in mathematics and physical and natural sciences.

HDFS 3233
Guidance and Discipline in Programs for Young Children. Prerequisite(s): Concurrent enrollment in 3243 and 3246, and full admission to Professional Education. Child-centered approach to the guidance and discipline of young children. Relevant theories, influential research and developmentally appropriate guidance techniques that facilitate the development of pro-social, cooperative and helping behaviors.

HDFS 3243
Preparation for Field Experience in Pre-kindergarten-Kindergarten Education. Prerequisite(s): Concurrent enrollment in 3233 and 3246, and full admission to Professional Education. Program planning, implementation and evaluation of developmentally appropriate programs for pre-kindergarten-kindergarten settings.

HDFS 3246
Internship in Early Childhood Education in Pre-kindergarten-Kindergarten. Prerequisite(s): Concurrent enrollment in 3233 and 3243, full admission to Professional Education. Supervised teaching experience in pre-school settings through kindergarten. *Graded on a pass-fail basis.*

HDFS 3413
(S)Infant and Child Development. Prerequisite(s): 2113. Examination of continuity and change in physical, cognitive/language, and socioemotional development from the prenatal period through early middle childhood (age nine). Diverse contexts, directed observation of infants and children.

HDFS 3423
(S)Adolescent Development in Family Contexts. Prerequisite(s): 2113. Development of the adolescent physically, socially, intellectually and emotionally with emphasis on the search for identity, sexuality, vocational choice and interpersonal relations. Observation of adolescents.

HDFS 3433
(S)Relationship Development and Marriage. Theory and research on the formation and development of interpersonal relationships from dating through courtship and marriage.

HDFS 3443
(S)Family Dynamics. Prerequisite(s): 2113. Applying family theories and current research to the examination of dynamics of diverse families across the life course and within the social context.

HDFS 3453
Management of Human Service Programs. Prerequisite(s): 1112, 2113, 3433, 3443. Designing and managing human service programs: planning, needs assessment, program hypothesis, developing human resources, budget management, monitoring and evaluation. Emphasis on accountability.

HDFS 3513
Introduction to Research Methods. Prerequisite(s): STAT 2013 or equivalent. Examination of fundamentals of scientific method as applied to research in human development and family sciences. Research design, sampling, and measurement. Analytical, evaluative, and interpretive skills needed to understand the professional research literature. Introduction to how computers are used in research.

HDFS 3523
Professional Skills in Human Services. Prerequisite(s): 1112, 2113, 3433. Development of professional skills for the human services. Intakes, interviewing, reporting, program marketing, case management, advocacy, facilitating change, community collaboration and using databases.

HDFS 3533
Observation and Assessment. Prerequisite(s): 2113. Examination of individual and family interaction through observation and assessment techniques in multiple contexts.

HDFS 4000
Senior Thesis. 1-6 credits, max 6. Prerequisite(s): 4743, STAT 2013, senior standing, consent of instructor. Supervised research for the bachelor's degree.

HDFS 4223
Field Experience Preparation in Primary. Prerequisite(s): Concurrent enrollment in 4226 and 4333, and full admission to Professional Education. Decision-making, priority-setting, self-assessment, classroom organization and management, selection of appropriate content, and teaching strategies in public schools and state accredited programs.

HDFS 4226
Internship in Early Childhood Education in Primary. Prerequisite(s): Concurrent enrollment in 4223 and 4333, and full admission to Professional Education. Supervised teaching experience in grades 1-3. *Graded on a pass-fail basis.*

HDFS 4333
Early Childhood Capstone. Prerequisite(s): Concurrent enrollment in 4223 and 4226 and full admission to Professional Education. Examination of the role of the early childhood professional in broader society contexts such as policy, advocacy, research and funding.

HDFS 4413
(S)Adulthood and Aging. Prerequisite(s): 2113. Study of the unique characteristics of development during the middle and later years of development. Emphasis on the aging process and the effects on the individual and family.

HDFS 4423
Family Risk and Resilience. Prerequisite(s): 3443. Examination of selected theoretical approaches; areas of family risk; protective factors; individual and family qualities relating to resilience; and prevention and intervention strategies.

HDFS 4433*
Family Life Education. Prerequisite(s): 2113, 3123, 3433, senior standing. Philosophy and principles of family life education. Planning, implementing, and evaluating family life programs in community and education settings. Field experience.

HDFS 4443
(S)Fatherhood: Developmental, Social and Historical Perspectives. Developmental, social and historical perspectives of fatherhood. Context and contemporary issues relating to fatherhood in the U.S., the contribution of involved fathering to men's adult development, the roles and responsibilities of fathers, skills for effective fathering, and father and child interaction in relation to both father and child adjustment and well being.

HDFS 4473
Policy, Law and Advocacy. Prerequisite(s): 3453 and 3513. The study of local, state, and federal legislations, regulations, social policies, and advocacy that affect children and families. Domestic relations, child welfare, health, education, social services, employment and housing.

HDFS 4521
HDFS Child and Family Services: Pre-internship. Prerequisite(s): 1112, 3523, 3533, senior standing, consent of advisor and instructor. Preparatory workshop for HDFS Child and Family Services internship. *Must be taken in the semester immediately prior to enrolling in HDFS 4525 internship.*

HDFS 4525
Internship in Child and Family Services. Prerequisite(s): 1112, 3523, 3533, 4521, senior standing, consent of adviser and instructor. Supervised field experience applying HDFS knowledge and skill base. Must complete application for internship. *Must have completed 4521 in the semester immediately prior to internship.*

HDFS 4533
Critical Issues in Human Development and Family Science. Prerequisite(s): 3453 and senior standing. An examination of the place of family relations and child development in the context of broader themes. An exploration of the students' specialization and its implications for an educated life.

HDFS 4543
(S)Family and Interpersonal Relationships in Adulthood. Prerequisite(s): 2113. Analysis of the aging process as it relates to relationships across the lifespan. Special emphasis on multigenerational family issues, peer relationships, and transitions associated with normative and non-normative life experiences.

HDFS 4673
Theories and Issues in Family Relationships. Prerequisite(s): 3753. Introduction to family theories. Current research and issues related to family dynamics, relationships, and crises within the context of the family system.

HDFS 4713
Families and Work. Addresses the implications of parents' employment for the family, the well-being of employed adults, and child/adolescent development. Human developmental, psychological, economic, and sociological theories and research on work-family issues are examined, with a particular focus on dual-earner families, low-income jobs and the working poor, and workplace and social policy relevant to work and family issues.

HDFS 4750
Special Problems in HDFS. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Various units of work related to specific issues in family relations and child development.

HDFS 4793
(S)The Family: A World Perspective. Family structure and interaction that transcend specific cultures or nationalities; examination of specific cultural and international family forms, their social issues and relevant services to meet their needs.

HDFS 4813
Dying, Death and Bereavement. Physical, psychological, emotional and social aspects to dying and death across the life course. Examination of human experiences with and responses to dying and death within various contexts such as family, medical and cultural.

HDFS 4823
Ethics and Aging. Interdisciplinary review of contemporary ethical issues within an aging population. Ethical challenges and opposing arguments from human development, psychological, social, economic, and legal perspectives will be analyzed and critically assessed relative to developing strategies related to prevention, intervention, and policy.

HDFS 4850
Special Unit Courses in Family Relations, Child Development and Early Childhood Education. 1-6 credits, max 6. Various units taught by specialists in the field. (Same course as 5470*)

HDFS 4900
Honors Creative Component. 1-3 credits, max 3. Prerequisite(s): College of Human Environmental Sciences Honors Program participation, senior standing. Guided creative component for students completing requirements for College Honors in College of Human Environmental Sciences. Thesis, creative project or report under the direction of a faculty member in the major area, with second faculty reader and oral examination.

HDFS 5000*
Master's Thesis. 1-6 credits, max 6. Research in FRCD for MS degree.

HDFS 5110*
Directed Study in HDFS. 1-9 credits, max 9. Prerequisite(s): 5253, 5293, 5513 or 5523 and consent of instructor. Directed individual study in human development and family science.

HDFS 5112*
Computer Applications in HDFS Research. Creating variable codebooks, data coding, data entry, variable specifications and data manipulation, merging files, and basic analysis using SPSS software. No computer experience necessary.

HDFS 5133*
Research Methods in Human Development and Family Science. Research processes, design, and methods in human development and family science. Application of research tools and methods to investigate theoretical, empirically-based, or field-based research issues in individual and relationship competence in diverse contexts. Development of a research proposal.

HDFS 5143*
Parent-Child Relations. Examination of theory and research related to parenting and the impact of parenting on the well-being of children, parents and the broader family system. Application of scholarship on parenting to parent education and child guidance.

HDFS 5153*
Policy in Human Development and Family Science. Critical analysis of approaches to and models of policy in Human Development and Family Science. Examination of policy analysis and evaluation, development, advocacy, and implementation of state and federal policy and legislation.

HDFS 5173*
Program Evaluation and Assessment in Human Development and Family Science. Principles and processes of program evaluation and assessment in Human Development and Family Science programs.

HDFS 5183*
Practicum in Developmental and Family Sciences Research. Prerequisite(s): Admission to graduate study in HDFS, nine hours of graduate credit in HDFS, and consent of instructor. Supervised research experiences in human development and family sciences.

HDFS 5190*
Teaching Practicum. 1-3 credits, max 3. Prerequisite(s): Six hours of graduate course work and consent of instructor. Teaching human development and family sciences; content and techniques.

HDFS 5203*
Family Systems. Research and theory related to family functioning throughout the life cycle, especially financial decision making during crisis and conflict. Factors that shape family values, attitudes and behaviors from a multicultural perspective. New and emerging issues critical to family functioning.

HDFS 5213*
Child Behavior and Development. Prerequisite(s): Consent of instructor. Current issues in child development beyond infancy explored within the context of recent research. Contrasting theoretical and methodological approaches critically evaluated.

HDFS 5223*
Theories of Child Behavior and Development. Prerequisite(s): Six credit hours at graduate level in child development or related areas. Major theories and supportive research that contribute to the understanding of child behavior and development.

HDFS 5243*
Infant Behavior and Development. Survey of research and theory pertaining to infant development, including behavioral genetics, perception, cognition and learning, social and emotional development, and assessment.

HDFS 5253*
Theory and Research: Social and Emotional Development. Research and theory pertaining to social and emotional development, including attachment and family context, social interaction, friendships and temperament. Incorporates applications to policy and practice.

HDFS 5263*
Theory and Research: Cognitive and Language Development. Research and theory pertaining to cognitive and language development including environmental influences and family influences, attention and memory, problem solving, and social cognition. Incorporates applications to policy and practice.

HDFS 5273*
Development Assessment. Prerequisite(s): Consent of instructor. Study and application of formal assessment tools across the life span. Supervised practice in administration, scoring, and interpretation of individual tests.

HDFS 5283*
Developmental Disabilities. Recent theories and research related to developmental disabilities, including both physical and mental handicapping conditions and their impact on human development.

HDFS 5290*
Practicum. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Supervised experience in various settings relevant to human development and family sciences.

HDFS 5293*
Developmental Contexts of Normative Behavior Problems. Examines the theory and research regarding biological, developmental and contextual factors associated with normative behavior problems. Contexts include families, neighborhoods, peers and schools. A lifespan perspective examining the origins and course of individual patterns of maladaptation, such as aggression, delinquency, social withdrawal, anxiety and depression. Addresses prevention of and intervention with normative adjustment difficulties.

HDFS 5323*
Observation in Early Childhood Education. Systematic observation of young children informs and transforms early childhood curriculum. Skills, attitudes and dispositions necessary to become an astute observer of children. In-depth reflection on student observations will demonstrate how observation informs teaching and learning.

HDFS 5333*
Theoretical Foundations in Early Childhood Curriculum. Implications of child development theory and research for planning educational programs and learning experiences appropriate for young children.

HDFS 5343*
Assessment Within Early Childhood Programs. Prerequisite(s): Consent of instructor. Examination of standardized and alternative assessment strategies for documenting children's learning and development within early childhood educational contexts. Exploration and critical review of strategies for evaluating early childhood classrooms.

HDFS 5353*
Diversity in Early Childhood. Exploration and critical review of the state of early childhood programming with emphasis on research, theory, and policy making that bear on current diversity and multicultural issues in practice.

HDFS 5363*
Learning Environments. Personal, empirical and theoretical foundation for curriculum development and program models for children through third grade emphasizing individual differences, equipment and materials, physical facilities and space, teacher roles and philosophical objectives.

HDFS 5373*
Early Childhood Administration. Examination of the administration, management, and supervision of programs for young children. Legal, social, and economic conditions affecting programs.

HDFS 5400*
Professional Seminar in Gerontology. 3 credits, max 3. An integrative experience for gerontology students designed to be taken near the end of the degree program. By applying knowledge gained in earlier course work, students strengthen skills in ethical decision-making and behavior, applying these skills in gerontology-related areas such as advocacy, professionalism, family and workplace issues. Students from a variety of professions bring their unique perspectives to bear on topics of common interest. *Web-based instruction.*

HDFS 5403*
Perspectives in Gerontology. An overview of current aging issues including current focus of gerontology theory and research; critical social and political issues in aging, the interdisciplinary focus of gerontology, current career opportunities, and aging in the future. *Web-based instruction.*

HDFS 5411*
Ethics and Aging. Analysis of ethical issues for the aging population. Critical examination of various ethical issues from legal, psychological, social, and financial perspectives. Enrollment requires attendance of the one-day, Oklahoma Ethics and Aging Conference.

HDFS 5413*
Adult Development and Aging. The biological, psychological and social factors associated with aging. *Web-based instruction.*

HDFS 5423*
Research Perspectives in Gerontology. Current research knowledge related to gerontology and the aging process. Critical study of classic and current research.

HDFS 5433*
Theories of Aging. Addresses the historical, contemporary and interdisciplinary basis of aging theory. Biological, psychological, sociological and human developmental conceptualizations of aging are critically assessed. Emphasis is placed on conceptual models, as well as theoretical development and application within gerontological research and the field of aging.

HDFS 5443*
Attachment in Later Life. Draws upon past and current knowledge research and theoretical conceptualizations of attachment in late and very late adulthood. Attachment is addressed as an individual, interpersonal, contextual and spiritual resource of late life development. In particular, emphasis is placed on adult attachment typology, attachment to place, caregiver attachment and spiritual attachment. Critical assessment of attachment concepts and theory, methodological and measurement concerns and associated developmental outcomes of well-being.

HDFS 5453*
Aging in the Medical Context. Orients students to the unique issues related to health and the health system for individuals in later life. A particular focus is placed on health programs, the role of medical personnel and tasks of family members as older persons face health issues and decisions.

HDFS 5470*
Developments and Innovations in Human Development, Family Science, and Early Childhood Education. 1-9 credits, max 9. Analysis of current developments and innovative practices in one or more of the specified areas. Emphasis upon evolving concepts with implications for programs serving societal needs in these areas.

HDFS 5493*
Aging and Families. Theories and research related to individual and family adjustments in later life affecting older persons and their intergenerational relationships. Critical issues include marriage, divorce and remarriage, adult children and their parents, grandparenting, and alternative family forms.

HDFS 5513*
Issues in Family Science. Current and classic literature in family studies. Consideration of philosophical bases and current research issues relevant to the family as a field of study.

HDFS 5523*
Family Theory. Theoretical frameworks and processes in family science. Overview of the interface between theory, research, and application in family science.

HDFS 5543*
Coping with Family Crises. Strategies for helping families deal with various family crises including illness, death and divorce. Focus on dealing with these from a family systems approach.

HDFS 5553*
Marital and Premarital Enrichment Education. Analysis of educational models and processes that relate to enriching couple relationships. Approaches to facilitating premarital and marital enrichment, emphasizing program development, implementation and evaluation.

HDFS 5563*
Management of Family and Community Service Programs. Functions of management applied to programs and services for children and families. Program planning, personnel decisions, resource development, marketing, community engagement, employee development, and evaluation.

HDFS 5573*
Adolescent in Family Context. Physical, social, emotional and intellectual development of adolescents within the context of family relationships. Exploration of research and theory as it relates to adolescent development and parent-adolescent relationships.

HDFS 5583*
Human Sexuality. Multiple aspects of human sexuality including physiological and psychosexual development and response, sexual relationships, and sexual dysfunction.

HDFS 5603*
Pre-practicum in Marriage and Family Therapy: Counseling Skills. Prerequisite(s): Admission to the marriage and family therapy specialization and consent of instructor. Pre-clinical experience for students in the marriage and family therapy (MFT) specialization, emphasizing counseling skills and structured observations.

HDFS 5612*
Pre-practicum in Marriage and Family Therapy: Group Processes. Prerequisite(s): Admission to marriage and family therapy specialization and consent of instructor. Pre-clinical experience for students in the marriage and family therapy specialization emphasizing group processes, designing and running therapy groups.

HDFS 5613*
Theoretical Models of Marriage and Family Therapy. An introduction to the historical context of marriage and family therapy. An overview of the major schools of marriage and family therapy and emerging models.

HDFS 5623*
Systems Theory and Applications to the Family. Examination of the cybernetic roots and terminology used with general systems theory providing an understanding, appreciation and integration of the role of "systems'' approaches to family theory and clinical practice.

HDFS 5633*
Couples Treatment in Marriage and Family Therapy. Prerequisite(s): Graduate standing or consent of instructor. Focus on assessment of couples and the systemic interventions available to address common couple issues. Pre-marriage, divorce and remarriage, sexuality, domestic violence, infidelity, and gender.

HDFS 5643*
Child and Adolescent Treatment in Marriage and Family Therapy. Prerequisite(s): Graduate standing or consent of instructor. An overview of the issues surrounding children and adolescents in marriage and family therapy including child abuse and neglect, drug abuse, oppositional behaviors, ADHD, and family structures and hierarchies. Assessment and treatment methods. Strategies for engaging families.

HDFS 5653*
Systemic Approaches to Psychopathology and Psychopharmacology. Prerequisite(s): Graduate standing or consent of instructor. Overview of major mental disorders and other conditions that maybe the focus of clinical mental health treatment. Treatment issues and an introduction to psychopharmacology.

HDFS 5663*
Professionalism and Ethics in Marriage and Family Therapy. Prerequisite(s): Graduate standing and consent of instructor. The development of the professional attitude and identity of a marriage and family therapist. The AAMFT Code of Ethics, family law, ethnicity, and gender issues, as related to the practice and profession of marriage and family therapy.

HDFS 5690*
Marriage and Family Therapy Practicum. 1-3 credits, max 18. Prerequisite(s): Admission to the marriage and family therapy program and consent of instructor. Supervised clinical experience for students in the marriage and family therapy specialization.

HDFS 5693*
Child Treatment Practicum in Marriage and Family Therapy. Prerequisite(s): Admission to the marriage and family therapy program and consent of instructor. Supervised clinical experience focusing on the treatment of children within a family context.

HDFS 5750*
Seminar in Human Development and Family Science. 1-9 credits, max 9. Current research in human development and family science. Critical study of classic and current research.

HDFS 5753*
Management of Volunteer Programs. This course is designed for education, health and human services professionals who have responsibility for involving volunteer personnel in achieving program goals. The course will include an overview of trends and issues in volunteering, management and leadership strategies for maximizing volunteer effectiveness, and strategies for evaluating volunteer service.

HDFS 5813*
Practicum in Child and Family Services. Prerequisite(s): Admission to graduate study in HDFS, 9 hours of graduate credit in HDFS, and consent of instructor. Supervised experiences in child and family service settings.

HDFS 6000*
Doctoral Thesis. 1-12 credits, max 30. Prerequisite(s): Consent of instructor. Research in human environmental sciences for the PhD degree under supervision of a graduate faculty member.

HDFS 6101*
Doctoral Seminar in Human Development and Family Science. Prerequisite(s): 5253, 5293, 5513, 5523 or equivalent and consent of instructor. Selected topics in human development and family science focusing on current research, theory or application.

HDFS 6110*
Doctoral Seminar in Human Development and Family Science. 1-9 credits, max 9. Prerequisite(s): 5253, 5293, 5513, 5523 or equivalent and consent of instructor. Doctoral level directed individual study in human development and family sciences.

HDFS 6123*
Advanced Research in Individual and Relationship Competence. Prerequisite(s): 5133 or equivalent, 5253 or 5293, and 5513 or 5523. Integration of current research and theory in human development and family science to address current issues in individual and relationship competence.

HDFS 6133*
Advanced Research Methods in Human Development and Family Science. Prerequisite(s): One course in research methods and one in statistics. Research design and analysis of data appropriate to the areas of human development and family science.

HDFS 6143*
Structural Equation Modeling for HDFS Applications. Prerequisite(s): 6133, REMS 6013 or equivalents. Introduction to structural equation modeling (SEM) with applications to longitudinal and grouped data typical of research in Human Development and Family Science. Includes elementary matrix algebra, measurement models (factor analysis), and latent path models, such as growth curve models. Applications using appropriate statistical software.

HDFS 6153*
Multilevel Modeling for HDFS Applications. Prerequisite(s): 6133 and REMS 6013 or equivalents. Introduction to advanced statistical methods for analyzing longitudinal and grouped data. Multilevel modeling is emphasized, with brief introductions to other advanced statistical procedures, such as survival analysis and developmental trajectory analysis. Models include occasions nested within persons and persons nested within groups. Applications using appropriate statistical software.

HDFS 6190*
Research Internship. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Special research studies under the supervision of a graduate faculty member.

HDFS 6223*
Advanced Human Development Theory. Prerequisite(s): 5253 or 5293. Critical analysis of selected child development theories using primary source material with demonstration of application to development, research and practice.

HDFS 6283*
Seminar in Human Development. Prerequisite(s): 5253. Selected topics in human development with special attention given to recent research literature and current theory.

HDFS 6363*
Theories and Research in Early Communication Development. Prerequisite(s): 5253, 5293 or consent of instructor. Recent theories and research in language communication development, including receptive and active language and the relationship of language to early social and cognitive development.

HDFS 6523*
Advanced Family Theory. Prerequisite(s): 5523. Family theory process, including logic, theory construction, and relating conceptual orientations to current research areas.

HDFS 6553*
Marital and Couple Relationships. In-depth analysis of historical and contemporary research on developmental and relational processes in marital and couple relationships. Emphasis on research and theory addressing the nature, dynamics and developmental course of committed couple relationships.

HDFS 6583*
Seminar in Family Science. Prerequisite(s): 5513 or 5523 or consent of instructor. Current research and theory in selected topics in family science.

HDFS 6613*
Contemporary Issues in Marriage and Family Therapy. Prerequisite(s): Admission to marriage and family therapy specialization. Critical issues facing students in the marriage and family therapy (MFT) specialization, while taking advantage of the unique expertise of clinical faculty. Professional seminar on dialogue with participants taking an active role in the learning process.

HUMAN ENVIRONMENTAL SCIENCES (HES)

HES 1112
Human Environmental Sciences Freshman Experience. Experiences that effectively facilitate transition from high school to the College of HES at OSU. Introduction to the developmental advising process to ensure a successful adviser/advisee partnership. Career development through connections among the student's major curriculum, general education courses, career goals, and eventual careers. Analysis of case scenarios. *Required of all first semester freshmen in HES.*

HES 2111
Career Exploration in Human Environmental Sciences. Acquisition of career information critical to introduce students to the world of work. Career searches, processes for interviewing and acquiring careers.

HES 2210
Professional Field Experience in HES. 1-3 credits, max 3. Prerequisite(s): Consent of instructor and DHM or HDFS or HRAD or NSCI major and freshman or sophomore standing. Supervised field experience in professional setting related to HES field of study.

HES 2510
HES Freshman Research Seminar. 1-3 credits, max 6. Prerequisite(s): College of Human Environmental Sciences major; Admission to the Freshman Research Scholars program. Seminar for College of Human Environmental Sciences' freshmen participating in the Freshman Research Scholars Program. Includes exploration of what "research" means in a variety of settings and introduces basic research skills and processes.

HES 3002
Leadership and Collaboration in the Workplace. Prerequisite(s): Junior standing in a major in the College of Human Environmental Sciences. Exploration of personal and workplace leadership, conflict resolution, workplace diversity and ethics. Development of transferable skills and emotional intelligence. Generation of personal mission statements. Current leadership and collaboration strategies, issues and terminology.

HES 3080
International Experience. 1-18 credits, max 36. Prerequisite(s): Consent of associate dean. Participation in a formal or informal educational experience outside of the USA.

HES 3090
(I)Study Abroad. 1-18 credits, max 36. Prerequisite(s): Consent of the Office of the Study Abroad and associate dean of the College of Human Environmental Sciences. Participation in an OSU reciprocal exchange program.

HES 3112
Human Environmental Sciences First-Year Transfer Experience. Experiences that effectively facilitate transition from high school to the College of HES at OSU. Introduction to the developmental advising process to ensure a successful adviser/advisee partnership. Career development through connections among the student's major curriculum, general education courses, career goals, and eventual careers. Analysis of case scenarios. *Required of all first semester transfer students in HES.*

HES 3210
Internship in Human Environmental Sciences. 1-3 credits, max 3. Prerequisite(s): Consent of instructor and DHM or HDFS or HRAD or NSCI major and sophomore standing and HES 1112 or 3112. Supervised internship related to an HES field of study.

HES 4000
Honors Seminar in Human Environmental Sciences. 1-6 credits, max 6. Prerequisite(s): Junior standing and admission to the Honors Program. In-depth interdisciplinary seminar focused on a current national or international issue having an impact on quality of life. Exploration of the issue utilizing various strategies and national resources. Dialogue and debate from multiple perspectives with emphasis on verbal and written expression.

HES 5110*
Directed Studies in Human Environmental Sciences. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Directed individual study in Human Environmental Sciences.

HES 5240*
Master's Creative Component. 1-6 credits, max 6. Prerequisite(s): Consent of associate dean. An in-depth application of theoretical models and philosophies related to area of specialization.

HES 5253*
Family Economics. Issues related to the economics of families, household production, and human capital development; economics of crises public policy and family life cycle spending, saving and borrowing; special attention to the role of ethics in family economic issues. A theoretical and a research perspective used to illuminate the concepts in the course. *Web-based instruction.*

HES 5303*
Fundamentals of Family Financial Planning. The nature and functioning of financial systems, including currencies, markets, monetary and fiscal policy, and supply and demand for land, labor and capital. Focus on the impact of global financial interdependence on individuals and families in the U.S. Current and emerging issues, as well as current research and theory relative to financial systems. *Web-based instruction.*

HES 5353*
Financial Counseling for Family Financial Planning. Theory and research regarding the interactive process between client and practitioner, including communication techniques, motivation and esteem building, counseling environment, ethics, and data intake, verification, and analysis. Legal issues, compensation, technology to identify resources, information management, and current or emerging issues. *Web-based instruction.*

HES 5403*
Estate Planning for Families. Fundamentals of estate planning process, estate settlement, estate and gift taxes, property ownership and transfer, and powers of appointment. Tools and techniques in implementing effective estate plan, ethical considerations in providing estate planning services, new and emerging issues in the field. Experience with case studies in developing estate plans for varied family forms. *Web-based instruction.*

HES 5453*
Retirement Planning, Employee Benefits and the Family. Study of micro and macro considerations for retirement planning. Survey of various types of retirement plans, ethical considerations in providing retirement planning services, assessing and forecasting financial needs in retirement, and integration of retirement plans with government benefits. *Web-based instruction.*

HES 5533*
Economics of Aging and Public Policy. Policy development in the contest of the economic status of the elderly populations. Retirement planning and the retirement decision; Social Security and public transfer programs for the elderly; intrafamily transfers to or from the elderly; private pensions; financing medical care for the elderly; prospects and issues for the future. *Web-based instruction.*

HES 5543*
Environments and Aging. Special needs of older people and attributes of physical environments that support these needs including attention to the "meaning of and attachment to home." Application of knowledge to design and management of housing, institutional settings, neighborhoods and communities. Environment-person fit; aging-in-place, assisted living and long-term care; and therapeutic environments. *Web-based instruction.*

HES 5553*
Insurance Planning for Families. Study of risk management concepts, tools, and strategies for individuals and families, including life insurance; property and casualty insurance; liability insurance; accident, disability, health, and long-term care insurance; and government-subsidized programs. Current and emerging issues and ethical considerations. Relationships between investment options and employee/employer benefit plan choices. *Web-based instruction.*

HES 5603*
Investing for the Family's Future. Evaluation of investment markets for the household. Analysis of how families choose where to put their savings. Using the family's overall financial and economic goals to help make informed decisions about which investments to choose. *Web-based instruction.*

HES 5633*
Program Evaluation and Research Methods in Gerontology. Overview of program evaluation, research methods and grant writing in gerontology. Application of quantitative and qualitative methods in professional settings. *Web-based instruction.*

HES 5653*
Personal Income Tax for Family Financial Planning. Information on income tax practices and procedures including tax regulations, tax return preparation, tax audit processes, appeals process, preparation for an administrative or judicial forum, and ethical considerations of taxation. New, emerging issues related to taxation. Family and individual case studies practice in applying and analyzing tax information and recommending appropriate tax strategies. *Web-based instruction.*

HES 5703*
Professional Practices in Family Financial Planning. Challenges of managing financial planning practices, including business valuation, personnel, marketing, client services, ethics and technological applications. Relying on theoretical as well as applied approach, analysis of case studies that provide relevant, practical exposure to practice management issues, with strong emphasis on current research findings. *Web-based instruction.*

HES 5803*
Case Studies in Family Financial Planning. Prerequisite(s): 5303, 5403, 5453, 5553, 5603, 5653 or consent of adviser. Professional issues in financial planning, including ethical considerations, regulation and certification requirements, communication skills, and professional responsibility. Utilization of skills obtained in other courses and work experiences in the completion of personal finance case studies, the development of a targeted investment policy, and other related financial planning assignments. *Web-based instruction.*

HES 6993*
Graduate Seminar in Human Environmental Sciences. 1-3 credits, max 3. Prerequisite(s): Consent of instructor. Analysis of philosophy, critical issues, current developments and interrelationships among elements in human environmental sciences.

HUMAN RESOURCES AND ADULT EDUCATION (HRAE)

HRAE 4010*
Occupational and Adult Education Workshop. 1-3 credits, max 6. Professional workshops of various topics and lengths. Each workshop focused on a particular topic from such areas as the development, use and evaluation of instructional methods and materials.

HRAE 4023*
Training and Development in the Workplace. Introduction to the field of training and development. Definitions, history, roles and models. Connection between learning and performance in the workplace.

HRAE 5000*
Thesis or Report. 2-10 credits, max 10. Students studying for a master's degree may enroll in this course for a total of two credit hours if they write a report or six hours if they write a thesis. *Students working on a specialist's degree may earn a maximum of 10 hours credit.*

HRAE 5010*
Seminar. 1-3 credits, max 6. Graduate student seminars focusing on current and critical issues and common problems relevant to occupational and adult education.

HRAE 5223*
Organization and Administration of Adult Education. Organizational procedures and administrative practices for effective planning, implementation and management of adult and continuing education programs. Analyses of legislation, finances and community groups that influence and impact upon adult and continuing education programs.

HRAE 5233*
Needs Analysis. Techniques of conducting organizational analyses of human performance problems, including surveys, interviews, records analysis, group interaction, and task analysis.

HRAE 5340*
Special Problems. 1-6 credits, max 6. Directed independent study of special topics involving assigned readings, library research, field work or a combination of these.

HRAE 5433*
Instructional Design for Training. Design and development of training to address performance problems in organizations, business and industry. In-depth study of a systematic approach to training for performance.

HRAE 5533*
Human Resource Development. Introduction to training and development, including history and nature of the field, trainer roles, needs analysis, program development, evaluation, and techniques of conducting training.

HRAE 5633*
Technology Application in Human Resource Development. The practice, theory, and research related to human resource development applications for technology and background information on specific technology-related topics. Development of technology applications.

HRAE 5703*
Adult Learning in Diverse Settings. The study of adult learning in diverse geographic and cultural settings. Interaction with experts in the field and reflection upon their experiences after returning from travel.

HRAE 5720*
Workshop. 1-3 credits, max 10. Professional workshops of various topics and lengths. Each workshop designed to meet unique or special needs of individuals concerned with adult education and human resource development.

HRAE 5730*
Special Topics in Human Resource Development. 1-3 credits, max 6. The practice, theory and research related to a current topic in human resource development.

HRAE 5833*
Global Consulting. The consulting process, including contract, entry, diagnosis, response, disengagement, closure and ethical considerations. The competencies of successful consultants and trainers in the international environment, including cultural adaptations of self and of training materials.

HRAE 5880*
Internship. 3-6 credits, max 6. Supervised experience working in business, industry, human service or education settings.

HRAE 6000*
Doctoral Dissertation. 2-10 credits, max 15. Required of all candidates for the Doctor of Education degree in adult education and human resource development.

HRAE 6103*
Foundations of Lifelong Learning. The definitions, historical and philosophical development, and the scope and function of lifelong learning.

HRAE 6110*
Graduate Readings in Adult Education and Human Resource Development. 1-6 credits, max 6. Prerequisite(s): Consent of supervising professor. Supervised readings of significant literature not included in regularly scheduled courses.

HRAE 6203*
Managing Adult Education Research. Analysis and application of techniques necessary for managing research projects in diverse agencies with adult learners. Practice with computer-based programs. Data sets from adult education research projects.

HRAE 6213*
Lifelong Learning and Performance. Lifelong learning theory within the context of applications in formal and informal settings in the community as well as in the workplace. Synthesis of research findings on changes of cognitive performance due to aging and analysis of recent literature on participation in adult education and training.

HRAE 6223*
Current Research in Adult Education. Analysis of the major research trends in the field of adult education. Recent research studies in the field.

HRAE 6233*
Critical Issues in Adult Education. Exploration of current issues of concern to adult educators from diverse settings.

HRAE 6330*
Special Topics in Adult Education. 1-3 credits, max 9. Prerequisite(s): 5203, 5213. Analysis and critique of the application of adult learning principles and methods in one of the numerous diverse settings in which adult education is practiced.

HRAE 6340*
Independent Study in Human Resources and Adult Education. 1-3 credits, max 9. Directed independent study for doctoral students involved in a research-based project.

HRAE 6533*
Organization Development. Seminar examining the field of organization development. Emergence of the field, diagnosis, performance, change management, the client and the consultation.

HRAE 6633*
Advanced Human Resource Development. Prerequisite(s): 5533. Scholarly critique of organizations as adaptive systems and the role human resource development plays in organization, process and individual performance.

HRAE 6871*
Doctoral Seminar: Level 1. Orientation to doctoral program in HRAE. *May be taken prior to program application; required of all applicants.*

HRAE 6880*
Internship in Human Resources and Adult Education. 1-8 credits, max 8. Directed Field experiences related to the participant's area of concentration. Provides opportunities for an individual to put into practice and test ideas, theories and concepts learned in graduate study.

HRAE 6881*
Doctoral Seminar: Level 2. Preparation of the required tentative proposal for dissertation and the comprehensive doctoral examination. *Required for HRAE doctoral candidates.*

INDUSTRIAL ENGINEERING AND MANAGEMENT (IEM)

IEM 2903
Manufacturing and Service Systems and Tools I. Prerequisite(s): ENGR 1111; MATH 2144. Introduction to definition, design, operation, and improvement of systems that produce goods and services. Case studies featuring classical and contemporary issues in industrial engineering and management. Issues include system effectiveness and efficiency in meeting customer needs, demands and expectations. Introduction to computer-aided tools useful in documentation, analysis, and modeling within contemporary organizations.

IEM 3103
Introduction to Probabilistic Modeling. Prerequisite(s): MATH 2153. Introduction to concepts and models of randomness, which support industrial engineering and engineering management analyses and decision-making. Includes probability models, statistical models and distributions, Markov processes and Little's Law.

IEM 3303
Manufacturing Processes. Lab 3. Prerequisite(s): ENGR 1322 and ENSC 3313. Manufacturing processes used to transform new materials including metals and non-metals into finished goods. Traditional and nontraditional manufacturing processes. Introduction to CAD/CAM. Basic process selection. Metrology and measurement fundamentals.

IEM 3403
Collaborative Engineering Project Management. Prerequisite(s): 2903, 3703. Engineering management and group issues involved in project planning, implementation and topics addressed include project management methodologies and software; teamwork structures, processes, and collaborative technologies; process management, leadership and other team roles.

IEM 3503
Engineering Economic Analysis. Prerequisite(s): MATH 2153. Development and use of time value of money models. Bases for comparison of alternatives, including present worth, annual worth, rate of return and payout period methods. Decision-making among independent, dependent, capital-constrained and unequal-life projects. Replacement, breakeven and minimum cost analyses. Depreciation and depletion methods and their effect on corporate income taxes, leading to after-tax cash flow analysis. Introduction to financial reports.

IEM 3513
Economic Decision Analysis. Prerequisite(s): MATH 2123. Quantitative evaluation of investment alternatives for non-engineering majors. The role of interest in economic equivalence and in formulating economic comparisons based on present worth, annual equivalent, rate of return and payout criteria. Accounting, depreciation and income tax considerations. Benefit-cost and cost-effectiveness analysis. Cost estimation and allowance for variance in estimates. *Not available for credit in industrial engineering curriculum.*

IEM 3523
Engineering Cost Information and Control Systems. Prerequisite(s): MATH 2144. Introduction to basic accounting concepts and operating characteristics of accounting systems relevant to engineering analysis and decision making. Principles of financial and managerial accounting, activity based costing, taxes and depreciation. Emphasis on interpretation and use of accounting information for decision-making.

IEM 3703
Manufacturing and Service Systems and Tools II. Prerequisite(s): ENGR 1111, MATH 2144. Introduction to definition, design, operation, and improvement of systems that produce goods and services. Case studies featuring classical and contemporary issues in industrial engineering and management. Issues include system effectiveness and efficiency in meeting customer needs, demands and expectations. Introduction to computer-aided tools useful in documentation, analysis, and modeling within contemporary organizations.

IEM 3813
Work Design, Ergonomics, and Human Performance. Lab 3. Prerequisite(s): 3103. Evaluation and design of work systems and processes employing humans. Emphasis on simultaneously achieving high productivity and employee health, safety and satisfaction.

IEM 4010*
Industrial Engineering Projects. 1-3 credits, max 6. Prerequisite(s): Consent of school head. Special undergraduate projects and independent study in industrial engineering.

IEM 4013*
Linear Modeling. Prerequisite(s): 3103, MATH 3263. Fundamental methods, models, and computational techniques of linear programming, including transportation and related network models relevant to industrial engineering and engineering management. Practical applications of operations research from manufacturing, service, and government organizations.

IEM 4020
Undergraduate Engineering Practicum. 1-3 credits, max 4. Prerequisite(s): Consent of IEM adviser, admission to the Professional School of Industrial Engineering and Management and satisfactory completion of at least 12 hours of IEM 3000 or 4000 level courses. Professionally supervised experience in real life problem solving involving industrial projects for which the student assumes a degree of professional responsibility. Activities approved in advance by the instructor. May consist of full or part-time engineering experience, on-campus or in industry, or both, either individually or as a responsible group member. Periodic reports both oral and written required as specified by the adviser.

IEM 4103*
Introduction to Quality Control. Prerequisite(s): 3103. Performance excellence in a enterprise, including relationships between industrial engineering and quality control. Statistical quality control concepts to measure, monitor, diagnose, and improve performance at the enterprise level, the operational level, and the project level. Quantitative and qualitative quality tools to solve problems and capture opportunities for improvement.

IEM 4113*
Industrial Experimentation. Prerequisite(s): 3103. Analytical methods for the purpose of process improvement. Experimental designs including single, blocked and multiple factors. Introduction to fractional factorial designs, central composite designs, and Taguchi robust designs. Data collection , analysis, and interpretation, including graphical methods, confidence intervals, and hypothesis tests. Multiple linear regression analysis methods. Industrial applications.

IEM 4163
Service Systems and Processes. Prerequisite(s): 3103, 3503, 4613. Design and analysis of service systems and processes from the perspective of industrial engineering and engineering management. Application of basic industrial engineering principles and tools applied to service systems. Basics of service quality and productivity, including metrics, measurement and improvement.

IEM 4203*
Facilities and Material Handling System Design. Prerequisite(s): 3303, 3813, 4013, 4713. Design principles and analytical procedures for determining facility location and location of physical assets within a facility. Introduction to material-handling concepts, technologies and methods. Considerations include production processes, product volume, material flow and information flows.

IEM 4323*
Manufacturing Systems and Processes. Lab 3. Prerequisite(s): 3303, 4103. Presentation of advanced concepts and processes in manufacturing. Topics include engineering for product life cycles, automated manufacturing, computer-aided design and manufacturing, real-time quality control and associated sensing, introduction to manufacturing research.

IEM 4413*
Industrial Organization Management. Prerequisite(s): 2903, 3703. Issues, concepts, theories and insights of engineering management and applications emphasizing effective performance.

IEM 4613*
Production Planning and Control Systems. Prerequisite(s): 4013. Concepts of planning and control for production and control systems. Design of operation planning and control systems. Techniques used in demand forecasting, operations planning, inventory control, scheduling, and progress control.

IEM 4713*
Introduction to Systems Simulation Modeling. Lab 3. Prerequisite(s): 4013. Simulation of discrete-event systems, including problem formulation, translation to a computer model, and use of a model for problem solution as well as concepts of random variable selection and generation, model validation and statistical analysis of results.

IEM 4723*
Information Systems Design and Development. Prerequisite(s): 2903, 3703. Information systems development methodologies, modeling methods and software tools for the design and development of information systems. Different phases of system design and implementation. Data modeling using entity-relationship diagrams and process modeling using data flow diagrams, IDEF0 and IDEF3. Introduction to enterprise resource planning systems and their use within different enterprise functional units.

IEM 4733
Engineering Business Processes. Prerequisite(s): 4723. Business-related process fundamentals including functional units, strategy and performance measurement within and between manufacturing and/or service-related operations. Modern enterprise structures such as virtual enterprises and supply chains. Techniques for the design and engineering of intra and inter-enterprise processes; functional and process modeling, qualitative analysis, quantitative analysis, and automation technologies.

IEM 4823*
Industrial Ergonomics. Lab 3. Prerequisite(s): 3813. Characteristics of humans, equipment, and work environment examined using a systems approach. Job designs that concurrently emphasize multiple goals of productivity, safety and employee satisfaction, investigation of psychological, social, safety, reward, training and ergonomic parameters that affect work life of both employee and supervisor.

IEM 4913
Senior Design Projects. Lab 6. Prerequisite(s): 3403, 3503, consent of instructor; IEM majors only. Student teams work on professional-level engineering projects selected from a wide range of participating organizations. Projects are equivalent to those normally experienced by beginning professionals and require both oral and written reports. Normally taken during student's last semester of undergraduate work.

IEM 4931
Industrial Engineering and Management Seminar. Prerequisite(s): Senior standing. Designed to orient seniors to their professional work environment. Topics include placement procedures, resume construction, interviewing skills, professional dress, graduate school, professional societies and registration, personal management of time and money, and job-related expectations. Taught by senior faculty; utilizes outside speakers.

IEM 4953
Industrial Assessment and Improvement. Prerequisite(s): Senior standing and consent of instructor. Plant assessment and improvement-based concepts, strategies, and tools for manufacturing operations. Emphasis is on small to medium-sized manufacturing operations. Issues include energy, water, waste, quality, and productivity analysis across the organization from a systems perspective. Justification of improvement projects and measurement of results.

IEM 4990
Selected Topics in Industrial Engineering and Management. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Study of selected contemporary topics in industrial engineering and management, including operations research; quality; manufacturing systems; engineering management; enterprise systems and supply chains; facilities, energy, and environmental management.

IEM 5000*
Research and Thesis. 1-6 credits, max 6. Prerequisite(s): Approval of major adviser. Research and thesis for master's students.

IEM 5003*
Statistics and Research Methods. Prerequisite(s): 3103 or STAT 4033 or equivalent. Statistical and research methods used in various areas of industrial engineering, including problem definition, managing the research process statistical methods and analysis tools, survey vs. experimental research techniques.

IEM 5010*
Industrial Engineering Projects. 1-6 credits, max 6. Prerequisite(s): Consent of school head and approval of major adviser. Special graduate projects and independent study in industrial engineering.

IEM 5013*
Linear Modeling II. Prerequisite(s): 4013 or equivalent. Model formulation and modeling of linear optimization problems using linear programming and network optimization techniques. Product mix, blending, staffing and covering, and multi-period planning models. Formulation of network problems as linear programming models, including maximum flow, minimum cost and capacited flow networks.

IEM 5020*
Graduate Engineering Practicum. 1-3 credits, max 3. Prerequisite(s): Consent of IEM adviser and satisfactory completion of 12 hours of IEM 5000- or 6000-level courses. Professionally supervised experience in real-life problem solving involving projects for which the student assumes a degree of professional responsibility. Activities approved in advance by the instructor and must reflect graduate level analysis. May consist of full or part-time engineering experience, on-campus or in industry, or both, either individually or as a responsible group member. *Periodic reports, both oral and written, required as specified by the adviser.*

IEM 5023*
Optimization Applications. Prerequisite(s): Graduate standing. A survey of various methods of unconstrained and constrained linear and non-linear optimization. Applications of these methodologies using hand-worked examples and available software packages. *Intended for engineering and science students.* (Same course as CHE 5703, ECEN 5703 & MAE 5703)

IEM 5030*
Engineering Practice. 1-9 credits, max 12. Prerequisite(s): Approval of adviser. Professionally supervised experience in a real-life problem involving authentic projects for which the student assumes a degree of professional responsibility. Activities must be approved in advance by the student's adviser. May consist of full or part-time engineering experience, on-campus or in industry, or both, either individually or as a responsible group member. *Periodic reports, both oral and written, required as specified by the adviser.*

IEM 5033*
Linear Optimization. Prerequisite(s): 4013 or equivalent. Algorithms for linear optimization, including linear programming and network optimization. Simplex algorithm to solve deterministic linear optimization models considering maximization and minimization objectives. Degeneracy, alternative optima and no feasible solutions. Revised simplex procedures. Duality theory, economic interpretations, dual simplexing and complementary pivoting. Sensitivity analysis and parametric programming. Interior point methods. Minimum cost, maximum flow, Dijkstra and other network optimization algorithms.

IEM 5043*
Nonlinear Optimization. Prerequisite(s): 5033 or equivalent. Theoretical and practical aspects of nonlinear optimization, integer optimization, and dynamic programming. Development and application of nonlinear optimization techniques for unconstrained and constrained problems; sequential search, gradient, penalty and barrier, and projection methods. Development and application of integer and mixed integer techniques for unconstrained and constrained problems; branch and bound, and cutting methods.

IEM 5103*
Breakthrough Quality. Prerequisite(s): 4103 and 4113 or equivalents. Structured, systematic approach and advanced statistical and modeling tools to achieve breakthrough improvement across all areas of an enterprise. Rigorous application, integration, and betterment of strategies and tools for improving or redesigning products and processes such that performance gains are noticeably higher or quicker than those achieved under traditional incremental improvement approaches.

IEM 5113*
Strategic Quality Leadership. Prerequisite(s): STAT 4013 or equivalent and graduate standing. Quality-related strategies. Critical elements that differentiate high performing organizations from their competitors. Delivering value to customers. Quality leadership, strategic planning, customer value, learning organizations, knowledge management, quality systems and business results.

IEM 5123*
Service Quality. Prerequisite(s): STAT 4013 or equivalent. Theory and application of service quality, including characteristics of services (intangibility, heterogeneity, perishability and inseparability of production and consumption), dimensions of service quality, measurement methodologies for service quality and improvement methodologies for service quality. Certification and accreditation processes for service industries.

IEM 5133*
Stochastic Processes. Prerequisite(s): MATH 2233, MATH 3013, STAT 5123. Definition of stochastic processes, probability structure, mean and covariance function, the set of sample functions. Renewal processes, counting processes, Markov chains, birth and death processes, stationary processes and their spectral analyses. (Same course as STAT 5133 & MATH 5133)

IEM 5143*
Reliability and Maintainability. Prerequisite(s): STAT 4033 or equivalent. Probabilistic failure models of components and systems. Detailed study of reliability measures, and static and dynamic reliability models. Classical and Bayesian reliability testing for point and interval estimation of exponential and Weibull failures. Reliability optimization through allocation and redundancy. Fundamentals of maintainability.

IEM 5153*
Process Design and Integration. Prerequisite(s): STAT 4033 or equivalent. Process design, integration, control, and improvement within and between enterprises. Analytical and systems approaches to address physical and statistical characterization of inputs, transformations, and outputs. Modeling issues, including process mapping, cause and effect analysis, and impact projection. Purpose, linkages, value, leverage, measurement, creativity and leadership.

IEM 5163*
Service Systems and Processes. Prerequisite(s): 3103, 3503, 4613. Design and analysis of service systems and processes from the perspective of industrial engineering and engineering management. Application of basic industrial engineering principles and tools applied to service systems. Basics of service quality and productivity, including metrics, measurement, and improvement.

IEM 5203*
Advanced Facility Location and Layout and Material Handling Systems. Prerequisite(s): 3503, 4013, 4203. A continuation and expansion of topics covered in 4203 with an emphasis upon model development for predicting and evaluating the effectiveness of production and/or service systems. Advanced analytical and computer techniques.

IEM 5303*
Computer Integrated Manufacturing Systems Design for Higher Volume Products. Prerequisite(s): 4613, 3303 or equivalents. Principles and procedures related to the design, implementation, documentation, and control of manufacturing systems focusing on higher volume, lower product variety production systems. Introduction to product life cycle concepts and the application of computer-aided design and computer-aided manufacturing tools to systems characterized by dedicated production equipment and the need for absolute minimization of unit costs. Product and production system design, analysis, and operation for fixed automation. Operational philosophies and applicable systems concepts, especially those relating to line design, analysis, efficiency, and unit production cost reduction.

IEM 5313*
Computer Integrated Manufacturing Systems Design for Lower Volume Products. Prerequisite(s): 3303, 4613, 4723 or equivalents. Principles and procedures for design, implementation, documentation, and control of manufacturing systems focusing on lower volume, higher product variety production systems. Product life cycle concepts, concurrent engineering, and computer-aided design and manufacturing practices for systems characterized by frequent product, product mix or product volume changes. Product and production system design and analysis for flexible automation. Operational philosophies and applicable systems engineering concepts, especially those providing system flexibility and those regarding the critical role of information availability and exchange in rapidly changing environments.

IEM 5350*
Industrial Engineering Problems. 1-6 credits, max 6. Prerequisite(s): Approval of major adviser. A detailed investigation into one area of industrial engineering with a required written report.

IEM 5363*
Management of Cellular Manufacturing Systems. Prerequisite(s): Graduate standing and consent of instructor. Issues related to cellular manufacturing systems, including group technology, production control, cell formation and design, office cells, industrial relations, performance measurement, justification and implementation.

IEM 5413*
Managing the Engineering and Technical Function. Prerequisite(s): 4413 or equivalent industrial experience. Advanced study of the engineering and technical organization. Engineering and technical functions, management process, roles, and activities. Individual study of current technical management issues of student interest.

IEM 5503*
Financial and Advanced Capital Investment Analysis. Prerequisite(s): 3503, 4013, STAT 4033 or IEM 3103 or equivalent. An understanding of financial concepts and markets, and an advanced treatment of proper methods of capital project selection under risk and uncertainty. Decision making under capital rationing. Financial environment and valuing securities, representing cash flows, selecting investments, avoiding common pitfalls, evaluating timing consideration, depreciation and corporate taxation, replacement analysis, and incorporating risk and uncertainty.

IEM 5603*
Project Management. Prerequisite(s): 4413 or equivalent. A systems approach to planning, organizing, scheduling and controlling projects. The behavioral and quantitative aspects of project management. Importance of working with personnel as well as technology. Project management software utilized.

IEM 5613*
Integrated Manufacturing Control Systems. Prerequisite(s): 4613. Advanced treatment of planning and control philosophies and techniques for manufacturing and production systems. Approaches focusing on demand-driven control and achieving competitive advantage through manufacturing. Material requirements planning, capacity planning, shop floor control, master scheduling, production planning and demand management. Just-in-time and the theory of constraints.

IEM 5623*
Project Planning and Control Technologies. Prerequisite(s): Graduate standing and consent of instructor. Project planning and control technologies including time and cost resources required to accomplish projects related to manufacturing, service, and software development enterprises. Project planning and control software: purpose, methods of use, progress reporting, deviation correction, and implementation issues.

IEM 5633*
Advanced Production Control. Prerequisite(s): 4013, 4613. Advanced concepts and quantitative techniques used in production planning and control, including demand forecasting using regression, time series analysis, and Box-Jenkins models, mathematical programming approaches, to aggregate planning and disaggregation, static and dynamic scheduling of machines and cells, and independent demand inventory management. Deterministic and stochastic models and their relationship to Just-In-Time and Zero Inventory practices.

IEM 5703*
Discrete System Simulation. Discrete-event systems via computer simulation models. Model building and the design and analysis of simulation experiments for complex systems. Application to a variety of problem areas. Use of simulation languages and related software tools.

IEM 5713*
Statistical Topics in Simulation Modeling. Prerequisite(s): 4713 or 5703. Statistical analysis in simulation modeling of discrete-event systems. Modeling of input processes, random variate generation and analysis of simulation output. Methods applied to any discrete-event simulation.

IEM 5723*
Data, Process and Object Modeling. Prerequisite(s): Graduate standing or consent of instructor. Logical and physical models in the analysis, design and improvement of enterprise systems. Structured and object-oriented analysis and design techniques. Data modeling using entity-relationship diagrams and IDEF1x. Data normalization techniques. Process modeling using data flow diagrams, IDEF0, IDEF3, and Petri nets. Object modeling using the unified modeling language (UML).

IEM 5743*
Information Systems and Technology. Prerequisite(s): Graduate standing or consent of instructor. For current and potential engineering and technology managers. Knowledge of information systems and technology to lead the specification, selection, implementation, and integration of information technology in manufacturing and service organizations. Management issues involved in the use of information technology in organizations.

IEM 5753*
Manufacturing Enterprise Modeling. Prerequisite(s): 5723 or equivalent. Generic Enterprise Reference Architecture (GERAM). Review of data, process, and object modeling techniques. Overview of enterprise modeling tools, methods, and architectures including the CIMOSA method and architecture, IDEF modeling tools, SAP's event-driven process chain (EPC) model, Baan's Dynamic Enterprise Modeling (DEM) approach, and integrated enterprise modeling (IEM) using the object-oriented (OO) approach. Role and scope of methods and tools in enterprise analysis, design and improvement. Emerging modeling frameworks and techniques for next-generation enterprises.

IEM 5763*
Supply Chain Strategy. Prerequisite(s): 4613 and 5503 or equivalents. Supply chain strategy including the philosophical base of business practice and the analytical base of modeling. Supply chain strategy, including key objectives and financial considerations, supply chain dynamics, supply chain performance measurement, supply chain integration, characteristics of different supply chains and supply chain performance modeling.

IEM 5773*
Supply Chain Modeling. Prerequisite(s): 5763 and 5013 or 5033 and 4713 or 5703 or equivalents. Supply chain analysis using different approaches to the supply chain modeling, including the Supply Chain Council's SCOR (Supply Chain Operations Reference) model, optimization and simulation. Specialized software is used to develop each modeling approach.

IEM 5803*
Human Factors. Lab 3. Prerequisite(s): Graduate standing and consent of instructor. Human factors theories and concepts and their impact on job and organization design. Evaluation and analysis of human performance in the workplace. System redesign for improved human-machine interaction.

IEM 5813*
Performance Measurement Systems. Prerequisite(s): 3813, 4413 or equivalents. Strategies and methods to define, measure, and apply individual, group- and organizational-level performance metrics in a variety of service and production contexts. Implementation and effective use of metrics. Measurement's role in a management system, managerial decision styles and preferences, operational definitions of performance, processes for identifying and applying metrics, performance measurement tools and techniques, data collection, portrayal of quantitative and qualitative information, and the role of computer technology in measurement system application.

IEM 5823*
Performance Management and Improvement. Prerequisite(s): 3813 and 4413 or equivalents. Philosophies and approaches for managing and improving organizational-, group-, and individual-level performance. Historical roots, theoretical foundations, implementation and use, and demonstrated efficacy of these approaches in production and service contexts. Planning, leadership, employee involvement and teams, culture, technology, training, and measurement and reward.

IEM 5913*
Decision-making Models for Multi-objective Analysis. Prerequisite(s): 4013. Quantitative and qualitative aspects of multiple criteria decision making. Dynamics of the decision process are examined and the multi-objective nature of most managerial decision problems is illustrated. General concepts and solution methodologies of the multi-objective problem. Multi-objective linear programming, goal programming, and compromise programming. Attribute importance, risk measurement, and utility measurement.

IEM 5923*
Advanced Energy and Water Management. Prerequisite(s): 4953. Continuation of material covered in 4953 with an emphasis on modern management techniques. Cogeneration, energy management control systems, private purchases of gas, energy accounting. Significant case study or term paper required.

IEM 5943*
Hazardous Material and Waste. Prerequisite(s): 3503 or equivalent, CHEM 1414 or 1515 or equivalent. Management of hazardous materials and waste by the generator to reduce operating costs and protect employees. Emphasis on hazard communication program, reducing volume and toxicity, and management activities.

IEM 5953*
Industrial Assessment and Improvement. Prerequisite(s): Senior standing and consent of instructor. Plant assessment and improvement-based concepts, strategies, and tools for manufacturing operations. Small to medium-sized manufacturing operations. Energy, water, waste, quality, and productivity analysis across the organization from a systems perspective. Justification of improvement projects and measurement of results.

IEM 5990*
Special Topics in Industrial Engineering and Management. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Study of selected contemporary topics in industrial engineering and management including operations research; quality and reliability; manufacturing systems; engineering management; enterprise systems and supply chains; facilities, energy, and environmental management.

IEM 6000*
Research and Thesis. 1-15 credits, max 30. Prerequisite(s): Approval of major adviser and advisory committee. Independent research for PhD dissertation requirement under direction of a member of the Graduate Faculty.

IEM 6110*
Special Problems in Industrial Engineering. 1-6 credits, max 12. Prerequisite(s): Consent of school head and approval of major adviser. Special problems in industrial engineering and management under supervision of a member of the Graduate Faculty.

IEM 6123*
Queuing Systems: Theory and Manufacturing Applications. Prerequisite(s): 5003, STAT 4033, 5133 or consent of instructor. Review of probability, stochastic processes, and Markov chains. Single-server and multi-server exponential queuing models. Queuing models with Poisson arrivals and general service times. Product form queuing network models: open and closed network models, mean value analysis algorithms for closed models, and single class and multiclass models. Approximations for general single server queues and non-product form networks. Applications of queuing models in the performance analysis of transfer lines, automatic assembly systems, and flexible manufacturing systems.

IEM 6990*
Advanced Topics in Industrial Engineering and Management. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Study of advanced topics in industrial engineering and management including operations research, quality and reliability, manufacturing systems, engineering management, enterprise systems and supply chains, facilities, energy, and environmental management.

INTERNATIONAL STUDIES (INTL)

INTL 5000*
Thesis. 1-6 credits, max 6. Prerequisite(s): Graduate standing and consent of adviser. For students studying for a master's degree in international studies under the thesis option.

INTL 5010*
Contemporary Issues in International Studies. 1-6 credits, max 6. Prerequisite(s): Graduate standing. Study of contemporary international issues, including news reports, speeches from foreign dignitaries, political leaders and experts in selected international fields.

INTL 5100*
Research in International Studies. 3-6 credits, max 6. Prerequisite(s): Graduate standing. Individually supervised research on topic within the student's focus area for the International Studies Program.

INTL 5110*
International Studies Internship. 1-6 credits. Prerequisite(s): Graduate standing and consent of Director. Individually supervised internships in international career areas.

INTL 5213*
Seminar International Political Economy. Prerequisite(s): Graduate standing. Research on the mechanics and theories of interaction between economic and political phenomena. (Same course as POLS 5213*)

INTL 5223*
Culture, History and World Systems. Prerequisite(s): Graduate standing. Study of the impact and influence of culture and history on the development of contemporary world systems with future projections. (Same course as SOC 5223*)

INTL 5233*
Global Competitive Environment. Prerequisite(s): Graduate standing. Development of a global business strategy for the organization. Issues of highly diversified markets and business environments, global competition, financial markets, and complex organizational relationships. (Same course as MBA 5233*)

INTL 5243*
Globalization and Culture. Critical assessment of 20th century social scientific theories of development culminating in current theories of globalization. Exploration of capitalism's antecedents, origin, and proliferation. Evaluation of global inequality from a cross-culture perspective. Utility of anthropological theories of culture, ideology and hegemony in assessing local responses to globalization. *No credit for students with credit in ANTH 5243.*

JAPANESE (JAPN)

JAPN 1115
Elementary Japanese I. Pronunciation, conversation, grammar and reading.

JAPN 1225
Elementary Japanese II. Prerequisite(s): 1115 or equivalent. Reading, the writing system, culture, grammar, conversation.

JAPN 2113
(I)Intermediate Japanese I. Prerequisite(s): 1225 or equivalent proficiency. Oral and written practice of modern Japanese. A continuation of 1225.

JAPN 2223
(I)Intermediate Japanese II. Prerequisite(s): 2113 or equivalent proficiency. A continuation of 2113.

JAPN 3012
Advanced Japanese Conversation I. Prerequisite(s): 2223 or equivalent proficiency. Designed to increase facility and naturalness of delivery in dialogue. Development of general oral and aural proficiency.

JAPN 3112
Advanced Japanese Conversation II. Prerequisite(s): 3012 or equivalent proficiency. Designed to increase facility and naturalness of delivery in dialogue. Development of general oral and aural proficiency.

JAPN 3133
Readings in Japanese I. Prerequisite(s): 2223 or equivalent proficiency. Development of the student's competence in reading a wide variety of materials by contemporary Japanese writers.

JAPN 3333
Readings in Japanese II. Prerequisite(s): 3133. A continuation of 3133.

JOURNALISM AND BROADCASTING (JB)

JB 1143
(S)Media and Society. An overview of the characteristics of newspapers, magazines, photojournalism, radio, television, film, advertising, public relations and interactive media, emphasizing the media's impact and role in American society.

JB 2003
Mass Media Style and Structure. Lab 2. Prerequisite(s): ENGL 1213 or 1223 or 1413 with grade of "C" or better. JB majors only. Elementary writing and editing techniques in print, broadcasting and other media.

JB 2013
Principles of Advertising. Prerequisite(s): JB majors only. Process of advertising examined from the perspectives of art, business and communication. Introductory course for majors that surveys advertising and how it fits into society. Applications of integrated marketing communication, consumer behavior, segmentation and target marketing, advertising research, creative and media strategy, international advertising and local advertising.

JB 2183
Principles of Public Relations. Prerequisite(s): JB majors only. An introduction to the history, development and current practice of public relations as a process in building relationships between organizations and publics.

JB 2843
Sports and the Media. Prerequisite(s): JB Majors only. How the sports media work and an understanding of the history of sports journalism and sports and culture in America. Also examines sports literature, women in sports, sports media, sports and racial issues.

JB 3013
Advertising Media and Markets. Prerequisite(s): 2003 with "C" or better, 2013 with "C" or better, minimum grade of 70 on Language Exam. Introduction to the strategic use of media. Major principles of media planning and buying, audience measurement, media re-search, new media technology, and market segmentation. Television, radio, magazine, newspaper, outdoor and the Internet.

JB 3153
Fundamentals of Audio and Video Production. Lab 2. Prerequisite(s): 2003 with "C" or better, minimum grade of 70 on Language Exam. Theory and practice of basic audio and video production techniques leading to later applications in radio, television and multimedia production.

JB 3173
History of Mass Communication. Growth and development of mass communication systems in America, with emphasis upon the economic, social and political interaction of the media.

JB 3263
Reporting. Lab 2. Prerequisite(s): 2003 with "C" or better, minimum grade of 70 on Language Exam. Reporting and writing through enterprise techniques for news coverage.

JB 3283
Public Relations Communications Methods. Prerequisite(s): 2003 with "C" or better, 2183 with "C" or better, minimum grade of 70 on Language Exam. An analysis and application course focused on the communications methods and techniques used in the practice of public relations.

JB 3293
Visual Communication. Prerequisite(s): 2003 with "C" or better, minimum grade of 70 on Language Exam. Use of photographs, charts, graphs and other visual representations in the mass media; the language of pictures; theories of nonverbal communication visual aids in education and other information systems.

JB 3313
News Editing I. Lab 2. Prerequisite(s): 3263 with grade "C" or better, minimum grade of 70 on Language Exam. Copy editing, design and headline writing for newspapers and magazines.

JB 3383
Public Relations Management and Strategies. Prerequisite(s): 2003 with grade "C" or better, 2183 with "C" or better, minimum grade of 70 on Language Exam. The practice and techniques of public relations as a management function in business, industry, agriculture, government, education and other fields.

JB 3400
Advertising Internship. 1-3 credits, max 3. Prerequisite(s): 3603 or 3803 with grade of "C" or better; minimum grade of 70 on Language Exam; consent of instructor. Internship practice for qualified advertising students who wish creative communications experience beyond that available in the classroom.

JB 3500
News Editorial Internship. 1-3 credits, max 3. Prerequisite(s): 3263 with grade of "C" or better; minimum grade of 70 on Language Exam; consent of instructor. Internship practice for qualified news editorial students who wish creative communications experience beyond that available in the classroom.

JB 3553
Broadcast News Writing I. Lab 3. Prerequisite(s): 3153 with "C" or better or concurrent enrollment; 3263 with "C" or better; and minimum grade of 70 on Language Exam. Broadcast news writing and reporting techniques with emphasis on radio coverage. Familiarization with news values, news services, broadcast equipment. Lab work in news reporting and writing.

JB 3600
Public Relations Internship. 1-3 credits, max 3. Prerequisite(s): 2003 with grade of "C" or better; 2183 with grade of "C" or better; minimum grade of 70 on Language Exam; consent of instructor. Internship practice for qualified public relations students who wish creative communications experience beyond that available in the classroom.

JB 3603
Advertising Copywriting. Lab 2. Prerequisite(s): 2003 with "C" or better, 2013 with "C" or better, minimum grade of 70 on Language Exam. An examination of the language of advertising. In-depth skills development in commercial writing for print, broadcast, and direct mail.

JB 3623
Internet Communications. Lab 2. Prerequisite(s): 2003 with "C" or better, minimum grade of 70 on Language Exam. Theoretical and practical understanding of how the Internet is changing the way mass media and media-related organizations communicate with audiences.

JB 3753
Graphic Communication. Lab 2. Prerequisite(s): 2003 with "C" or better, minimum grade of 70 on Language Exam. Creative and practical aspects of typography, layout and design, and production of printed communication.

JB 3783
Sports Public Relations. Prerequisite(s): 2843 and 3283 with grade of "C" or better; minimum grade of 70 on Language Exam. Overview and introduction to the practice of Public Relations within the field of sports. Included is an exploration of the role practitioners play in the sports industry focusing on the role of media, promotion, publicity and other communication activities.

JB 3803
Advertising Layout and Design. Lab 2. Prerequisite(s): 2003 with grade of "C" or better; 2013 with grade of "C" or better; minimum grade of 70 on Language Exam. A comprehensive look at the design of print advertising, magazine, outdoor, direct mail, and others. Lab component offers hands-on instruction and skills development.

JB 3823
Photography I. Lab 2. Prerequisite(s): 2003 with a grade of "C" or better, minimum grade of 70 on Language Exam. Expression of visual communications through photography. Creating and producing photographs using digital equipment and understanding lenses, exposures, color and composition. Manipulation, color and tone correction of photography using photo-editing software. For students who want an elementary understanding of photography or to prepare for advanced work in photography or photojournalism.

JB 3853
Sports Writing. Lab 2. Prerequisite(s): 2843 and 3263 with grade of "C" or better, minimum grade of 70 on Language Exam. Hands-on experience stressing the basics of sports writing and reporting. Advances, game stories, sidebars, features and columns. A writing intensive lab class.

JB 3873
Audio Production. Lab 2. Prerequisite(s): 3153 with "C" or better, minimum grade of 70 on Language Exam. Theory and practice of communication using electronic media. Students prepare and present materials in a broadcasting situation.

JB 3900
Broadcast Internship. 1-3 credits, max 3. Prerequisite(s): 3153 with "C" or better, minimum grade of 70 on Language Exam, and consent of instructor. Preparation and participation in all phases of radio-television and cable through active internship program.

JB 3913
Video Production. Lab 3. Prerequisite(s): 3153 with "C" or better, minimum grade of 70 on Language Exam. Electronic field production and post-production techniques, including videography, lighting, special effects, audio, directing and creative producing. A major emphasis on nonlinear editing and taking projects from conception to completion.

JB 3943
Photojournalism. Lab 2. Prerequisite(s): 2003 with "C" or better, minimum grade of 70 on Language Exam. Theory and practice in the digital techniques of photojournalism. Intermediate concepts of lighting, composition, action and storytelling via digital photography. A basic understanding of photography and photo developing necessary. Must have access to 35mm single reflex or digital camera.

JB 4053
Performance in Electronic Sports Media. Lab 2. Prerequisite(s): 2843 and 3153 with grade of "C" or better, minimum grade of 70 on Language Exam; 3553 recommended. Theory and practice of electronic media sports coverage. Emphasis on the role, skills and practices of radio and television sports announcers and electronic sports media journalism.

JB 4123
Public Relations Crisis Communications. Prerequisite(s): 3263 with grade of "C" or better; 3283 with grade of "C" or better; minimum grade of 70 on Language Exam. The nature of organizational crises and the techniques for preparing crisis communications plans for various types of organizations.

JB 4163
Mass Communication Law. Prerequisite(s): 2003 with grade of "C" or better, minimum grade of 70 on Language Exam. Statutes and case decisions in print and broadcast law, including government regulation of broadcasting by the FCC and media relations with other regulatory agencies. *No credit for students with credit in MC 5163.* (Same course as MC 5163)

JB 4223
Media Sales and Marketing. Prerequisite(s): 2003 with grade of "C" or better, minimum grade of 70 on Language Exam. Sales development, pricing, promotion and other aspects of broadcast sales and sales management.

JB 4243
Programs and Audiences. Prerequisite(s): 2003 with grade "C" or better, minimum grade of 70 on Language Exam. Audience analysis, proper construction of programs for greatest appeal and use of appeals to attract the desired audience. Program types, rating systems, program selection and audience attention. Design and discussion of programs to reach specific audiences.

JB 4253
(I)International Mass Communication. Examination of the nature and flow of news and information within and among nations, states and societies from a theoretical vantage point grounded in region-specific realities. The political, economic, social, cultural and historical forces determining media practice in a global environment. *No credit for students with credit in MC 5253.* (Same course as MC 5253)

JB 4313
Public Affairs Reporting. Lab 2. Prerequisite(s): 3263 with grade "C" or better, minimum of 70 on Language Exam. Coverage of social problems, people and events in fields of government, business, science, sports and entertainment.

JB 4360
Special Problems in Journalism and Broadcasting. 1-3 credits, max 6. Prerequisite(s): Junior standing, a minimum of 3.00 GPA, or consent of instructor. Independent study and project development to fit the student's major or minor specialization.

JB 4383
Media Relations. Prerequisite(s): Senior standing, minimum graduation/retention grade point average of 2.5. Strategies for dealing with the news media. Students will gain hands-on experience in conducting media news conferences, pitching story ideas and preparing themselves and other for dealing with news media interviews. *Meets with MC 5383. No credit for students with credit in MC 5383.*

JB 4393
Computer-Assisted Journalism. Lab 2. Prerequisite(s): 3263 with grade "C" or better, minimum grade of 70 on Language Exam, STAT 2013 or 2023 or 2053. Access by news media and communication specialists to electronic sources of information primarily through the Internet. A skills course in understanding and applying ways to obtain and share information through computer access.

JB 4413
Advanced Reporting and Writing. Prerequisite(s): 4313 with grade "C" or better, minimum grade of 70 on Language Exam. Enhancement of writing style and reporting techniques; evaluation of sources and polling practices, and investigative coverage of newsmakers and events.

JB 4423
News Editing II. Lab 2. Prerequisite(s): 3313 with grade "C" or better, minimum grade of 70 on Language Exam. Advanced copy editing; ethics and legal considerations from an editor's viewpoint; design techniques for newspapers and magazines, including picture editing, introduction to type, makeup and design practices, and special pages.

JB 4433
Feature Writing for Newspapers and Magazines. Prerequisite(s): 15 credit hours of English or journalism. Newspaper features and special articles for general circulation magazines, business and trade journals; sources, materials, markets and other factors pertinent to nonfiction writing.

JB 4493
Advanced Public Relations Media. Lab 2. Prerequisite(s): 3263 with grade "C" or better, 3283 with grade "C" or better, minimum grade of 70 on Language Exam. An advanced application course in planning, researching, writing, editing and designing of materials used in public relations communications.

JB 4520
Specialized Public Relations Applications. 3 credits, max 6. Prerequisites: 3283 with grade "C" or better, minimum grade of 70 on Language Exam. Professional public relations at an advanced level. Public relations study of non-profit, corporate, agency, international and other specialized applications. Course content varies by semester. *No credit for students with credit in MC 5520.* (Same course as MC 5520)

JB 4530
Specialized Advertising Applications. 3 credits, max 6. Prerequisite(s): 3603 with a "C" or better, 3803 with a "C" or better, minimum grade of 70 on Language Exam. Professional advertising at an advanced level. Special topics courses in areas such as globalization, convergence and the digital realm or scene. Course content varies by semester. *Meets with MC 5530. No credit for students with credit in MC 5530.*

JB 4540
Specialized Broadcast Applications. 3 credits, max 6. Prerequisite(s): 3153 with a "C" or better, minimum grade of 70 on Language Exam. Professional broadcast journalism at an advanced level. Special topics in areas such as sports media production, announcing, performance; political, investigative and sports reporting; advanced audio production. Course content varies by semester. *Meets with MC 5540. No credit for students in MC 5540.*

JB 4553
Broadcast News Writing II. Lab 3. Prerequisite(s): 3553 with grade "C" or better, minimum grade of 70 on Language Exam. Advanced broadcast news writing with emphasis on techniques of feature and in-depth reporting for radio, television and cable television. Students work up to two full-time days per semester producing OSU cable news show and serve as writers and anchors.

JB 4560
Specialized News-Editorial Applications. 3 credits, max 6. Prerequisite(s): 3263 with a "C" or better, minimum grade of 70 on Language Exam. Professional news-editorial at an advanced level. Special topics in areas such as investigative, political, sports and business reporting; feature, column and editorial writing; advanced layout and design. Course content varies by semester. *Meets with MC 5560. No credit for students with credit in MC 5560.*

JB 4573
Broadcast Documentary. Lab 3. Prerequisite(s): 3553 with grade "C" or better, 3913 with grade "C" or better, minimum grade of 70 on Language Exam. Student-written and produced broadcast and cablecast mini-documentaries; analysis of selected programs.

JB 4603
Integrated Marketing Communications. Prerequisite(s): 2003 with grade "C" or better; 2013 with grade "C" or better or 2183 with grade "C" or better or MKTG 3213 with grade "C" or better; minimum grade of 70 on Language Exam. Planning and the value of coordinating the various promotional mix elements within a communication campaign to create maximum clarity and impact. Communication elements including advertising, public relations, direct marketing and sales promotion and examine strategies for combining and integrating them into an effective campaign. Theories, models and tools to make better promotional communication decisions. *No credit for students with credit in MC 5603.* (Same course as MC 5603)

JB 4623
Advertising Campaigns. Prerequisite(s): 3013, 3603 and 3803 with grade of "C" or better; minimum grade of 70 on Language Exam. Planning, preparation and presentation of comprehensive advertising and marketing campaigns for national or local clients. Student teams produce all aspects of the campaign, from conception to presentation. Satisfies capstone requirement for advertising majors.

JB 4653
Electronic Media Advertising. Lab 2. Prerequisite(s): 3603 with grade of "C" or better, minimum grade of 70 on Language Exam. A concentrated examination of how advertising is prepared for electronic media, including developing media technologies. Radio, television, web-based streaming and Internet and their unique contribution to advertising.

JB 4663
Professional Portfolio. Lab 2. Prerequisite(s): 2003 with grade of "C" or better, minimum grade of 70 on Language Exam, junior or senior standing. Course is designed to help students polish up and present their design and creative work in an integrated package coupled with personalized identity materials for professional interviews. Emphasis will be on applying advanced visual and graphic communication theories to present an attractive and persuasive portfolio of creative work. It is intended for students who have completed a significant amount of course work in their field and have printed communication samples that they have produced in classes, student media or internships. *Students enrolling in Professional Portfolio are assumed to have an intermediate level of experience with desktop design software packages.*

JB 4733
Responsibility in Mass Communications. Prerequisite(s): 2003 with "C" or better, minimum grade of 70 on Language Exam. Interaction between mass media and society with emphasis upon the communicator's ethics and responsibilities. *Meets with MC 5733. No credit for students with credit in MC 5733.*

JB 4753
Media and Elections. Prerequisite(s): 2003 with "C" or better, minimum grade of 70 on Language Exam. Examination of media's role in the political process with primary emphasis on print and broadcast journalism practices. *Meets with MC 5753. No credit for students with credit in MC 5753.*

JB 4773
Censorship. Prerequisite(s): 2003 with grade of "C" or better, minimum grade of 70 on Language Exam. A critical examination of historical and contemporary occurrences of censorship from legal, philosophical, political, religious and sociological perspectives. The course will explore the definition of censorship, the common elements found in all forms of censorship, the rationalizations and justifications for censorship, and the consequences and unintended results of censorship. *No credit for students with credit in MC 5773.* (Same course as MC 5773)

JB 4813
Sports Media Production. Lab 2. Prerequisite(s): 2843, 3553 and 3913 with grade of "C" or better, minimum grade 70 on Language Exam. Capstone course in sports broadcast production. Students will learn the pre-production and production requirements for a variety of broadcast sporting events with special emphasis on the theories of sport and implications of those theories on media production.

JB 4843
Public Relations Research and Campaigns. Prerequisite(s): 3263 with grade "C" or better, 3283 with grade "C" or better, minimum grade of 70 on Language Exam. Capstone course requiring public relations students to prepare a public relations campaign involving the public relations process; research, planning, communications and evaluation.

JB 4863
Media Management. Prerequisite(s): 2003 with grade "C" or better, minimum grade of 70 on Language Exam. Basic issues, theoretical concepts and operational procedures associated with managing newspapers, magazines, advertising, public relations, broadcast and cable companies and firms specializing in computer-mediated communications. *No credit for students with credit in MC 5863.* (Same course as MC 5863)

JB 4883
Sports in the Newsroom. Lab 2. Prerequisite(s): 3853 with a "C" or better and minimum grade of 70 on the Language Exam. Capstone course in print sports journalism. Emphasis on the role of sports and the sports media in American society, ethical considerations, how the sports media reflect our views on gender and race, the modern sports section in American newspapers and management techniques.

JB 4933
Advanced Sports Public Relations. Prerequisite(s): 3263 with "C" or better, 3783 with "C" or better, minimum grade of 70 on the Language Proficiency Exam. Capstone course providing a study of relevant issues practitioners face in today's sports industry. Covers the scope and effect of sports on society and culture.

JB 4953
Advanced Production Practices. Lab 3. Prerequisite(s): 3913 with grade "C" or better or 4553 with grade "C" or better, minimum grade of 70 on Language Exam. Advanced professional television production. Student produced and directed television programs, including "specials," for distribution on cable or other professional media.

JB 4960
Live Field Production. 3 credits, max 6. Prerequisite(s): 3153 with "C" or better, minimum grade of 70 on Language Exam or consent of instructor. Development of a live, in-the-field production from writing the program proposal to an actual broadcast, in a setting that closely mirrors a broadcast environment.

JB 4980
Advertising Competitions. 3 credits, max 6. Prerequisite(s): Consent of instructor. Research and construction of a comprehensive communications marketing campaign for the America Advertising Federation National Student Advertising Competition. Student team members must make application for admission.

JB 4993
Senior Honors Thesis. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis under the direction of a senior faculty member, with second faculty reader and oral examination. *Required for graduation with departmental honors in journalism and broadcasting.*

LANDSCAPE ARCHITECTURE (LA)

LA 1013
Introduction to Landscape Architecture and Landscape Contracting. An overview of the field of landscape architecture and landscape contracting with emphasis on the role of the landscape architect/ landscape contractor and the need for design and management of outdoor space and structures and the environment.

LA 2213
Landscape Architecture Graphics I. Lab 6. Recommended: 3 hours credit in freehand drawing or drafting. Drafting and illustration techniques for developing and presenting landscape concepts and designs in black and white media. Computer graphics applications, including illustration, typesetting, scanning and visualization techniques.

LA 2223
Landscape Architecture Graphics II. Lab 3. Prerequisite(s): 2213. The application of multimedia color presentation and delineation techniques to more complex plans, drawings and programs.

LA 2323
Computer-aided Design. Lab 2. Prerequisite(s): 1013, 2213. Introduction to computer operating systems. Principles of electronic drafting and visual communication techniques related to the landscape for two-dimensional and three-dimensional systems.

LA 2513
(D)Native American Symbolism in Landscape Design. Lab 3. Study of cultural diversity through Native American symbolism and application of these symbols as design elements relating to functional and aesthetic qualities in landscape design.

LA 3010
Internship in Landscape Architecture and Landscape Contracting. 1-7 credits, max 10. Prerequisite(s): 45 credit hours, consent of internship chairperson. Supervised work experience with approved public and private employers in landscape architecture, landscape contracting or related fields. *May not be substituted for other required courses.*

LA 3112
Landscape Architecture Seminar I. Prerequisite(s): 1013. Professional analysis of various aspects of the landscape architecture profession and designed works with guest speakers and in-state or regional field trips to completed works. *Required of fourth year students.*

LA 3314
Landscape Architectural Design I. Lab 8. Prerequisite(s): 1013, 2223 and 2323. Introduction to the principles of design, problem solving, site analysis, and the correlation of aesthetic concerns with functional solutions in small-scale landscape architecture design problems and computer-aided design applications.

LA 3324
Landscape Architectural Design II. Lab 8. Prerequisite(s): 3314. The design of small to medium scale areas with an emphasis on design process, site analysis and computer-aided design applications.

LA 3673
(H)History and Theory of Landscape Architecture. History and historic styles and approaches to landscape architectural design. Past and present landscape design theory.

LA 3682
Professional Practice and Office Procedure. Ethics, office practice and procedure. Contract documents and specifications relating to landscape architecture.

LA 3884
Landscape Architectural Construction I. Lab 4. Prerequisite(s): 2323, MCAG 2313. Review mechanical drafting and lettering techniques, understanding contours, principles of stormwater runoff, site grading and earthwork calculations, methods of managing stormwater runoff, erosion control, introduction to paving and drainage construction materials, specifications, cost estimating. Semester project covering grading, drainage, cut and fill, stormwater runoff, specifications, and cost estimating. Utilizing Auto CAD and other computer applications.

LA 3894
Landscape Architectural Construction II. Lab 4. Prerequisite(s): 2323, 3884. Advanced grading and drainage, horizontal and vertical roadway alignment, site layout and dimensioning, construction documents, site utilities, engineering properties of soils, introduction to paving and drainage construction materials, introduction to retaining wall design and site lighting. Semester project covering construction documents, site layout and dimensioning, grading and drainage, cut and fill, site utilities, retaining walls, site lighting and cost estimating utilizing Auto CAD and other computer applications.

LA 4034*
Landscape Planting Design. Lab 4. Prerequisite(s): 3324, HORT 2313 and 2413. Plants in the landscape as aesthetic and functional elements. Environmental enhancement by and for plants. Preparation of planting sketches, plans and specifications.

LA 4053
(I)International Experience in Landscape Architecture - Japan. Prerequisite(s): Consent of appropriate faculty member. Participation in a formal or informal educational experience related with landscape architecture in Japan.

LA 4063
(I)International Experience in Landscape Architecture - Peru. Prerequisite(s): Consent of appropriate faculty member. Participation in a formal or informal educational experience related with landscape architecture in Peru.

LA 4112
Landscape Architecture Seminar II. Prerequisite(s): 4514. Topics in landscape architecture and related fields, career exploration and job placement. Out-of-state field trips to completed landscape architecture projects. *Required of fifth year students.*

LA 4414*
Landscape Architectural Design III. Lab 8. Prerequisite(s): 3324, 3884. Medium scale site development projects with an emphasis on landforms, structures and computer-aided design applications. *Portfolio must be reviewed and approved in Design II for admittance to the professional phase of the program.*

LA 4424*
Landscape Architectural Design IV. Lab 8. Prerequisite(s): 4414, 4894. Medium-scale complex landscape architectural design projects with emphasis on arrangement and design of landscape elements as they relate to functional and aesthetic qualities. Integration of landscape construction detailing, drawings as part of design presentation, and computer-aided design applications.

LA 4433*
Land Use and Community Planning. Lab 3. Prerequisite(s): 3313. The inventory and analysis of natural and man-made landscape resources and their application to land use and community planning within the framework of a municipality's comprehensive plan and regulations.

LA 4514*
Landscape Architectural Design V. Lab 8. Prerequisite(s): 4424, 4894. The design of large-scale sites with an emphasis on mixed use developments and computer-aided design applications.

LA 4524*
Landscape Architectural Design VI. Lab 10. Prerequisite(s): 4514. A capstone course with a large scale development project in urban design, recreation or resource planning with computer-aided design applications, summarizing previous planning, design and construction course work.

LA 4573*
Recreation Planning. Lab 6. Prerequisite(s): Consent of instructor. Theory and methods for small and large scale area planning with emphasis on natural and cultural resources.

LA 4583*
Landscape Environmental Planning. Lab 6. Prerequisite(s): 3324. Development of landscape architectural projects in the context of conservation, preservation, urban, regional planning and other developmental design problems encountered by the landscape architect.

LA 4894*
Landscape Architectural Construction III. Lab 4. Prerequisite(s): 2323, 3324, 3884. A capstone course utilizing design techniques, computer skills, construction materials, methods and applications for the landscape industry. Detailed computerized construction drawings of pavement, fences, walls, wood structures, irrigation, and water features will be prepared. Comprehensive construction documents are required as a semester project utilizing computer drafting, design and calculation applications.

LA 4990*
Landscape Architecture Special Problems. 1-6 credits, max 12. Prerequisite(s): Consent of appropriate faculty member. Landscape architectural related problems.

LA 5110*
Advanced Special Problems. 1-12 credits, max 20. Prerequisite(s): Consent of appropriate faculty member. Specific landscape architectural problems.

LATIN (LATN)

LATN 1113
Elementary Latin I. The rudiments of beginning Latin: grammar, vocabulary and elementary readings.

LATN 1223
Elementary Latin II. Prerequisite(s): 1113 or equivalent proficiency. Continuation of 1113. Grammar, vocabulary and readings.

LATN 2113
Elementary Latin III. Prerequisite(s): 1223 or equivalent. A continuation of 1223. Grammar and readings of Latin authors.

LATN 2213
Intermediate Readings. Prerequisite(s): 2113 or equivalent proficiency. Readings from Virgil's Aeneid.

LATN 3330
Advanced Readings in Latin. 1-6 credits, max 9. Prerequisite(s): 2213. Prose authors, poetry, and medieval Latin.

LATN 4113
(H)Latin Literature in Translation. Readings of significant works from Latin literature in English translation, from the late Republic through the early Christian era. Readings and classes conducted in English.

LEGAL STUDIES IN BUSINESS (LSB)

LSB 1113
Law in Society. Forms and types of law and their evolution, including antitrust, ecology, consumerism and civil rights. Political, social and economic forces affecting legal developments. Legal needs of society and the probable future direction of the law.

LSB 3010
Special Topics in Legal Studies in Business. 1-3 credits, max 6. Prerequisite(s): 3213, prior consent of instructor. Analysis of a contemporary topic in business law. Changing social issues and trends in legal studies in business.

LSB 3213
Legal and Regulatory Environment of Business. Prerequisite(s): Junior standing. General concepts regarding the nature of the legal system, ethical issues in business decision making, dispute resolution processes, basic constitutional limitations on the power of government to regulate business activity, the nature of government regulation, fundamental principles of tort and contract law.

LSB 3323
Law of Commercial Transactions and Debtor-Creditor Relationships. Prerequisite(s): 3213. Concentrated study of law relating to certain commercial transactions and debtor/creditor relationships. Includes law of sales, negotiable instruments, secured transactions, suretyship and bankruptcy.

LSB 4413*
Law of Business Organizations. Prerequisite(s): 3213. General principles of law relating to the formation, operation and termination of various forms of business organizations. Includes a study of the law of agency, partnerships and corporations.

LSB 4423*
Employment Law. Prerequisite(s): 3213 or equivalent. Legal foundations of employment in the United States. Contemporary topics relating to the employment environment such as state legislative and judicial limitations on employment at will doctrine, federal legislation relating to equal employment opportunity and affirmative action, fair labor standards, safety in the work place and state workers compensation laws.

LSB 4523*
Law of Real Property. Prerequisite(s): 3213 or equivalent. Nature of real property and of the legal transactions relating thereto. Topics may include deeds and conveyancing, landlord-tenant relationships, mortgages, easements, oil and gas interests, types of estates, joint ownership, and legal descriptions.

LSB 4633
(I)Legal Aspects of International Business Transactions. Prerequisite(s): 3213 or equivalent. Legal aspects of operating a business entity engaged in international commerce. Topics may include: foreign business organizations, U.S. taxation of foreign investors, common clauses in transnational contracts, problems of technology transfer on the international market, anti-trust aspects of international business, and jurisdictional problems in resolving disputes.

LSB 5010*
Research and Independent Studies. 1-3 credits, max 10. A workshop arrangement or supervised independent study.

LSB 5163*
Legal Environment of Business. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Legal environment within which business must operate. Nature and source of law, the operation of the judicial system, the operation of administrative agencies, selected Constitutional provisions frequently involved in litigation of business problems, and selected substantive legal areas having a direct relationship with business operation and decision-making.

LSB 5203*
Foundations of Issue and Conflict Management. Provides professionals from all fields with the skills necessary to handle conflicts, solve disputes, influence decisions and develop positive interpersonal relationships. It provides an overview of the alternative dispute resolution processes by utilizing readings, research, discussion and role-playing exercises.

LSB 5213*
Mediation and Facilitation: Theories and Practice. Prerequisite(s): 5203. This course examines the theories, skills, and boundaries of the mediation and facilitation processes, and analyzes the role of the third party neutral in the intervention and resolution conflicts. Ethical, practical and legal constraints are also addressed.

LSB 5223*
Negotiation and Third-Party Dispute Resolution. This course is designed to improve students' personal effectiveness and increase their productivity by drawing on the latest research in the psychology of judgment combined with the art of negotiation and decision-making. Students learn to develop effective strategies and systematic approaches to negotiations and influence opportunities. (Same course as MGMT 5713)

LSB 5233*
Introduction to Arbitration and Litigation. Prerequisite(s): 5203. This course examines the elements and process of arbitration, situations, in which arbitration skills are required, including construction, securities, civil conflicts, labor disputes and commercial contracts. Topics include comparisons to litigation, the role of judicial review and the enforcement of arbitration awards.

LSB 5290*
Seminar in Negotiation and Alternative Dispute Resolution. 1-3 credits. Prerequisite(s): Consent of instructor. Individual investigations in the areas of issue and conflict management under the direct supervision of a faculty member.

LEISURE (LEIS)

LEIS 1232
Beginning Golf. Lab 2. Theory and practice of basic skills, rules, terminology and etiquette.

LEIS 1242
Beginning Tennis and Racquetball. Lab 2. Theory and practice of tennis and racquetball; basic skills, rules, terminology, and game strategy for singles and doubles play. *No credit for students with credit in 1252.*

LEIS 1252
Beginning Tennis. Lab 2. Theory and practice of basic skills, rules, terminology and game strategy for singles and doubles play. *No credit for students with credit in 1242.*

LEIS 1322
Bowling. Lab 2. Theory and practice of approaches, deliveries, releases and mechanical principles involved in aiming and follow through.

LEIS 1342
Physical Fitness. Lab 2. Theory and practice of aerobic and weight training activities with learning experiences designed to promote physical fitness.

LEIS 1352
Weight Training. Lab 2. Improvement of muscular strength and endurance in the major muscle groups of the body through progressive resistive exercise. Fundamental anatomy, physiology, mechanical principles, methods and techniques as applied to weight training programs.

LEIS 1362
Self Defense. Lab 2. Theory and practice of self defense; scientific principles of gravity and body control over opposing forces, and principles of contest judo.

LEIS 2112
Rock Climbing. Lab 2. Theory and practice in the basics of technical rock climbing, bouldering and spelunking.

LEIS 2122
Backpacking and Hiking. Lab 2. Theory and practice of outdoor skills and leadership techniques for executing and evaluating a wilderness activity.

LEIS 2322
Recreational Dance. Lab 2. Theory and practice of traditional social dances and a variety of "free style" dance forms.

LEIS 2403
Leisure and Society. The leisure phenomenon, the leisure services industry, and societal views of leisure in the United States. Exploration of personal and social views of leisure and how those views impact individuals, families and social groups.

LEIS 2413
Introduction to Leisure Services. The nature, scope and significance of leisure and recreation. Delivery systems for leisure services, major program areas and the interrelationship of special agencies and institutions serving the recreation needs of society.

LEIS 2433
Introduction to Therapeutic Recreation. Theory and application of therapeutic recreation with emphasis on types of illnesses and disabilities, delivery systems, programming and services.

LEIS 2443
(D,S)Contemporary Issues in Diversity. Exploration of the primary and secondary dimensions of diversity and their impact on society. Individual and institutional responses to cultural diversity.

LEIS 2463
Laboratory in Leisure Services. Lecture, discussion and experiential learning of recreation and leisure activities. Adapted activities, small and large group games, sports, arts and crafts, music, drama and cultural events. Utilization of areas and facilities for leisure activities and development of activities across the lifespan. *Fee required.*

LEIS 2473
Foundation of Leisure Service Leadership. Lab 2. Introduction to the principles and practical applications of group leadership techniques, problem solving, supervision and evaluation of personnel.

LEIS 3010
Leisure Services Workshop. 1-3 credits, max 6. Intensive training program on a specialized topic in leisure services.

LEIS 3212
Lifeguard Training. Lab 2. Theory and practice of water safety and rescue skills essential for lifeguards. May obtain American Red Cross Lifeguard Training Certification.

LEIS 3313
Camp Operations and Programming. Operations and programming for day and resident camps. Includes all camp settings and camper populations.

LEIS 3413
Therapeutic Recreation and Mental Illness/Developmental Disabilities. Prerequisite(s): 2433. The role of Therapeutic Recreation (TR) specialists in working with individuals diagnosed with mental illness and/or developmental disabilities. Topics include terminology, etiology, prognosis, assessment, and program development in TR.

LEIS 3423
Therapeutic Recreation in Geriatric Practices. Prerequisite(s): 2433. The role of Therapeutic Recreation (TR) specialists working with the geriatric population. Topics include terminology, etiology, prognosis, assessment, and program development in TR.

LEIS 3431
Leisure Services Practicum I. Lab 3. Prerequisite(s): 2413. Supervised practical experience with leadership responsibilities for planning, conducting and evaluating activities and programs. *Graded on a pass-fail basis.*

LEIS 3432
Leisure Services Practicum II. Lab 2. Supervised practical experience with leadership responsibilities for planning, conducting and evaluating activities and programs. *Graded on a pass-fail basis.*

LEIS 3433
Therapeutic Recreation and Physical Disabilities. Prerequisite(s): 2433. The role of Therapeutic Recreation (TR) specialists in the rehabilitation of individuals with physical disabilities. Topics include terminology, etiology, prognosis of specific problems, assessment, and program development in TR.

LEIS 3463
Program Design in Leisure Services. Prerequisite(s): MATH 1513, MATH 1483 or equivalent. Emphasis on organization, supervision, promotion and evaluation of programs.

LEIS 3480
Junior Internship. 3-6 credits, max 6. Prerequisite(s): 2413, 2473 and two courses in emphasis area of study (Therapeutic Recreation or Leisure Service Management). Supervised practical experience (minimum 200 to 400 contact hours based upon credit hours enrolled) with leadership responsibilities for planning, conducting and evaluating activities and programs. *Graded on a pass-fail basis.*

LEIS 3491
Pre-internship in Leisure Services. Preparation for internship in therapeutic recreation and leisure services management.

LEIS 4010
Directed Studies in Leisure. 1-3 credits, max 6. Prerequisite(s): Consent of instructor and program head. Supervised readings, research or study of trends and issues related to leisure studies.

LEIS 4213
Water Safety Instructorship. Lab 1. Methods of teaching swimming and aquatic safety with practical application of knowledge, principles and analysis of skills. May obtain American Red Cross Water Safety Instructor's Certification (WSI).

LEIS 4433
Evaluation of Leisure Services. Prerequisite(s): STAT 2013. Methods, techniques and application of the evaluation process related to a wide variety of leisure service functions: clientele, programs, personnel, facilities and organization.

LEIS 4453*
Outdoor Education. Development of a holistic approach to teaching and learning in the outdoors. Learning in, about, and for, the out-of-doors as a process for acquiring skills with which to enjoy outdoor pursuits.

LEIS 4463*
Areas and Facilities in Leisure Services. Prerequisite(s): 3463 or consent of instructor. Planning, design and development of areas and facilities in leisure service delivery systems.

LEIS 4473*
Recreation in the Natural Environment. Theory and practical application of outdoor recreation concepts with emphasis on philosophies, principles, policies, economics, trends and problems.

LEIS 4480
Internship in Therapeutic Recreation. 1-9 credits, max 9. Prerequisite(s): Last semester senior year with cumulative GPA of 2.5 and completion of 3480. LEIS 4481 and co-requisite of 4483. Supervised fieldwork experience in therapeutic recreation. *Graded on a pass-fail basis. Must be taken concurrently with 4483.*

LEIS 4481
Senior Seminar in Leisure Services. Prerequisite(s): Leisure major; completion of a minimum of 15 hours of Leisure Studies core courses. Culmination of course work in leisure studies. Examination of current issues, professional practices and personal philosophy of leisure.

LEIS 4483
Administrative Documentation in Internship for Therapeutic Recreation. Prerequisite(s): Last semester senior year with cumulative GPA of 2.5 and 3480. LEIS 4481 and co-requisite of 4480. Assignment based course that complements 4480 Internship in Therapeutic Recreation. *Must be taken concurrently with 4480.*

LEIS 4493
Administration of Leisure Services. Decision-making, problem solving, personnel policies, legal issues, fiscal policies and budget procedures related to the delivery of leisure services.

LEIS 4513*
Leisure Education. Prerequisite(s): 3463. Models of leisure education discussed and practiced in conjunction with enhancing student's ability with basic skills of leisure counseling to facilitate optimal leisure pursuits.

LEIS 4553*
Tourism in Recreation Settings. Theory and foundations of the philosophy, principles and practices that associate tourism with recreation agencies and settings.

LEIS 4563*
Entrepreneurial Leisure Services. Prerequisite(s): 3463 or consent of instructor. Introduction to the scope, characteristics and management aspects of the commercial recreation industry from an entrepreneurial perspective.

LEIS 4680
Internship in Leisure Services Management. 1-9 credits, max 9. Prerequisite(s): Last semester senior year with cumulative GPA of 2.5 and 500 verified experience hours. 4481 and co-requisite of 4683. Supervised fieldwork experience in Leisure Services Management. *Graded on a pass/fail basis. Must be taken concurrently with 4683.*

LEIS 4683*
Administrative Documentation in Internship for LSM. Prerequisite(s): Last semester senior year with cumulative GPA of 2.5 and 500 verified experience hours. 4481 and co-requisite of 4680. Assignment based course that complements 4680 Internship in Leisure Services Management. *Must be taken concurrently with 4680.*

LEIS 4933*
Advanced Methods in Therapeutic Recreation. Prerequisite(s): 3483 and consent of instructor. Theoretical and practical examination of contemporary implementation procedures used in therapeutic recreation practice.

LEIS 4943*
Grant Writing and Nonprofit Management. Methods and techniques used in grant writing as well as the establishment of a nonprofit agency.

LEIS 5000*
Master's Thesis. 1-6 credits, max 6. Prerequisite(s): Consent of major professor. Research in leisure studies for master's degree.

LEIS 5020*
Workshop in Leisure Studies. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Advanced instruction on specialized topic area in leisure studies.

LEIS 5023*
Legal Aspects of Health, Physical Education and Leisure Services. The application and interpretation of the law as it applies to teachers, coaches and administrators of health, physical education and leisure services programs.

LEIS 5030*
Field Problems in Leisure Studies. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Applied research within the practice of leisure studies.

LEIS 5403*
Interpretation in Leisure Services. Organization and administration of visitor centers and interpretive naturalist programs, philosophic approaches, and methods for interpreting the natural and cultural history of public parks and recreation areas.

LEIS 5413*
Organization and Administration of Leisure Services. Systematic approach to problem solving and decision-making for structure, personnel management, finance and program development for leisure service delivery systems.

LEIS 5423*
Supervision and Leadership in Leisure Services. Prerequisite(s): Graduate standing. Administrative supervision and leadership in leisure services delivery systems. An examination of theories and practice as it relates to human, programmatic, and facility resources.

LEIS 5433*
Current Issues in Leisure Services. Prerequisite(s): Admission to the leisure studies program. Current issues related to the leisure services profession. Investigation, discussion and analysis of contemporary issues.

LEIS 5443*
Social Foundations of Leisure Services. Prerequisite(s): Graduate standing. Social, psychological, philosophical and historical foundations of leisure. The impact of social forces on leisure throughout history.

LEIS 5453*
Social Psychology of Leisure. Inquiry into the understanding of human behaviors, thoughts and attitudes related to leisure, and the understanding of complex issues related to the social psychology of leisure.

LEIS 5463*
Issues in Therapeutic Recreation. Prerequisite(s): LEIS 2433 or professional experience in therapeutic recreation. Current issues in therapeutic recreation with emphasis on accreditation, certification, licensure, quality assurance and ethics.

LEIS 5473*
Leisure and Aging. Prerequisite(s): 2433 or consent of instructor. Overview of the leisure needs and services for older adults, with emphasis upon the delivery system and leisure interventions.

LEIS 5483*
Therapeutic Recreation for Persons with Physical Disabilities. Prerequisite(s): 3483 or consent of instructor. Role of therapeutic recreation in the treatment and rehabilitation of individuals with physical disabilities, with emphasis on terminology, prognosis, etiology of specific disabilities, program development and assessment.

LEIS 5493*
Therapeutic Recreation in Mental Health and Mental Retardation. Prerequisite(s): 3483 or consent of instructor. Role of therapeutic recreation in mental health with emphasis upon client prognosis and methodologies of treatment programs.

LEIS 6000*
Doctoral Dissertation. 1-25 credits, max 25. Required of all candidates for the Doctor of Philosophy degree. Credit is given upon completion of the dissertation.

LEIS 6010*
Independent Study in Leisure Studies. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Supervised readings, research or study of trends and issues related to leisure studies.

LEIS 6013*
Professional Issues in Leisure Studies. Prerequisite(s): Admission to the Graduate College. Introduction to higher education issues relevant to professional preparation in leisure studies curricula, including roles of the educator, curriculum development, implementation and management, instructional strategies and accreditation.

LEIS 6020*
Leisure Research Colloquium. 1-3 credits, max 6. Prerequisite(s): Doctoral standing. Exploration and presentation of selected topics and research in leisure studies.

LEIS 6023*
Special Topics in Leisure Studies. Prerequisite(s): Admission to the Graduate College. Special topics related to recreation, parks and leisure studies. Investigation, discussion and analysis of contemporary topics.

LEIS 6043*
Ethical Issues in Health, Leisure, and Human Performance. Prerequisite(s): Admission to the Graduate College. A survey of ethical issues with specific emphasis on health, leisure, and human performance in higher education.

LEIS 6453*
Leisure Behavior. The advanced study of leisure and human behavior. Research related to the understanding of how and why humans engage in leisure.

LEIS 6763*
Management in Health, Leisure, and Human Performance Settings. Prerequisite(s): Admission to the Graduate College. Essential elements of organizational structures, management issues, functions and styles in public, non-profit and private settings in health, leisure and human performance.

LIBRARY SCIENCE (LBSC)

LBSC 1011
Library and Internet Information Competencies. Introduction to the organization, retrieval and evaluation of information found in research libraries and on the Internet. Development of information-seeking competencies using both print resources and electronic databases.

LBSC 5013*
Library Media Center in the Schools. Effective utilization of the centralized school media center for the teaching-learning process.

LBSC 5113*
Selection of Print and Non-print Materials. Selection, evaluation and use of print and non-print materials including reference materials.

LBSC 5413*
Organization of Information. Basic principles of the organization of information in schools. Information and knowledge organization techniques that exist or are emerging and focuses on standards and tools that are used in educational environments.

LBSC 5613*
Library Networks and Databases. Introduction to the organization, retrieval and evaluation of information found in research libraries and on the Internet. Development of information-seeking competencies using both print resources and electronic databases.

LBSC 5823*
Administration of School Library Media and Technology Programs. Vision of, planning, organizing, policy making, staffing, budgeting, decision- making and evaluating a standards-based school library media or school technology program.

MANAGEMENT (MGMT)

MGMT 3013
Fundamentals of Management. Survey of management principles and techniques. Examines a variety of issues at individual, team and organizational levels and challenges faced by today's managers.

MGMT 3123
Managing Behavior and Organizations. Prerequisite(s): 3013. Focuses on the complexities of human behavior in organizational settings. Performance expectations and determinants at the individual, team and organizational levels are examined. *Priority enrollment is given to management majors.*

MGMT 3133
Developing Leadership Skills. Prerequisite(s): 3013. The study of personal, interpersonal and group factors relating to leadership performance. An integration of the theory and practice of leadership.

MGMT 3313
Human Resource Management. Prerequisite(s): 3013. Policies and practices used in personnel management. Focuses upon the functions of a human resource management department.

MGMT 3943
Sports Management. Prerequisite(s): 3013. Basic management skills necessary in the operation of sport organizations. The social, behavioral and managerial foundations of sport management, public relations, finance, economics, budgeting in the sport industry and managing a sports facility.

MGMT 4013
Current Topics in Management and Leadership. Prerequisite(s): 3013. Examination of selected topics representing the most current management and leadership theories and practices.

MGMT 4083*
Corporate and Social Responsibility. Prerequisite(s): 3013. Management of situations to minimize adverse consequences and serve an organization's best interests.

MGMT 4123*
Labor Management Relations. Prerequisite(s): 3013. Labor relations and collective bargaining. Negotiation and administration of labor agreements and employee relations in non-union organizations. Modes of impasse resolution.

MGMT 4133*
Compensation Administration. Prerequisite(s): 3313, STAT 2023. Introductory course. Fundamentals of compensation such as the legislative environment, compensation theories, job analysis, job evaluation, wage structures and indirect compensation programs.

MGMT 4143
Preventive Stress Management. Prerequisite(s): 3013. Management to promote eustress (positive stress) and prevent or resolve distress (negative stress) in organizations. Psychophysiology of the stress response and the individual and organizational costs of distress. The principles and methods of preventive stress management.

MGMT 4153
Managing Training and Development. Prerequisite(s): 3313. The role of training and development in organizational sustainability and competitiveness is examined. Topics include assessing training needs, developing and delivering training, evaluating training effectiveness, and career development. Students develop a training program and trainer skills.

MGMT 4213
(D)Managing Diversity in the Workplace. The American workforce is becoming increasingly more diverse. Successful leaders need to be able to interact with a wide-range of individuals. In this class, students will examine how managers build a successful organization by embracing diversity.

MGMT 4313
Organization for Action. Prerequisite(s): 3013. A behavioral approach to the study of inter-organizational processes and the implementation strategies of firms. Building on Strategic Management and Human Resource Management, from the behavioral science, the study of the cognitive, social, cultural, and political aspects of strategy implementation in simple and complex organizations.

MGMT 4413
Change Management. Prerequisite(s): 3013. Managing organizational change and redesign. The study of organizational change processes and the enhancement of performance through change management. Study of the body of knowledge and applications in this branch of organizational science.

MGMT 4533
Leadership Dynamics. Prerequisite(s): MGMT 3013. Contemporary business challenges require managerial leadership of the highest order. Students will learn about the latest developments in leadership theory and research. Students will also gain experience in putting into action the concepts learned in this class.

MGMT 4573
Managerial Decision Making. Prerequisite(s): 3013. The goal of this course is to help students become more effective decision-makers. It attempts to provide an understanding of decision-making at two levels - the individual and the group. It examines the mechanisms that underlie decision choices, preferences, and judgments, and through this examination, attempt to discover how to improve decision-making processes.

MGMT 4613
(I)International Management. Prerequisite(s): 3013 or 3123. Survey of the organization, planning and management of international operations of business firms. Exploration of major cultural, economic and political systems and their effects on the management function.

MGMT 4623*
Small Business Management. Prerequisite(s): 3013 or 3123. Starting and managing a small business.

MGMT 4650
Leadership Issues. 1-6 credits, max 9. Prerequisite(s): 3013. Examination of leadership issues. Specific topics vary from semester to semester.

MGMT 4693*
International Human Resource Management. Prerequisite(s): 3013 required, 3133 preferred and LSB 4423 recommended. A comparison of human resource management policies and practices in the United States with those of major U.S. trading partners. Major human resource functions such as planning, staffing, training, compensation, performance appraisal and labor relations. Human resource policies and practices of China, Japan, Mexico, Canada and other countries.

MGMT 4713*
Negotiation Essentials. Prerequisite(s): 3013. Fundamentals of effective negotiation and dispute resolution practices. Current theory, strategies and tactics. More effective negotiations and how to secure "win-win" solutions.

MGMT 4743
Advanced Sports Management. Prerequisite(s): 3943. This course builds on the material covered in MGMT 3943. More in-depth coverage is given to selected topics related to managing a sports entity.

MGMT 4813*
Staffing Organizations. Prerequisite(s): 3313. Theories and methods of recruiting and selecting employees. Job analysis, human resource planning, recruiting, employment laws, and staffing. Staffing methods such as interviews, references, application blanks, cognitive ability and personality tests and others. Development and critique of a selection plan and conduct of a behavioral interview.

MGMT 4850
Applied Leadership Studies. 1-6 credits, max 6. Prerequisite(s): 3013. Structured internship of field project with supporting academic study.

MGMT 4883
(I)Multiple Perspectives in Global Management. Prerequisite(s): 3013 or 3123. View of how multinational corporations and cross-border business transactions have an impact on countries, cultures, employees, and ecological systems.

MGMT 5113*
Management and Organization Theory. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Contemporary theories of organization. Structure and dynamics of organizational goals and environments.

MGMT 5123*
Contemporary Management Topics. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Examination of selected topics representing the most current management theories and practices.

MGMT 5213*
Seminar in Organizational Behavior. Prerequisite(s): Admission to MBA program or consent of MBA director. Current research on group behavior in organizations. Group processes and structural factors affecting the interaction process and intra- and intergroup performance characteristics. Laboratory simulation and team research projects used to pursue advanced topics.

MGMT 5223*
Seminar in Human Resource Management. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Principles, theories and methods of human resource management applied to various types of organizations. Human resource functions of planning, staffing, training and development, performance management, compensation and benefits, safety and health, and labor relations.

MGMT 5313*
Project Management. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. The processes and techniques of managing projects in today's business world. The processes of idea generation, needs analysis, implementation, evaluation, and learning. The techniques of team building and conflict resolution in project management.

MGMT 5323*
Teams in Organizations. Prerequisite(s): 5113, admission to MBA program or consent of MBA director. The different ways in which organizations use teams. Many aspects of team development and the skills needed to effectively work in a team environment.

MGMT 5443*
Building the Effective Organization. Prerequisite(s): 5113, 5513 (concurrent enrollment). The steps involved in building a small to mid-sized business into a well-run organization.

MGMT 5453*
Technology Commercialization. Prerequisite(s): Admission to MBA program or consent of MBA director. The steps involved in evaluating and commercializing new technologies. The necessary steps in moving from prototype to product.

MGMT 5533*
Leadership Challenges. Prerequisite(s): 5113, admission to MBA program or consent of MBA director. Contemporary leadership practices. Leadership as a behavior, not as a position. The challenges of leadership, regardless of position.

MGMT 5553*
Management of Technology and Innovation. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Business applications of research, practice, and theory in the management of technology and innovation. To improve the effectiveness by which technologies are developed, implemented, and institutionalized. Emphasizes both management with advanced technologies and strategic management of technology.

MGMT 5563*
Crisis in Organizations. Prerequisite(s): 5113, admission to MBA program or consent of the MBA director. Management and leadership in the face of crisis, from the smallest mom and pop store to the largest multinational corporation.

MGMT 5613*
Business Opportunity Identification and Analysis. Prerequisite(s): Admission to MBA program or consent of MBA director. The techniques required for locating business opportunities, assessing their feasibility, and evaluating their potential returns.

MGMT 5713*
Negotiation and Third-Party Dispute Resolution. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. This course is designed to improve students' personal effectiveness and increase their productivity by drawing on the latest research in the psychology of judgment combined with the art of negotiation and decision-making. Students learn to develop effective strategies and systematic approaches to negotiations and influence opportunities.

MGMT 5743*
International Negotiations. Prerequisite(s): Admission to MBA program or consent of MBA director. Improvement of negotiation skills and learn how cultural and national issues affect negotiations.

MGMT 6313*
Advanced Organizational Behavior. Prerequisite(s): Doctoral student standing and consent of instructor. Theory and research focusing on individual and group behavior in organizations. Both classic and contemporary topics in organizational behavior, including work attitudes, motivation, job design, leadership, group processes, power and politics, and individual differences.

MGMT 6323*
Advanced Strategic Management. Prerequisite(s): Doctoral student standing and consent of instructor. Research concerning the content of organizational strategy and the process through which it is formulated and implemented.

MGMT 6333*
Meso Organization Studies. Prerequisite(s): Doctoral student standing and consent of instructor. Integration of macro- and micro-level concepts and topics across individual, group and organizational levels of analysis. Work and organization design, teams and groups, decision-making, and conflict management.

MGMT 6343*
Contemporary Research in Management I. Prerequisite(s): Doctoral student standing and consent of instructor. Introduction to the research process in management and building a career as a management scholar.

MGMT 6353*
Advanced Methods in Management Research. Prerequisite(s): Doctoral student standing and consent of instructor. Course examines issues in theory building and development, strategies for collecting behavioral research. At conclusion of course, student should be able to: develop research questions, develop appropriate measures for constructs to be tested, and design research study using various methodologies.

MGMT 6443*
Contemporary Research in Management II. Prerequisite(s): Doctoral student standing and consent of instructor. Specialized contemporary topics in management for doctoral students.

MGMT 6553*
Structural Equation Modeling Applications in Business. Prerequisite(s): Doctoral student standing and consent of instructor. Conceptual and statistical underpinnings of structural equation modeling and application to organizational and business research including measurement development and model testing. Recent advances in this technique. Hands-on experience with structural equation modeling software.

MANAGEMENT SCIENCE AND INFORMATION SYSTEMS (MSIS)

MSIS 2103
Business Computer Concepts and Applications. Lab 2. Concepts for the design, operation, and use of computer information systems in organizations, including fundamentals of key information technologies, information assurance, and the use of personal computing applications to support problem-solving. Lab-based computer training in fundamental productivity software and Internet tools.

MSIS 2203
Computer Programming for Business. Prerequisite(s): 2103 or equivalent. Computer programming for organizations from the perspective of integrating the Internet into business information systems. Fundamental principles and constructs of programming and applied programming in the business environment.

MSIS 3023
(D)Technology, Diversity and Entrepreneurship. Prerequisite(s): 2103 or consent of instructor. A study of technology, diversity and entrepreneurship. The use of technology as a research tool to study diversity and the opportunities available to diverse groups through entrepreneurship.

MSIS 3033
Information Systems Project Management and Communication. Prerequisite(s): 2103 or equivalent. This class discusses the multi-faceted dimensions critical to successfully leading information systems projects. Topics will include behavioral, strategic, technical, quantitative and communications issues faced by those directing projects.

MSIS 3103
Database Systems Design, Manipulation and Management for End Users. Prerequisite(s): 2103 or equivalent. Non-MIS (or CS) majors only. Use of computer technology and software to represent, manipulate and manage data. Principles and techniques of logical database design and related database concepts. Analysis, design and implementation of a database system using a relational DBMS. *No credit for students in the MIS or MSCS majors.*

MSIS 3203
Advanced Computer Programming for Business. Prerequisite(s): 2203. Advanced programming features are examined with an emphasis on the development of computer programs for business application. File processing including magnetic tape sequential files, disk-indexed sequential files, and virtual storage applications are an integral part of the course. Subjects and techniques such as TSO, segmentation, debugging tools and procedures, and pertinent JCL are also studied and applied.

MSIS 3223
Operations Management. Prerequisite(s): 2103 and STAT 2023 or equivalent. Introductory examination of the management of processes or systems that create goods and provide services. Management decision-making techniques and their application to problems in production and operations management. Decision analysis, forecasting, facility layout, location planning, quality management, inventory planning, and project management.

MSIS 3233
Management Science Methods. Prerequisite(s): 3223 and calculus. Deterministic operations research techniques applied to the resource allocation and operational problems encountered in accounting, economics, finance, management and marketing. Linear programming, goal programming, integer programming and network models.

MSIS 3243
Managerial Decision Theory. Prerequisite(s): 3223 and calculus. Decision processes under risk and uncertainty. The use of models in business decision-making with outcomes governed by probability distributions. Bayesian decision analysis, utility measurements, game theory, Markov chains, queuing theory, simulation, and inventory models.

MSIS 3303
Systems Analysis and Design. Prerequisite(s): 2203. Systems thinking. Systems analysis and design as a profession. Role of the analyst. Systems development methodologies. Requirements analysis. Use of computer-aided software engineering tools (CASE). Modeling of data, processes, and objects. Logical design, interface design and project management.

MSIS 3363
Advanced Management Information Systems Programming. Prerequisite(s): 2203 or equivalent. Programming tools with applications in industry. Advanced programming procedures, processes and algorithms.

MSIS 3373
File and Data Management for Business. Prerequisite(s): 2203. A survey of business data storage methodologies and approaches and of file management methodologies for business enterprises.

MSIS 3393
Advanced Spreadsheet Modeling and Programming. Prerequisite(s): 2103 and permission of instructor. This class provides students with advanced spreadsheet skills, including the ability to formulate math programming models, simulations, risk analysis, and other business decision-making tools. The class will also provide students with an introduction to spreadsheet programming (VB, macros, etc.), building decision support systems in spreadsheets, etc.

MSIS 4010
Applied Management Science and Information System Studies. 1-6 credits, max 6. Prerequisite(s): Consent of department head; MIS and MSCS majors only. Structured internship, field study or independent project with supporting academic study.

MSIS 4013
Database Systems Design, Management, and Administration. Prerequisite(s): 3303 and 3363, MIS and CS Majors only or permission of MSIS department. Theoretical aspects and business of data models and databases. Data security, maintaining database integrity, and database administration in a shared, networked or distributed environment. Related database concepts, including object-oriented databases and web database development. Analysis, design, and implementation of a database system using advanced DBMS tools and high-level languages to retrieve, manipulate data. *Required for MIS or MSCS majors.*

MSIS 4020
Applications Software Tools and Techniques. 1-3 credits, max 3. Prerequisite(s): 3303, 2203, permission of instructor. Hands-on experience with selected software-based tool or programming languages such as SAP, SQL, PERT/CPM, etc.

MSIS 4113
Enterprise Systems and Collaborative Commerce. Prerequisite(s): 4013. Current and emerging management and technical concepts, practices, and tools for information integration and re-engineering of organizational processes. The use of enterprise resource planning tools (ERP II), collaborative commerce, supply chain, business intelligence, and e-business.

MSIS 4133
Information Technologies for Electronic Commerce. Prerequisite(s): 4013. The Internet and web-based technologies, systems and applications that allow organizations to overcome the barriers of time and distance for conducting commerce. Scripting and markup languages, web programming tools, and the connectivity technologies for designing and developing electronic commerce and systems.

MSIS 4223
Information Assurance Management. A broad investigation of the elements of information assurance and security with an emphasis on the management impact to corporations and businesses engaged in the information services and e-commerce. Students should come away from the course with the ability to advise management on the risks and mitigation for all types of threats to information and privacy.

MSIS 4233
Applied Information Systems Security. Prerequisite(s): 4523, CS 4283, or ECEN 4283. An investigation into the various technical aspects of attacking and guarding against attacks and failures in various types of information systems. Course content may vary but will generally include computer, network, and data protection technologies (e.g. firewalls, packet filters, proxy servers, user authentication and validation techniques, encryption, backup methodologies, system and component redundancies, etc.). Various threats and attack methods will be examined.

MSIS 4243
IT Forensics and Auditing. Procedures for identification, preservation and extraction of electronic evidence. Auditing and investigation of network and host system intrusions, analysis and documentation of information gathered, and preparation of expert testimonial evidence. Forensic tools and resources for system administrators and information system security offices. Ethics, law, policy and standards concerning digital evidence.

MSIS 4253
IT Risk Management, Planning, and Mitigation. This course examines factors of risk analysis in information technology and how management can plan to achieve an acceptable level of risk in the face of corporations desiring to open up their networks still further to partners, customers, and mobile workers.

MSIS 4263
Decision Support and Business Intelligence Applications. Prerequisite(s): 3303. Applied knowledge management tools and techniques for organizational decision support. Knowledge-based systems, decision support systems, and data mining techniques such as inductive learning and neural networks.

MSIS 4273
Legal and Ethical Issues in Information Systems. This course reviews the current status of information systems law in regard to rights of privacy, freedom of information, confidentiality, work product protection, copyright, security, legal liability, ethical issues, and a range of additional legal and information policy topics. We will investigate the legal difficulties that technological innovations are causing in all of these areas. Legal options for dealing with the conflicts caused by technological change and likely adaptations of the law over time in response to societal changes will be explored. *No credit for students having completed TCOM 5273.*

MSIS 4283
Operating Systems for Information Assurance. Operating Systems (OS) concepts for security. Vulnerabilities and threats. Security models. User authentication. Smart cards: architectures, technologies, application environments, and case studies. System availability. Software and data integrity. Auditing. Sensitive data confidentiality. Access control. Secure OS development: design principles, design methodologies, security certification. Case studies: Unix/Linus, MS/Windows XP/2000.

MSIS 4363*
Advanced Topics in Systems Development. Prerequisite(s): Senior standing and consent of instructor. Current and emerging advanced topics in information systems development. Development of web-based information systems and groupware systems, advanced object-oriented systems development methodologies and other related emerging topics.

MSIS 4373*
Advanced Topics in Management Information Systems. Prerequisite(s): Senior standing and consent of instructor. Current and emerging advanced topics in the field of management information systems. Advanced network management, advanced electronic commerce issues, international management information systems and legal and regulatory issues in telecommunications.

MSIS 4443*
Computer-based Simulation Systems. Prerequisite(s): 2203 and 3233 or 3243. Discrete-event systems simulation. Modeling of systems to be simulated such as inventory, financial management, data communications, information system problems, or other queuing situations. Collection and numerical analysis of associated data, understanding of simulation as a useful tool in management science and information systems.

MSIS 4523*
Data Communication Systems. Prerequisite(s): Senior standing. Broad coverage of network types and protocols used to drive the diverse voice, video and data needs of today's business. Network vocabulary and the understanding of how telecommunications components function are stressed.

MSIS 4533
Advanced Data Communications. Prerequisite(s): 4523. An applied and in-depth study of voice, video and data networks and technologies. Actual implementation knowledge and experience, using current technologies and equipment.

MSIS 4543
Techniques in Technology Investigation. Prerequisite(s): Consent of department head. Review systems for vulnerabilities and analyze systems that have been breached. Related issues. Hands-on component.

MSIS 4553
Analysis of Risk in Management and Information Systems. Prerequisite(s): Consent of department head. Examination of risk analysis in information technology and how management can plan to achieve an acceptable level of risk in the face of corporations desiring to open up their networks still further to partners, customers and mobile workers.

MSIS 4943
Decision-Making Tools for Sports Management. Prerequisite(s): 3223. This course is designed as an elective for MGMT students enrolled in the Sports Management option. Useful decision tools such as statistical inference, decision analysis, mathematical programming, forecasting and simulation are used to address decisions faced by sports administrators and decisions made during sporting contests. Current 'hot' issues in sports decision-making will also be examined.

MSIS 5020*
Advanced Applications Software Tools. 1-3 credits, max 3. Advanced hands-on experience with selected software-based tool or programming languages such SAP, SQL, PERT/CPM, etc. *For graduate credit only.*

MSIS 5033*
Information Systems Project Management. Prerequisite(s): Consent of MS in MIS director, MSTM director or MBA director. This class covers the important multi-faceted dimensions of directing and leading information systems projects. Topics will include behavioral, strategic, technical and quantitative issues faced by information system project teams.

MSIS 5123*
Enterprise Resource Planning. Prerequisite(s): Graduate standing, ACCT 5103, and MSIS 5643, or consent of MS in MIS director. Resource planning for today's global business organizations. Integrated data flow and computer software for enterprise resource planning. Integration of transactional analysis, fundamental accounting practice, financial planning, and supply chain analysis forming the basis for study in this integrated approach to enterprise resource planning.

MSIS 5133*
Advanced Information Technologies for Electronic Commerce. Prerequisite(s): Admission to MBA, MSTM, or MS in MIS program, a programming object-oriented language and either 5643 or 4013; or consent of instructor. Information technologies that enable electronic commerce, including data base and web technologies and infrastructure, web software, transaction security, business web models and applications.

MSIS 5223*
Object-oriented Programming Applications for Business. Prerequisite(s): 5643, graduate standing and computer programming proficiency; or consent of MS in MIS director. Object-oriented programming concepts and applications for business in a global environment. Implementation through an appropriate object-oriented programming language.

MSIS 5303*
Quantitative Methods in Business. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director; algebra and spreadsheet proficiency required. Application of quantitative techniques to business problems. Linear programming, transportation and assignment models, goal programming, integer programming, and networks.

MSIS 5313*
Production Operations Management. Prerequisite(s): Admission to MBA program or consent of MBA director and 5303. The management of operations in manufacturing and service organizations. Production planning, facility location and layouts. Inventory control, waiting line problems and simulation. Project management and quality control. Emphasis is on a management science approach.

MSIS 5413*
Advanced Management Science. Prerequisite(s): Admission to MBA program or consent of MBA director. Advanced management science methods, with computer applications. Mathematical programming, simulation, forecasting, queuing, Markov processes.

MSIS 5543*
Advanced File and Data Management for Business. Prerequisite(s): 5603 or equivalent, or consent of MS in MIS director. A design perspective of business data storage methodologies, structures and approaches; and of file management techniques for business enterprises.

MSIS 5600*
Special Projects in Business Information Systems. 1-6 credits, max 6. Prerequisite(s): Consent of MS in MIS director. Study of advanced topics not covered directly in other classes or directed study under the supervision of a faculty member.

MSIS 5603*
Introduction to Object-oriented Programming for Business. Prerequisite(s): Admission to MBA, MSTM, or MS in MIS program or consent of instructor. Introduction to elementary object-oriented computer programming for business including fundamental constructs, construction and integration of objects, and the use of development tools and methodologies for successful development of business applications.

MSIS 5613*
Advanced Production and Operations Management. Prerequisite(s): 5313 or equivalent; admission to MBA program or consent of MBA director. Production system, including a synthesis of production and management techniques used by operations managers. A computerized management simulation game provides decision-making experience.

MSIS 5623*
Information and Network Technology Management. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Integrated view of information and network system technologies. Internet-enabled business and economic models, and emerging managerial and strategic issues faced by organization related to technology adoption. Knowledge management, information security, privacy, decision support systems, technology infrastructure. *Required for the MBA program.*

MSIS 5633*
Business Intelligence Tools and Techniques. Prerequisite(s): Admission to MBA, MSTM, or MS in MIS program or consent of instructor. A comprehensive analysis of contemporary business intelligence tools and techniques used in managerial decision-making, including decision support systems, data and text mining, knowledge management, expert systems, neural networks, and other tools and techniques.

MSIS 5643*
Advanced Database Management. Prerequisite(s): Admission to the MBA, MSTM or MS in MIS program or consent of instructor. Advanced theoretical and practical foundations of database systems. Brief review of classical issues surrounding design, analysis, and implementation of databases. Overview and use of modern database systems. Current and emerging issues in the database field.

MSIS 5653*
Advanced Systems Development. Prerequisite(s): Consent of MS in MIS director, MSTM director or MBA director. Theory and applications for business systems development from an enterprise-wide perspective.

MSIS 5900*
Practicum in Management Information Systems. 1-3 credits, max 3. Prerequisites: Consent of director of and admission to the MS in MIS program. Application of MIS-related methods and skills in a business environment. Integration of knowledge through real-world problem solving situations in organizational contexts.

MSIS 6200*
Advanced Topics in Management Information Systems. 3-6 credits, max 12. Prerequisite(s): Doctoral student status and consent of instructor. Special advanced topics in management information systems for doctoral students.

MSIS 6300*
Contemporary Topics in MSIS Research. 1-6 credits, max 6. Prerequisite(s): Doctoral standing. In-depth study in one or more topics in the MSIS field. An ongoing conversation about major issues in the field. Topics related to any one of the areas within the broad, interdisciplinary field of management science and information systems, such as management information systems, management science, telecommunications, and operations management.

MSIS 6333*
Overview of MSIS Research. Prerequisite(s): Doctoral standing. Recent research studies that fall within the broad, interdisciplinary field of management science and information systems. An introduction to the academic "way of life", focusing on research productivity.

MSIS 6343*
Advanced Methods in MSIS Research. Prerequisite(s): Doctoral standing. Development of advanced methodological skills necessary to carry out research in the chosen area of study within the field of MSIS. Skills related to any one of the areas within the broad, interdisciplinary field of management science and information systems, such as management information systems, management science, telecommunications, and operations management.

MARKETING (MKTG)

MKTG 3213
Marketing. Prerequisite(s): Minimum of 45 credit hours. Marketing strategy and decision-making. Consumer behavior, marketing institutions, competition and the law.

MKTG 3263
Entrepreneurial Marketing. Prerequisite(s): EEE 3023, MKTG 3213 and completion of business core classes or instructor permission. Examination of the roles of marketing in entrepreneurial ventures and entrepreneurship in the marketing efforts of any organization. Emphasis on marketing as it relates to risk management, resource leveraging and guerrilla approaches. *No credit for students with credit in EEE 5223 or MKTG 5223.* (Same course as EEE 3263)

MKTG 3323
Consumer and Market Behavior. Prerequisite(s): 3213. Qualitative and quantitative analyses of the behavior of consumers; a marketing consideration of the contributions of economics and the behavioral disciplines to consumer behavior.

MKTG 3433
Promotional Strategy. Prerequisite(s): 3213. Promotional policies and techniques and their application to selling problems of the firm.

MKTG 3473
Professional Selling. Prerequisite(s): 3213. Skills to understanding the professional personal selling process. Strong emphasis on the communications function of personal selling. Lecture sessions combined with experiential exercises and role playing.

MKTG 3513
Sales Management. Prerequisite(s): 3213. Sales planning and control, organization of the sales department, developing territories, motivating salespersons and control over sales operations.

MKTG 3613
Retailing Management. Prerequisite(s): 3213. Applied marketing knowledge, with attention given to those concepts and methods which provide the necessary foundation for a retailing manager.

MKTG 3713
Sports Marketing. Prerequisite(s): 3213, 3323 and 3433. Applied marketing knowledge with attention given to those concepts and methods used in sports marketing.

MKTG 3813
Business to Business Marketing Management. Prerequisite(s): 3213. A strategic overview of the marketing of products and services to business, government and not-for-profit organizations.

MKTG 4223
Supply Chain Management. Prerequisite(s): 3213. An economic and operational analysis of the physical flow of goods and materials. A system interpretation of marketing channels.

MKTG 4333*
Marketing Research. Prerequisite(s): 3213; 3323; STAT 2023. Basic research concepts and methods. Qualitative and quantitative tools of the market researcher.

MKTG 4443*
Social Issues in the Marketing Environment. Prerequisite(s): 3213. Social and legislative considerations as they relate to the marketplace.

MKTG 4550
Problems in Marketing. 1-9 credits, max 9. Prerequisite(s): 3213. Problems in marketing. Specific topics vary from semester to semester.

MKTG 4553
International Marketing. Prerequisite(s): 3213. The conceptual framework for marketing into and from foreign countries. The development of action-oriented strategies with emphasis on the uncontrollable factors that affect marketing decisions in an international setting.

MKTG 4683
Managerial Strategies in Marketing. Prerequisite(s): 3213, 3323 and a minimum of nine credit hours in marketing, ACCT 2103 and 2203, ECON 2103 and 2203, FIN 3113, LSB 3213, MGMT 3013, MSIS 2103. Analysis of the marketing management decision process; market opportunity analysis, strategy development, planning and integration with corporate strategy.

MKTG 4773
Services Marketing. Prerequisite(s): 3213. Conceptual and managerial tools for students who intend to be involved with the marketing of ser-vices. Characteristics of services, listening to customers, managing customer expectations, conceiving and creating service breakthroughs, service quality, positioning of services, managing demand and supply, creating a strategic service vision and designing a customer focused organization to create and retain customers.

MKTG 4850
Applied Marketing Studies. 1-6 credits, max 6. Prerequisite(s): 12 credit hours of marketing and consent of instructor. Structured internship or field project with supporting academic study.

MKTG 4973
New Product Development. Prerequisite(s): 3213, 4333. The elements involved in creating and marketing a successful new product. Qualitative and quantitative methods will analyze data collected from focus groups, including surveys to test a new product concept.

MKTG 4983
Database Marketing. Prerequisite(s): 3213, 3323, MSIS 2103 or consent of instructor. An information-driven process to develop, test, implement, measure, and adopt customized marketing programs and strategies.

MKTG 4993
Electronic Commerce Marketing. Prerequisite(s): 3213, 3433, MSIS 2103 or consent of instructor. Digital interactive tools changing the management of markets. The development and impact of electronic commerce on business and use of interactive (electronic) marketing for building one-to-one relationship with customers.

MKTG 5133*
Marketing Management. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Consideration at an advanced level of the major elements of marketing from the point of view of the marketing executive. Emphasis on problem solving and decision making; using an interdisciplinary approach. Development of an integrated, comprehensive marketing strategy.

MKTG 5213*
Services Marketing. Prerequisite(s): 5133. Services and services marketing with emphasis on services research and services management.

MKTG 5220*
Seminar in Marketing. 3 credits, max 9. Prerequisite(s): 5133. Selected topics in marketing. Industrial marketing, product management, strategic marketing planning, international marketing, and services marketing.

MKTG 5223*
Entrepreneurial Marketing. Prerequisite(s): Admission to MBA program or instructor permission. Interplay of entrepreneurship concepts and marketing concepts, including the role of marketing in entrepreneurial ventures, and the role of entrepreneurship in a firm's marketing efforts. Emphasis is placed on how to address the significant changes taking place in markets and the modern marketing function. (Same course as EEE 5223)

MKTG 5313*
Marketing Research Methodology. Prerequisite(s): 5133. Research methodology applied to marketing problems. Measurement, survey research, experimentation, and statistical analysis of data.

MKTG 5553*
International Marketing Strategy. Prerequisite(s): 5133. An analysis of marketing in the global environment. Environmental effects on international marketing management and corporate strategy decisions.

MKTG 5613*
Seminar in Consumer Behavior. Prerequisite(s): 5133 or consent of instructor. Psychological, sociological, and anthropological theories related to consumer decision processes. Special emphasis on current empirical research in consumer behavior.

MKTG 5963*
Data Mining and Customer Relationship Management Applications. Lab 2. Prerequisite(s): 5983 or consent of MBA, MIS/MSIS, MSTM director or assistant director or instructor. Data mining and turning business data into actionable information. Use of various data mining tools such as neural networks, decision trees, classification and prediction algorithms, in the context of most common applications in business-sales, marketing, and customer relationship management (CRM). Use of state-of-the-art industrial strength data mining software to analyze real-world data and make strategic recommendations for managerial actions.

MKTG 5973*
New Product Development. Prerequisite(s): Acceptance into the MBA program or consent of the MBA director. Elements involved in creating and selling a successful new product in a complex environment, including internal organizational and external environmental influences.

MKTG 5983*
Data Base Marketing. Prerequisite(s): 5133 or consent of MBA, MIS/MSIS, MSTM director or assistant director or instructor. An information-driven process managed by database technology that enables marketers to develop, test, implement, measure, and adopt customized marketing programs and strategies.

MKTG 5993*
Digital Business Strategy. Prerequisite(s): Consent of MBA, or MIS/AIS or MSTM director or instructor. Businesses employment of digital technologies to craft a superior and unique value proposition for its customers and strategic partners.

MKTG 6100*
Advanced Seminar in Marketing. 1-3 credits, max 6. Prerequisite(s): Consent of instructor and doctoral student standing. Specialized topics in marketing for doctoral students.

MKTG 6323*
Seminar in Advanced Consumer Behavior. Prerequisite(s): MKTG 5133 or consent of the instructor. An interdisciplinary course examining empirical and theoretical studies of the factors that influence the acquisition, consumption, and disposition of goods, services, and ideas. Analysis of the psychological, sociological, anthropological, demographic, and regulatory forces that impact consumers. Examination of research methodologies employed to conduct empirical studies of consumer behavior.

MKTG 6413*
Advanced Marketing Research. Prerequisite(s): 5313. Introduction to the latest empirical marketing research techniques. Data collection and analysis techniques such as conjoint analysis, multidimensional scaling, path analysis, and structural equations modeling (via LISREL).

MKTG 6513*
Seminar in Marketing Theory. Prerequisite(s): 5133 or consent of instructor. Development of an evaluation of marketing theory.

MKTG 6683*
Seminar in Marketing Strategy. Prerequisite(s): 5133 or consent of instructor. Examination of a broad range of marketing management topics from a strategic perspective. Understanding of content, theory and research methods involved in the development of strategic marketing knowledge.

MKTG 6913*
Measurement and Experimental Design. An analysis of measurement issues from both psychometric and marketing perspectives. Scale construction and validation. The design, analysis, and evaluation of marketing experiments.

MASS COMMUNICATIONS (MC)

MC 5000*
Thesis. 1-6 credits, max 6. For mass communication graduate students who are candidates for the master's degree.

MC 5010*
Capstone Project or Creative Component. 1-3 credits, max 4. Prerequisite(s): "B " or better in 5113, 5333, and 5651. Capstone research project or creative activity for a mass communication graduate student electing to not write a thesis to complete a master's degree.

MC 5020*
Advanced Practicum or Internship in Mass Communication. 1-3 credits, max 3. Prerequisite(s): One semester of graduate course work and consent of instructor. Applied training allowing students to relate theoretical principles to situations in professional settings. *Required for students without mass media backgrounds*.

MC 5030*
Independent Study in Mass Communication. 1-3 credits, max 3. Prerequisite(s): Consent of instructor. Independent study, directed readings or project development in mass communications to fit the student's academic and professional interests.

MC 5113*
Methods of Research in Mass Communication. Principles and techniques of research; research planning, design and measurement in mass communication.

MC 5163*
Mass Communication Law. Prerequisite(s): 2003 and graduate standing. Statutes and case decisions in print and broadcast law, including government regulation of broadcasting by the FCC and media relations with other regulatory agencies. *No credit for students with credit in JB 4163.* (Same course as JB 4163)

MC 5223*
Mass Communication Research Analysis and Interpretation. Prerequisite(s): 5113. Single- and multi-variate analysis, interpretation and reporting of mass communication research data. Use of computers in research analysis.

MC 5253*
International Mass Communications. Prerequisite(s): Graduate standing. Examination of the nature and flow of news and information within and among nations, states, and societies from a theoretical vantage point grounded in region-specific realities. The political, economic, social, cultural and historical forces determining media practice in a global environment. *No credit for students with credit in JB 4253.* (Same course as JB 4253)

MC 5333*
Process and Effects of Mass Communication. Mediating factors that affect interaction of ingredients in the communications process, and how these factors can affect the fidelity of information conveyed.

MC 5383*
Media Relations. Prerequisite(s): Graduate standing. Strategies for dealing with the news media. Students will gain hands-on experience in conducting media news conferences, pitching story ideas and preparing themselves and others for dealing with news media interviews. *Meets with JB 4383. No credit for students with credit in JB 4383.*

MC 5520*
Specialized Public Relations Applications. 3 credits, max 6. Prerequisite(s): JB 3283 and graduate standing. Professional public relations at an advanced level. Non-profit, corporate, agency, international and other specialized applications. Course content varies by semester. *No credit for students with credit in JB 4520.* (Same course as JB 4520)

MC 5530*
Specialized Advertising Applications. 3 credits, max 6. Prerequisite(s): Graduate standing. Professional advertising at an advanced level. Special topics in areas such as globalization, convergence and the digital realm or scene. Course content varies by semester. *Meets with JB 4530. No credit for students with credit in JB 4530.*

MC 5540*
Specialized Broadcast Applications. 3 credits, max 6. Prerequisite(s): Graduate standing. Professional broadcast journalism at an advanced level. Special topics in areas such as sports media production, announcing, performance; political, investigative and sports reporting; advanced audio production. Course content varies by semester. *Meets with JB 4540. No credit for students with credit in JB 4540.*

MC 5560*
Specialized News-Editorial Applications. 3 credits, max 6. Prerequisite(s): Graduate standing. Professional news-editorial at an advanced level. Special topics in areas such as investigative, political, sports and business reporting; feature, column and editorial writing; advanced layout and design. Course content varies by semester. *Meets with JB 4560. No credit for students with credit in JB 4560.*

MC 5603*
Integrated Marketing Communications. Prerequisite(s): JB 2003; JB 2013 or JB 2183 or MKTG 3213; and graduate standing. Planning and the value of coordinating the various promotional mix elements within a communication campaign to create maximum clarity and impact. Communication elements including advertising, public relations, direct marketing and sales promotion and examination of strategies for combining and integrating them into an effective campaign. Theories, models and tools to make better promotional communication decisions. *No credit for students with credit in JB 4603.* (Same course as JB 4603)

MC 5651*
Introduction to Graduate Study in Mass Communications. Prerequisite(s): Graduate standing. Orientation to skills necessary for successful completion of graduate work. Training in library and archival research, academic writing and preparation of research reports, familiarization with theoretical concepts and issues associated with mass communication. Required of all mass communication MS candidates, and prerequisite to MS candidates enrolling in mass communication seminars.

MC 5733*
Responsibility in Mass Communication. Prerequisite(s): Graduate standing. Interaction between mass media and society with emphasis upon the communicator's ethics and responsibilities. *Meets with JB 4733. No credit for students with credit in JB 4733.*

MC 5753*
Media and Elections. Prerequisite(s): Graduate standing. Examination of media's role in the political process with primary emphasis placed on print and broadcast journalism practices. *Meets with JB 4753. No credit for students with credit in JB 4753.*

MC 5770*
Seminar in Communication Media. 1-3 credits, max 9. Prerequisite(s): Graduate standing. International communication, media history, legal research, new technology, women and the media, television and children, industrial television, and communication research.

MC 5773*
Censorship. Prerequisite(s): Graduate standing. A critical examination of historical and contemporary occurrences of censorship from legal, philosophical, political, religious and sociological perspectives. The definition of censorship, the common elements found in all forms of censorship, the rationalizations and justifications for censorship, and the consequences and unintended results of censorship. *No credit for students with credit in JB 4773.* (Same course as JB 4773)

MC 5863*
Media Management. Prerequisite(s): 2003 and graduate standing. Basic issues, theoretical concepts and operational procedures associated with managing newspapers, magazines, advertising public relations, broadcast and cable companies and firms specializing in computer-mediated communication. *No credit for students with credit in JB 4863.* (Same course as JB 4863)

MC 5883*
Advanced Media Management. Prerequisite(s): Graduate standing. Management concerns in four areas of mass communication practice: public relations, advertising, broadcasting and print journalism. Different emphases offered according to student demand or need.

MC 5923*
Law and Ethics for Public Relations and Advertising. Prerequisite(s): 5163 and graduate standing. A critical examination of the legal and ethical issues confronting public relations and advertising practitioners. Focus on First Amendment rights of public relations and advertising professionals; the interpretation and application of statutes, regulations and judicial opinions to specific situations; and the application of ethical reasoning and professional codes of conduct to determine the most ethical action. *Meets with JB 4923. No credit for students with credit in JB 4923.*

MASTER OF BUSINESS ADMINISTRATION (MBA)

MBA 5010*
Independent Study. 3-6 credits, max 6. Prerequisite(s): Admission to MBA program or consent of MBA director. Investigation of advanced research topics or directed study under the supervision of a faculty member. *Consent of MBA Graduate Studies Committee required.*

MBA 5100*
Professional Development. 1 credit, max 6. Prerequisite(s): Admission to MBA program or consent of MBA director. Career and professional development of MBA students. A blend of guest speakers, projects, and exercises used to better prepare students for advanced business careers.

MBA 5192*
Managing Operations and Decision Processes. Prerequisite(s): 5172. Study of concepts of management of production and service operations. Contemporary manufacturing technologies and application of quantitative techniques. Development of analytical skills required to conduct detailed investigations of real-world systems.

MBA 5233*
Global Competitive Environment. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Development of a global business strategy for the organization. Issues of highly diversified markets and business environments, global competition, financial markets, and complex organizational relationships. (Same course as INTL 5233*)

MBA 5261*
Legal Issues in Business. Prerequisite(s): Admission to MBA program or consent of MBA director. Analysis of the basic concepts of public and private law related to business decisions. Overview of the laws affecting private business relationships including employment law, agency laws, and various forms of business organizations.

MBA 5300*
Current Business Topics. 1-6 credits, max 9. Prerequisite(s): Admission to the MBA program or consent of the director. Examination of selected topics representing the most current academic and business concepts.

MBA 5303*
Corporate and Business Strategy. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Key issues in formulating and implementing business and corporate strategies. The orientation of top management and diagnosis of what is critical in complex business situations and realistic solutions to strategic and organizational problems.

MBA 5310*
Integrative Decision-Making II: Crossing Organizational Boundaries. 2-6 credits, max 6. Prerequisite(s): Consent of MBA director and completion of minimum of 24 MBA credit hours. Identification and analysis of environmental forces affecting an organization's ability to compete and survive. Interaction among all corporate functional units. Development of a comprehensive, integrated plan of action for the firm.

MBA 5400*
Business Practicum. 1-3 credits, max 3. Prerequisite(s): Consent of MBA director and completion of 18 MBA credit hours. Application of knowledge and skills developed in MBA functional courses in an organizational environment. Integration of functional concepts, allowing students to experience the adaptation of concepts to fit organizational reality, and assisting students in understanding ways in which their academic training can help organizations.

MBA 5500*
Interdisciplinary Inquiry in Business Administration. 1-3 credits, max 3. Prerequisite(s): Admission to a SSB graduate program or consent of MBA director. Investigation of various business problems using an interdisciplinary approach. Courses team taught to ensure problems viewed from varying functional perspectives.

MBA 5990*
MBA Applied Business Report. 3-6 credits, max 6. Prerequisite(s): Admission to MBA program or consent of MBA director. Independent investigation of a business problem under the direction of a supervising professor.

MATHEMATICS (MATH)

MATH 1483
(A)Mathematical Functions and Their Uses. Prerequisite(s): Intermediate algebra or placement into 1513. Analysis of functions and their graphs from the viewpoint of rates of change. Linear, exponential, logarithmic and other functions. Applications to the natural sciences, agriculture, business and the social sciences.

MATH 1493
(A)Applications of Modern Mathematics. Prerequisite(s): Intermediate algebra or placement into 1513. Introduction to contemporary applications of discrete mathematics. Topics from management science, statistics, coding and information theory, social choice and decision making, geometry and growth.

MATH 1513
(A)College Algebra. Prerequisite(s): Two years of high school algebra or intermediate algebra. Quadratic equations, functions and graphs, inequalities, systems of equations, exponential and logarithmic functions, theory of equations, sequences, permutations and combinations. *No credit for those with prior credit in 1715 or any mathematics course for which 1513 is a prerequisite.*

MATH 1613
(A)Trigonometry. Prerequisite(s): 1513 or equivalent, or concurrent enrollment. Trigonometric functions, logarithms, solution of triangles and applications to physical sciences. *No credit for those with prior credit in 1715 or any course for which 1613 is a prerequisite.*

MATH 1715
(A)Precalculus. Prerequisite(s): One unit of high school plane geometry, and intermediate algebra or high school equivalent. Preparation for Calculus. Includes an integrated treatment of topics from College Algebra and Trigonometry. *Combined credit for 1513, 1613, and 1715 limited to six hours. No credit for those with prior credit in any course for which 1613 is a prerequisite. Satisfies the six hour general education Analytical and Quantitative Thought requirement.*

MATH 2103
(A)Elementary Calculus. Prerequisite(s): 1513. An introduction to differential and integral calculus. *For students of business and social sciences.*

MATH 2123
(A)Calculus for Technology Programs I. Prerequisite(s): 1715 or 1513 and 1613. First semester of a terminal sequence in calculus for students in the School of Technology. Functions and graphs, differentiation and integration with applications.

MATH 2133
(A)Calculus for Technology Programs II. Prerequisite(s): 2123. Second semester of a terminal sequence in calculus for students in the School of Technology. Calculus of trigonometric, exponential and logarithmic functions and applications to physical problems.

MATH 2144
(A)Calculus I. Prerequisite(s): 1715, or 1513 and 1613. An introduction to derivatives, integrals and their applications.

MATH 2153
(A)Calculus II. Prerequisite(s): 2144. A continuation of 2144, including series and their applications, elementary geometry of three dimensions and introductory calculus of vector functions.

MATH 2163
Calculus III. Prerequisite(s): 2153. A continuation of 2153, including differential and integral calculus of functions of several variables and an introduction to vector analysis.

MATH 2233
Differential Equations. Prerequisite(s): 2153. Methods of solution of ordinary differential equations with applications. First order equations, linear equations of higher order, series solutions and Laplace transforms.

MATH 2910
Special Studies. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Special subjects in mathematics.

MATH 3013*
Linear Algebra. Prerequisite(s): 2153. Algebra and geometry of finite-dimensional linear spaces, linear transformations, algebra of matrices, eigenvalues and eigenvectors.

MATH 3263*
Linear Algebra and Differential Equations. Prerequisite(s): 2153. An integrated treatment of linear algebra and differential equations. *No credit for those with credit in 2233 or 3013.*

MATH 3403
Geometric Structures. Prerequisite(s): 1483, 1493 or 1513. Fundamentals of plane geometry, geometric motion (translation, rotations, reflections), polyhedra, applications to measurements.

MATH 3603
Mathematical Structures. Prerequisite(s): 1483, 1493 or 1513. Foundations of numbers (set theory, numeration, and the real number system), number theory, algebraic systems, functions and applications and probability.

MATH 3613*
Introduction to Modern Algebra. Prerequisite(s): 3013. Introduction to set theory and logic; elementary properties of rings, integral domains, fields and groups.

MATH 4003*
Mathematical Logic and Computability. Prerequisite(s): 3613 or PHIL 3000 or 3003 or consent of instructor. The basic metatheorems of first order logic: soundness, completeness, compactness, Lowenheim-Skolem theorem, undecidability of first order logic, Godel's incompleteness theorem. Enumerability, diagonalization, formal systems, standard and nonstandard models, Godel numberings, Turing machines, recursive functions, and evidence for Church's thesis. (Same course as PHIL 4003*)

MATH 4013*
Calculus of Several Variables. Prerequisite(s): 2163 and 3013. Differential and integral calculus of functions of several variables, vector analysis, Stokes' Theorem, Green's Theorem and applications.

MATH 4023*
Introduction to Modern Analysis. Prerequisite(s): 2163 and 3613 or consent of instructor. An introduction to the theorems and proofs of one-variable calculus. Properties of the real numbers, sequences and series of constants and functions, limits, continuity, differentiation and integration.

MATH 4033*
History of Mathematics. Prerequisite(s): 2153. Early development of mathematics as a science, contributions of Greek mathematics, mathematical advancements of the 17th and 18th centuries, and the mathematics of the 19th and 20th centuries. The emphasis in the course will be on replicating the setting and techniques of the times to understand the nature of a discovery and its relationship to contemporary thought.

MATH 4143
Advanced Calculus I. Prerequisite(s): 3013 and 4023. A rigorous treatment of calculus of one and several variables. Elementary topology of Euclidean spaces, continuity and uniform continuity, differentiation and integration. *No credit for students with credit in 5043.* (Same course as 5043*)

MATH 4153*
Advanced Calculus II. Prerequisite(s): 4143. Continuation of 4143. A rigorous treatment of sequences and series of functions, uniform convergence, differentiation and integration of vector-valued functions, and differential forms. *No credit for students with credit in 5053.* (Same course as 5053*)

MATH 4233*
Intermediate Differential Equations. Prerequisite(s): 2233, 3013. Systems of differential equations, series, solutions, special functions, elementary partial differential equations, Sturm-Liouville problems, stability and applications.

MATH 4263*
Introduction to Partial Differential Equations. Prerequisite(s): 2163, 2233, 3013. Solution of the standard partial differential equations (Laplace's equation, transport equation, heat equation, wave equation) by separation of variables and transform methods, including eigenfunction expansions, Fourier and Laplace transform. Boundary value problems, Sturm-Liouville theory, orthogenality, Fourier, Bessel, and Legendre series, spherical harmonics.

MATH 4283*
Complex Variables. Prerequisite(s): 4013. Analytic functions, power series, residues and poles, conformal mapping and applications.

MATH 4403*
Geometry. Prerequisite(s): 3013, recommended 3613. An axiomatic development of Euclidean and non-Euclidean geometries.

MATH 4453*
Mathematical Interest Theory. Prerequisite(s): 2153. Fundamental concepts of financial mathematics including simple and compound interest, inflation, yield rates, and equations of value for annuities, stocks, bonds, and other financial instruments. Determining equivalent measures of interest, determining yield rates, estimating rates of return, amortization.

MATH 4513*
Numerical Mathematics: Analysis. Prerequisite(s): 2233, 3013, knowledge of programming or consent of instructor. Machine computing, algorithms, and analysis of errors applied to interpolation and approximation of functions solving equations and systems of equations, discrete variable methods for integrals and differential equations. (Same course as CS 4513)

MATH 4553*
Linear and Nonlinear Programming. Prerequisite(s): 2163, 3013. Linear programming, simplex methods, duality, sensitivity analysis, integer programming and nonlinear programming.

MATH 4583*
Introduction to Mathematical Modeling. Prerequisite(s): 3013. Techniques of problem solving and mathematical models presented by examples and case studies of applications of mathematics in industrial settings. Oral and written presentation of solutions.

MATH 4613
Modern Algebra I. Prerequisite(s): 3613. An introduction to the theory of groups and vector spaces. *Meets with 5003*. No credit for students with credit in 5003.*

MATH 4623
Modern Algebra II. Prerequisite(s): 4613. Continuation of 4613. An introduction to the theory of rings, linear transformation and fields. *Meets with 5013*. No credit for students with credit in 5013.*

MATH 4663*
Combinatorial Mathematics. Prerequisite(s): 3013. Counting techniques, generating functions, difference equations and recurrence relations, introduction to graph and network theory.

MATH 4713*
Number Theory. Prerequisite(s): 3613. Divisibility of integers, congruencies, quadratic residues, distribution of primes, continued fractions and the theory of ideals.

MATH 4813*
Groups and Representations. Prerequisite(s): 3013 and either 3613 or consent of instructor. An introduction to groups, group actions, symmetry groups, representations and characters. Further topics may include infinite symmetry groups, applications to chemistry and physics, and finite isometry groups and geometry.

MATH 4900
Undergraduate Research. 1-4 credits, max 4. Prerequisite(s): Consent of instructor. Directed readings and research in mathematics.

MATH 4910*
Special Studies. 1-3 credits, max 9. Prerequisite(s): Consent of instructor. Special subjects in mathematics.

MATH 4950
Problem Solving Seminar. 1-3 credits, max 3. Prerequisite(s): 2233, 3013. The general process of problem solving. Selected problem-solving techniques. Applications to challenging problems from all areas of mathematics.

MATH 4993
Senior Honors Thesis. Prerequisite(s): Senior standing and Honors Program participation. A guided reading and research program ending with an honors thesis under the direction of a faculty member, including a public presentation. *Required for graduation with departmental honors in mathematics.*

MATH 5000*
Research and Thesis. 1-6 credits, max 6. Prerequisite(s): Consent of advisory committee. Directed reading and research culminating in the master's report or master's thesis.

MATH 5003*
Modern Algebra I. Prerequisite(s): 3613. An introduction to the theory of groups and vector spaces. *Meets with 4613. No credit for students with credit in 4613.*

MATH 5010*
Seminar in Mathematics. 1-3 credits, max 12. Prerequisite(s): Consent of instructor. Topics in mathematics.

MATH 5013*
Modern Algebra II. Prerequisite(s): 4613 or 5003. Continuation of 5003. An introduction to the theory of rings, linear transformations and fields. *Meets with 4623. No credit for students with credit in 4623.*

MATH 5023*
Advanced Linear Algebra. Prerequisite(s): 3013. A rigorous treatment of vector spaces, linear transformations, determinants, orthogonal and unitary transformations, canonical forms, bilinear and hermitian forms, and dual spaces.

MATH 5043*
Advanced Calculus I. Prerequisite(s): 3013 and 4023. A rigorous treatment of calculus of one and several variables. Elementary topology of Euclidean spaces, continuity and uniform continuity, differentiation and integration. *Meets with 4143. No credit for students with credit in 4143.*

MATH 5053*
Advanced Calculus II. Prerequisite(s): 4143 or 5043. Continuation of 5043. A rigorous treatment of sequences and series of functions, uniform convergence, differentiation and integration of vector-valued functions and differential forms. *Meets with 4153*. No credit for students with credit in 4153.*

MATH 5133*
Stochastic Processes. Prerequisite(s): 2233, 3013 and STAT 5123. Definition of stochastic processes, probability structure, mean and covariance function, the set of sample functions, stationary processes and their spectral analysis, renewal processes, counting analysis, discrete and continuous Markov chains, birth and death processes, exponential model, queuing theory. (Same course as IEM 5133* & STAT 5133*)

MATH 5143*
Real Analysis I. Prerequisite(s): 4153 or 5053. Measure theory, measurable functions, integration and differentiation with respect to measures.

MATH 5153*
Real Analysis II. Prerequisite(s): 5143. Aspects of point set topology: nets, locally compact spaces, product spaces, Stone-Weierstrass theorem. Elementary functional analysis: Hahn-Banach, uniform boundedness, and open mapping theorems, Hilbert spaces. Riesz representation theorems: duals of Lebesgue spaces and spaces of continuous functions.

MATH 5213*
Fourier Analysis and Wavelets. Prerequisite(s): 4013 or 4023. Orthogonal series expansions, Fourier series and integrals and boundary value problems. Haar wavelets and multiresolution analysis. Applications.

MATH 5233*
Partial Differential Equations. Prerequisite(s): 4013, 4143 and 4233 or consent of instructor. Representation formulas for solutions of transport equation, Laplace's equation, heat equation and wave equation, mean value theorems, maximum principle, Green's functions, characteristics, eigenvalue problems, separation of variables, transform methods, variational methods, general theory of first order equations.

MATH 5243*
Ordinary Differential Equations. Prerequisite(s): 4143 or 5043; 4233; 5023. Banach space, contraction mapping principle, existence and uniqueness theorems, linear systems, higher-order linear equations, boundary value and eigenvalue problems, stability and asymptotic behavior, attractors, Gronwall's inequality, Liapunov method.

MATH 5253*
Advanced Ordinary Differential Equations. Prerequisite(s): 5243. Selected topics in ordinary differential equations.

MATH 5283*
Complex Analysis I. Prerequisite(s): 4143 or 5043. Basic topology of the plane, functions of a complex variable, analytic functions, transformations, infinite series, integration and conformal mapping.

MATH 5293*
Complex Analysis II. Prerequisite(s): 5283. Riemann Mapping Theorem, meromorphic functions, analytic continuation, Dirichlet problem, and entire functions.

MATH 5303*
General Topology. Prerequisite(s): 4143 or 5043 or consent of instructor. Basic properties of topological spaces and continuous functions, including connectedness, compactness, and separation and countability axioms. Metric, product, and quotient spaces, Urysohn lemma, and Tietze extension theorem.

MATH 5313*
Geometric Topology. Prerequisite(s): 4613 or 5003, 5303. Manifolds, complexes, the fundamental group, covering spaces, combinatorial group theory, the Seifert-Van Kampen theorem, and related topics.

MATH 5413*
Differential Geometry. Prerequisite(s): 4013 or 4143 or 5043. Differential manifolds, vector fields, differential forms, connections, Riemannian metrics, geodesics, completeness, curvature, and related topics.

MATH 5543*
Numerical Analysis for Differential Equations. Prerequisite(s): 4233, 4513 or CS 4513. Advanced machine computing, algorithms, analysis of truncation and rounding errors, convergence and stability applied to discrete variables, finite elements, and spectral methods in ordinary and partial differential equations.

MATH 5553*
Numerical Analysis for Linear Algebra. Prerequisite(s): 3013, and 4513 or CS 4513. Advanced machine computing, algorithms, analysis of rounding errors, condition, convergence, and stability applied to direct and iterative solution of linear systems of equations, linear least squares problems, and algebraic eigenvalue problems, including LU and QR factorization, conjugate gradients, QR algorithm, and Lanczos method.

MATH 5580*
Case Studies in Applied Mathematics. 1-3 credits, max 6. Prerequisite(s): 2233, 4013, and knowledge of computer programming. Selected mathematical problems from industry. Independent problem-solving, oral presentation of solutions, and technical report writing. Seminar-style format.

MATH 5593*
Methods of Applied Mathematics. Prerequisite(s): 2233, 4013, and knowledge of computer programming. Continuous and discrete techniques in modern applied mathematics. Positive definite matrices, eigenvalues and dynamical systems, discrete and continuous equilibrium equations, least squares estimation and the Kalman filter, potential flow, calculus of variations, network flows, and combinatorics.

MATH 5613*
Algebra I. Prerequisite(s): 4613 or 5003. A rigorous treatment of classical results in group theory and ring theory.

MATH 5623*
Algebra II. Prerequisite(s): 5613. A rigorous treatment of classical results in module theory and field theory.

MATH 5902*
Seminar and Practicum in the Teaching of College Mathematics. Prerequisite(s): Graduate standing in mathematics or consent of instructor. Foundations of college mathematics teaching, including lecturing, grading and exam preparation. Adapting classroom activities to better serve different types of learners. Current trends in mathematics education such as calculus reform, cooperative learning, and technology in the classroom.

MATH 6000*
Research and Thesis. 1-9 credits, max 24. Prerequisite(s): Consent of advisory committee. Directed reading and research culminating in the PhD or EdD thesis.

MATH 6010*
Advanced Seminar in Mathematics. 1-3 credits, max 12. Prerequisite(s): Consent of instructor and student's advisory committee. Directed reading on advanced topics in mathematics.

MATH 6143*
Functional Analysis I. Prerequisite(s): 4613 or 5003 or 5023, 5153, 5303. Theory of topological vector spaces including metrizability, consequences of completeness, Banach spaces, weak topologies, and convexity.

MATH 6213*
Harmonic Analysis. Prerequisite(s): 5153, 5283. Classical results giving connections among the size of a harmonic or analytic function on a complex domain, the existence and smoothness of its boundary values, and behavior of the Fourier series; selected extensions, related topics and applications.

MATH 6233*
Advanced Partial Differential Equations. Prerequisite(s): 5233 or consent of instructor. Schwarz class, tempered distributions, basic linear functional analysis, Holder spaces, Sobolev spaces, spaces involving time, Sobolev inequalities, existence and regularity theory of second-order elliptic, parabolic, and hyperbolic equations, semigroup theory.

MATH 6283*
Several Complex Variables. Prerequisite(s): 5293. Elements of function theory of several complex variables, including extension phenomena, domains of holomorphy, notions of convexity, holomorphic maps, and complex analytic varieties.

MATH 6290*
Topics in Analysis. 1-3 credits, max 9. Prerequisite(s): Consent of instructor. Advanced topics in analysis.

MATH 6323*
Algebraic Topology I. Prerequisite(s): 5313. Chain complexes, homology and cohomology groups, the Eilenberg-Steenrod axioms, Mayer-Vietoris sequences, universal coefficient theorems, the Eilenberg-Zilber theorem and Kunneth formulas, cup and cap products, and duality in manifolds.

MATH 6390*
Topics in Topology. 1-3 credits, max 9. Prerequisite(s): Consent of instructor. Advanced topics in topology.

MATH 6433*
Algebraic Geometry. Prerequisite(s): 5623. Affine and projective varieties, dimension, algebraic curves, divisors and Riemann-Roch theorem for curves.

MATH 6453*
Complex Geometry. Prerequisite(s): 5283. Complex manifolds, analytic sheaves, differential forms, Dolbeault cohomology, Hodge theory, line bundles, divisors, Kodaira embedding, and vanishing.

MATH 6490*
Topics in Geometry. 1-3 credits, max 9. Prerequisite(s): Consent of instructor. Advanced topics in geometry.

MATH 6513*
Theoretical Numerical Analysis. Prerequisite(s): 5153, 5543 or CS 5543, and 5553 or CS 5553. An advanced theoretical treatment based on function spaces and operator theory of algorithms for machine computing and analysis of errors.

MATH 6590*
Topics in Applied Mathematics. 1-3 credits, max 9. Prerequisite(s): Consent of instructor. Advanced topics in applied mathematics.

MATH 6613*
Commutative Algebra. Prerequisite(s): 5623. Commutative rings, exactness properties of modules, tensor products, integral dependence, chain conditions, completions, filtrations, local rings, dimension theory, and flatness.

MATH 6623*
Homological Algebra. Prerequisite(s): 5623. Closed and projective classes, resolution and derived functors, adjoint theorem, construction of projective classes in the categories of groups, rings and modules; categories, Abelian categories.

MATH 6690*
Topics in Algebra. 1-3 credits, max 9. Prerequisite: consent of instructor. Advanced topics in algebra.

MATH 6713*
Analytic Number Theory. Prerequisite(s): 4283 or 5283. Arithmetic functions, Zeta and L functions, distribution of primes and introduction to modular forms.

MATH 6723*
Algebraic Number Theory. Prerequisite(s): 5013 or 5623. Number fields, ideal theory, units, decomposition of primes, quadratic and cyclotomic fields, introduction to local fields.

MATH 6790*
Topics in Number Theory. 1-3 credits, max 9. Prerequisite(s): Consent of instructor. Advanced topics in number theory.

MATH 6813*
Lie Groups and Representations. Prerequisite(s): 4153 or 5053, 4613 or 5003, 5303. Differentiable manifolds, vector fields, Lie groups, exponential map, homogeneous spaces, representations of compact Lie groups, and maximal tori.

MATH 6823*
Lie Algebras. Prerequisite(s): 5013 and 5023. Matrix groups, Lie algebras, root systems, structure of semisimple Lie algebras, universal enveloping algebra, and representations of lie algebras.

MATH 6890*
Topics in Representation Theory. 1-3 credits, max 9. Prerequisite(s): Consent of instructor. Advanced topics in representation theory.

MATH 6990*
Topics in Collegiate Mathematics Education. 1-3 credits, max 9. Prerequisite(s): Consent of instructor. Advanced topics in collegiate mathematics education.

MECHANICAL AND AEROSPACE ENGINEERING (MAE)

MAE 3013
Mechanical and Aerospace Engineering Analysis. Prerequisite(s): MATH 2233 and ENSC 2123 and ENSC 2613. Setup and solution of equations which govern mechanical engineering systems. Application and solution of the governing equations to describe the steady state or transient behavior of dynamics, mechanics and circuit problems. Linear sets of equations, ODEs and PDEs will be used to describe systems. Solutions may be simplified using complex numbers of Fourier/Laplace transforms. Numerical methods for solutions will be covered. Data analysis, quality control and statistical hypothesis testing will be covered.

MAE 3033
Design of Machines and Mechanisms. Lab 2. Prerequisite(s): ENGR 1332 and ENSC 2123. Lecture: Study of the position, velocity, acceleration, and static and dynamic force behavior of machines and mechanisms. Analysis and synthesis of linkages and gear trains. Characteristics and selection of power sources, including electric motors, hydraulics, pneumatics and internal combustion engines. Lab: Machine tool safety. Use of common machine tools to build machine components. Use of lecture concepts in designing and building a machine to participate in a robot design competition.

MAE 3113
Measurements and Instrumentation. Lab 2. Prerequisite(s): ENSC 2613 and ENSC 2123. Application of basic electronic laboratory measurement equipment. Selection and testing of transducers for measurement of displacement, time frequency, velocity, pressure, force, temperature, flow-rate, and vibration, for machine design applications. Considerations of accuracy, uncertainty and repeatability. Design projects involving the use of analog and digital integrated circuits and construction of prototype sensors. Practice in the use of signal processing, including digital filtering and applications of Fast Fourier Transform theory. Practice in the use of computer-based data acquisition systems. Preparation of formal reports, including the presentation of plots, figures and tables.

MAE 3123
Manufacturing Processes. Prerequisite(s): ENSC 2143 and 3313 or equivalent. An introduction to manufacturing processes including the fundamental processes of casting, forging, rolling, extrusion, drawing and metal cutting. Quantitative relationships to identify important parameters which influence a given process.

MAE 3223
Thermodynamics II. Prerequisite(s): ENSC 2213. A continuation of ENSC 2213. Irreversibility and availability, power cycles, refrigeration cycles, mixtures and solutions, chemical reactions, phase and chemical equilibrium, and introduction to compressible flow.

MAE 3233
Heat Transfer. Prerequisite(s): ENSC 3233. Mechanisms of heat transfer. Steady and transient conduction, free and forced convection, heat exchanger design and analysis, radiation and multiphase behavior. Numerical methods, dimensional analysis and boundary layer theory.

MAE 3253
Applied Aerodynamics and Performance. Prerequisite(s): ENSC 3233, MATH 2233. Relevant fluid properties; standard atmospheres; mathematical models of flows about bodies. Characteristic parameters of airfoils and wings. Thin airfoil theory and flows about finite wings. Boundary layers. Propeller theory. Supersonic and hypersonic flows about wings and lifting bodies. Drag polars. Power required for level flight. Rate of climb and descent. Steady turns. Maximum range and endurance. Design applications.

MAE 3293
Compressible Fluid Flow. Prerequisite(s): ENSC 2213, 3233, MATH 2233. Gas flows in one and two dimensions. Basic thermodynamic and dynamic equations. Nozzle and duct flows, choking, plane and oblique shock waves, Prandtl-Meyer expansions, rocket propulsion, frictional high-velocity flows and heat addition effects. Two-dimensional ideal fluid flow, stream function, velocity potential, linearized flows and method of characteristics.

MAE 3323
Mechanical Design I. Prerequisite(s): ENSC 2113, 2143. Introduction to the design process. Consideration of reliability, factors of safety, product liability, and economics. Use of codes, standards, and other design resources. Design stress analysis of mechanical components such as beams, rings, cylinders, and shafts. Analysis of stiffness and deflection of straight and curved beams, columns, and links. Consideration of failure theories for various types of engineering materials. Application of fatigue analyses in the design process.

MAE 3403
Computer Methods in Analysis and Design. Prerequisite(s): ENGR 1412. Application of computer methods in the design, analysis, and simulation of mechanical, thermal and fluid systems. Linear algebra and numerical methods. Applied statistics.

MAE 3723
Systems I. Prerequisite(s): ENSC 2123, 2613 and MATH 2233. Physical and mathematical modeling of electrical and mechanical dynamic systems. Transient response of first and second-order systems. Laplace transform technique for solving differential equations; transfer functions, frequency response and resonance.

MAE 4010*
Mechanical Engineering Projects. 1-6 credits, max 6, Lab variable. Prerequisite(s): Consent of instructor. Special projects and independent study in mechanical engineering.

MAE 4053*
Automatic Control Systems. Prerequisite(s): 3723 or ECEN 3723. Properties of feedback control systems, mathematical models of basic components, state-variable models of feedback systems, design specifications of control systems, time-domain analysis, stability, stability robustness, transform analysis, frequency domain techniques, root-locus, design of single-input-single-output systems and compensation techniques for engineering systems. (Same course as ECEN 4413*)

MAE 4063*
Mechanical Vibrations. Prerequisite(s): 3723. Lumped parameter analysis of multi-mode vibrating systems. Analysis techniques including classical analytical methods, matrix methods and numerical methods. Selection and design of vibration isolation systems. Selection of vibration instrumentation. Machine dynamics, including balancing, whirl, nonlinear effects, and self-excited vibrations.

MAE 4223*
Aerospace Engineering Laboratory. Lab 6. Prerequisite(s): 3113, 3253, 4283. Experimental study of aerospace principles including topics in aeronautics and astronautics. State-of-the-art instrumentation, diagmostics, and computerized data acquisition equipment and techniques applied to experiments including application of low speed wind tunnel testing techniques, rocket propulsion and control-jet experiments, fundamentals of supersonic nozzles, and flight test evaluation of performance, stability, control, and handling qualities of a propeller-driven airplane.

MAE 4243*
Propulsion and Power Systems. Prerequisite(s): ENSC 3233. Aerospace power and propulsion engines utilizing a gas as the working fluid. Design and analysis of overall aircraft engine systems and individual components of the aircraft engine, as well as engine component matching for design using analysis routines, including centrifugal and axial flow turbines and compressors, inlets, diffusers, nozzles, fans and propellers. Additional propulsion and power systems including chemical and non-chemical rocket motors and other internal combustion and electric motors.

MAE 4263*
Vapor Power Systems. Prerequisite(s): 3223, 3233. Vapor power cycles, combustion processes applied to power production, power plants, and auxiliary systems associated with power plants. Overall design of power plants as well as component design. Power system economics and loan analysis. Extensive use of software design and analysis packages.

MAE 4273*
Experimental Fluid Dynamics. Lab 3. Prerequisite(s): 3113 and ENSC 3233. Experimental study of basic and applied fluid dynamics systems with comparisons to analytical predictions. Fluid dynamics instrumentation, digital data acquisition and processing, design of facilities and experiments, technical report writing and design project with experimental verification.

MAE 4283*
Aerospace Vehicle Stability and Control. Prerequisite(s): 3253, 3723, ENSC 2123. Motion and control of aerospace vehicles. Derivation of equations of motion for aircraft and spacecraft. Aerodynamic stability derivatives. Static and dynamic aircraft stability and control. Handling qualities. Satellite orbital and attitude dynamics. Satellite attitude control. Design experience for stability and control in aeronautical and astronautical vehicles.

MAE 4313*
Advanced Processing of Engineered Materials. Prerequisite(s): ENSC 3313. Introduction of novel processing methods for a range of engineered materials, such as electro-slag remelting, vacuum melting, melting to remove tramp elements, precision casting, sintering, hot-pressing, directional solidification, mechanical alloying, liquid infiltration, net-shaped finishing, superplastic forming, sol-gel processing, float glass process, tape laying, microwave processing, laser processing, CVD and PVD, sputtering, ion plating, ultraprecision machining and grinding, polishing and lapping, multilayer coatings, Czhochralski single crystal growth, processing of nanocrystalline materials, engineered surfaces and surface modification, and layer processing for electronic materials.

MAE 4333*
Mechanical Metallurgy. Lab 2. Prerequisite(s): ENSC 3313. Mechanical deformation processes and strengthening mechanisms in engineering materials. Material failure modes including creep, fatigue, stress corrosion, ductile and brittle fractures.

MAE 4344*
Design Projects. Lab 4. Prerequisite(s): 3033, 3113, 3323. Students work in small teams on a semester-long design project sponsored by a company, agency, or individual. Team members work with mentors from sponsors and with faculty members in fields related to their topics. Presentations on safety, patent law, product liability, report writing, oral presentations, scheduling and ideation. Oral presentations, progress reports, and a professional log book documenting personal activity and contributions.

MAE 4353*
Mechanical Design II. Prerequisite(s): 3033, 3323 and 3403. Design of power transmission systems, including belts, chains and gears. Selection and application of hydraulic and pneumatic components in machine design applications. Selection of electric motors, actuators, encoders, and related electromechanical components. Design practice in the form of short projects integrating segments of the course. (Same course as BAE 4353*)

MAE 4354*
Aerospace Systems Design for Mechanical Engineers. Lab 8. Prerequisite(s): 3033, 3113 and 3323. Multidisciplinary design of aerospace vehicles. Multidisciplinary teams that work on a semester-long project that includes the design, construction, and a flight test of an aerospace vehicle optimized for a given set of requirements. Teamwork, leadership and presentation skills emphasized. *Students from all appropriate disciplines who wish to participate in this course are encouraged to do so by enrolling in MAE 4010.*

MAE 4363*
Advanced Methods in Design. Lab 1. Prerequisite(s): 3113 and 3323. Analytical and experimental techniques for the analysis of vibration, stress, force and motion. The finite element analysis method is introduced. Strain gages, photoelasticity, force gages, deflection gages, accelerometers and other transducers and methods are used in the laboratory. Projects involve the combined use of advanced analytical and experimental methods to realize optimal designs.

MAE 4374*
Aerospace Systems Design. Lab 8. Prerequisite(s): 4243, 4283, 4513. Multidisciplinary design of aerospace vehicles. Multidisciplinary teams that work on a semester-long project that includes the design, construction, and a flight test of an aerospace vehicle optimized for a given set of requirements. Teamwork, leadership and presentation skills emphasized. *Students from all appropriate disciplines who wish to participate in this course are encouraged to do so by enrolling in MAE 4010.*

MAE 4513*
Aerospace Structures I. Prerequisite(s): 3323 and 3403. Design and analysis of flight structures. Topics from two and three-dimensional elasticity. Behavior of composite materials. Stress and deflection analysis of thin-skinned stiffened structures. Introduction to the finite element method and its applicability in the design process.

MAE 4623*
Biomechanics. Prerequisite(s): MATH 2163, ENSC 2143, ENSC 3233. To introduce non-bioengineering students to the field of biomechanics. This class will serve as a foundation for further biomechanics investigation at senior undergraduate and graduate level. At the end of this class students will be able to apply engineering principles to describe the mechanical properties of biological systems.

MAE 4703*
Design of Indoor Environmental Systems. Prerequisite(s): 3223, 3233. Design of heating, ventilating and air conditioning systems. Calculation of heating and cooling loads.

MAE 4713*
Thermal Systems Design, Simulation and Optimization. Prerequisite(s): 3233, 3223; ENSC 3233; Co-requisite: MAE 3403. Design, modeling, simulation and optimization of thermal systems. Analysis and modeling of components such as fans, pumps, ducts, pipes, fittings, heat exchangers, compressors, thermal storage equipment.

MAE 4733*
Mechatronics Design. Prerequisite(s): 3113 and 3403. Design of mechanical and electrical components, including sensors and actuators into an integrated environment using microcontrollers. Software design using an easy-to-program microcontroller embodies the importance of software implementation into the overall engineering system. Design practice with given design projects to build up skills plus an open-ended term design project of the student's choosing.

MAE 5000*
Thesis. 1-6 credits, max 6. A student studying for a master's degree who elects to write a thesis must enroll in this course.

MAE 5003*
Advanced Biomaterials Science and Engineering. Prerequisite(s): Graduate standing or consent of instructor. Engineering issue that are implicit in understanding the interactions of living tissue and processed materials will be introduced. Emphasis is on identifying the processes in which cells interact with surfaces and particulate matter and the outcome of these interactions. Highlighted biological responses will include inflammation and coagulation. Also, biomaterial issues related to drug delivery and tissue engineering will be discussed. (Same course CHE 5263)

MAE 5010*
Mechanical Engineering Projects. 1-12 credits, max 12. Project in research or design selected by the student, or assigned by the instructor. A student who wishes to complete a master's degree under Plan III must enroll in this course.

MAE 5013*
Physiological System Analysis for Engineers. Prerequisite(s): Graduate standing or consent of instructor. Introduce the basic physiology concepts used widely in biomedical engineering research; and introduce and develop engineering concepts and approaches for quantitative analysis of physiological systems. Engineering principles of mechanical properties of various tissue and organ systems under normal and diseased conditions. (Same course as CHE 5273)

MAE 5030*
Engineering Practice. 1-12 credits, max 12. Prerequisite(s): Senior or graduate standing and consent of instructor. Solution of real-life engineering design and development problems in an actual or simulated industrial environment. Activities include application of design and testing procedures, economic evaluation and periodic oral and written reporting on one or more assigned problems. Activities must be approved in advance by the adviser.

MAE 5033*
Advanced Biomedical Engineering. Prerequisite(s): Consent of instructor. Principles and engineering analysis of biomedical processes. Artificial organs, biomaterials, tissue engineering, transport in biological systems, biomedical imaging and drug delivery systems. (Same course as CHE 5293)

MAE 5073*
Advanced Mechanical Vibrations. Prerequisite(s): 4063 or consent of instructor. Analysis of nonlinear vibrations, classical analysis of continuous systems and numerical methods.

MAE 5083*
Engineering Acoustics. Prerequisite(s): Graduate standing or consent of instructor. Acoustical analysis and measurement techniques, with emphasis on design applications for noise and vibration control in machinery and in buildings.

MAE 5093*
Numerical Engineering Analysis. Prerequisite(s): Undergraduate course in computer programming and consent of professor. Practical digital methods for obtaining steady-state and transient solutions to lumped and distributed mechanical, fluid and thermal problems.

MAE 5113*
Diffraction in Materials. Prerequisite(s): Graduate standing or consent of instructor. Introduction to crystallography and diffraction with an emphasis on X-ray diffraction, some exposure to Neutron diffraction, radiography and tomography. Applications will focus on mechanical properties measurements. New methods will be surveyed with an emphasis on current research.

MAE 5123*
Advanced Material Removal Processes. Prerequisite(s): ENSC 3313 and MAE 3123 and graduate standing or consent of instructor. Understanding the fundamental principles and practice (mechanics and material aspects) of machining and grinding of materials. Historical aspects; physics of metal cutting, mechanics of machining (orthogonal and oblique); shear stress and shear strain in machining, dynamometry; tool materials, tool wear, tool life, and machinability; vibrations in machining; thermal aspects of machining, cutting fluids; economics; surface finish accuracy and surface integrity, and grinding.

MAE 5133*
Mechanical Behavior of Materials. Prerequisite(s): ENSC 3313 or equivalent. A unified approach to the behavior and response of engineering materials to applied loads. Mechanical and metallurgical fundamentals of deformation processes. Spatial scales of atomic physics, micromechanics and continuum mechanics.

MAE 5143*
Tribology. Prerequisite(s): Graduate standing or consent of instructor. The principles of tribology. Definition of tribology, contact of solids, surface topography, real area of contact, friction of various materials, basic mechanisms of friction, mechanisms of wear (adhesion, abrasion, fatigue, erosion, and fretting), hardness of solids, frictional heating and surface temperatures, material properties that influence surface interactions, surface roughness measurement, surface integrity residual stresses and subsurface deformation, application of tribology to manufacturing, wear resistant materials, wear-resistant coatings, experimental methods in tribology, surface analytical tools in tribology, scanning tunneling microscopy/atomic force microscopy, wear monitoring and wear prevention, and systems approach to tribology.

MAE 5153*
Precision Engineering I. Prerequisite(s): Graduate standing or consent of instructor. An integrated approach to underlying engineering principles governing product and process designs requiring accuracies typically better than 1 part in 10^6. Design and control of precision machines and instruments, dimensional and surface metrology, scanning probe microscopy, ultra-precision machining and grinding, and precision assembly.

MAE 5233*
Viscous Fluid Dynamics. Prerequisite(s): ENSC 3233. The dynamics of viscous flow over external surfaces, inside channels, and in free shear layers. Boundary layer solutions. Theory of similarity. Approximation methods.

MAE 5243*
Micro Flows. Prerequisite(s): Graduate standing or consent of instructor. Fundamentals and simulation of micro flows including governing equation, slip models, shear- and pressure-driven micro flows. Thermal effects in micro scales. Applications; MEMS and micro propulsion. Numerical methods for continuum simulation and atomistic simulation.

MAE 5253*
Multiphase Flow. Prerequisite(s): Graduate standing. Theory, methods and practical experience for studying complex transient multiphase flows: basic concepts and definition, dynamics of bubbles, drops and rigid particles, gas-liquid transport in ducts, fluid-solid transport in ducts, aerosol and spray systems, foam, fluidization, particle separation systems multiphase flow in porous media, breakup of liquid sheets and jets, modeling, advanced experimental techniques for multiphase flow.

MAE 5403*
Computer-aided Analysis and Design. Prerequisite(s): Undergraduate course in computer programming and consent of professor. Theory, application and implementation of digital-computer-oriented algorithms for the synthesis, simulation, analysis and design of engineering systems. Advanced FORTRAN methods for optimization, simulation and data analysis. Implementation of these methods uses program libraries, batch processing, remote terminals and graphic display units.

MAE 5413*
Optimal Control. Prerequisite(s): 5713 or ECEN 5713. Optimal control theory for modern systems design. Specification of optimum performance indices. Dynamic programming, calculus of variations and Pontryagin's minimum principle. Iterative numerical techniques for trajectory optimization. (Same course as ECEN 5413)

MAE 5433*
Robotics, Kinematics, Dynamics and Control. Prerequisite(s): 4053 or ECEN 4413 or consent of instructor. Kinematic and dynamic analysis of robot manipulators. Inverse kinematics, motion planning and trajectory generation. Industrial practice in robot servo control. Dynamics and control in the presence of constraints. Actuators and sensors. Force sensors and vision systems. Robotic force control and its applications in industry. Passivity based control algorithms. Advanced control techniques for motion and force control. (Same course as ECEN 5433)

MAE 5463*
Nonlinear System Analysis and Control. Prerequisite(s): 4053 or ECEN 4413. Failure of superposition of effects; phase-plane analysis; limit-cycles; Lyapunov stability; hyperstability and input-output stability; controllability and observability of nonlinear systems; feedback linearization; robust nonlinear control system design. (Same course as ECEN 5463)

MAE 5473*
Digital Control Systems. Prerequisite(s): 4053 or ECEN 4413. Input output and state space representations of linear discrete-time systems. Approximate methods in discrete-time representation. Stability methods. Controllability, observability, state estimation, and parameter identification. Design and analysis of feedback control system using frequency-domain and state-space methods. Introduction to optimal control. (Same course as ECEN 5473)

MAE 5483*
Advanced Mechatronics Design. Prerequisite(s): 4733 or similar course and consent of instructor. Continuation of topics covered in the undergraduate course MAE 4733 Mechatronics Design. Optimizing C programming code for microcontrollers using the assembly language instruction set, RS-232 microcontroller communication protocol, Controller Area Network (CAN) communication protocol plus hands-on CAN bus development boards, advanced topics which could include but are not limited to sensor design, real time operating systems, and advanced communication protocols. (Same course as ECEN 5483)

MAE 5503*
Mechanics of Advanced Composites for Structural Design. Prerequisite(s): ENSC 2113, ENSC 2143 or consent of instructor. Basic principles governing the micro-mechanics of a lamina, and the macro-mechanics of a laminate are discussed in detail. Analysis of continuous fiber, short-fiber, and woven-fiber polymer matrix composites. A computer program for a analysis and design of composite laminates is developed.

MAE 5513*
Stochastic Systems. Prerequisite(s): ECEN 3513 and 4503 or STAT 4033 or MAE 4053 or MAE 4063 or consent of instructor. Theory and applications involving probability, random variables, functions of random variables, and stochastic processes, including Gaussian and Markov processes. Correlation, power spectral density, and non-stationary random processes. Response of linear systems to stochastic processes. State-space formulation and covariance analysis. (Same course as ECEN 5513)

MAE 5523*
Estimation Theory. Prerequisite(s): 5513 or ECEN 5513. Stochastic model development, parameter estimation and state estimation. The linear model, model order determination, least squares, estimation, maximum likelihood estimation, Bayesian estimation. Gaussian random vectors, estimation in linear and Gaussian models, state estimation, the Kalman filter, prediction and smoothing. (Same course as ECEN 5523)

MAE 5533*
Analysis of Structural Systems. Prerequisite(s): 3323. Computer-oriented matrix methods in the analysis of linear structural systems; energy principles; matrix equations for static and dynamic analyses of elastic systems; stability.

MAE 5543*
Modern Materials. Prerequisite(s): ENSC 3313. Properties, applications and recent innovations of structural engineering materials. Metals, ceramics, polymers and composites considered.

MAE 5553*
Fatigue and Fracture Mechanics. Prerequisite(s): 4333 or consent of instructor. Fracture processes in engineering materials including design considerations, failure avoidance and predictability. Fatigue processes and high-strength, toughness-limited materials.

MAE 5563*
Finite Element Methods. Prerequisite(s): Graduate standing or consent of instructor. Introduction to the finite element method in mechanical engineering. Numerical and mathematical formulations including an introduction to variational methods. Computer applications in solid mechanics, heat transfer and fluid mechanics.

MAE 5573*
Continuum Mechanics. Prerequisite(s): Consent of instructor. Principles governing the mechanics of continua. Kinematics of deformation, including the Lagrangian and Eulerian descriptions. Development of stress and strain tensors. Conservation principles to derive field equations describing solid and fluid mechanics. Application to problems in linear elasticity and viscous fluid flow.

MAE 5583*
Corrosion Engineering. Lab 2. Prerequisite(s): ENSC 3313. Modern theory of corrosion and its applications in preventing or controlling corrosion damage economically and safely in service.

MAE 5593*
Theory of Viscoelasticity. Prerequisite(s): Consent of instructor. Advanced stress analysis in solids exhibiting time-dependent behavior. Material characterization and thermodynamic foundation of the constitutive behavior of time-dependent materials such as polymers, solid propellants and metals near their melting points; time-temperature; superposition principle for thermo-rheologically simple materials; correspondence principle for linearly viscoelastic and associated linearly elastic solutions; integral formulation for quasistatic boundary value problems; treatment of time-varying boundary conditions such as moving boundaries and moving loads; linearly viscoelastic stress waves and approximate methods of linearly viscoelastic stress analysis.

MAE 5633*
Advanced Thermal Systems. Prerequisite(s): 3223, 3233, ENSC 3233. Analysis, design, simulation and optimization of thermal systems. Engineering applications to HVAC systems, refrigeration systems, ground-source heat pump systems.

MAE 5653*
Refrigeration. Lab 2. Prerequisite(s): 3223. Thermal engineering of refrigeration and heat pump systems, vapor compression systems, absorption refrigeration cycles, cryogenics, compressors, heat exchangers, flow control devices, laboratory simulators and measurements, socio-economics and environmental impact of systems and refrigerants.

MAE 5663*
Advanced Finite Element Analysis. Prerequisite(s): 5563 or consent of instructor. Development of three-dimensional isoparametric solid elements using Lagrange and serendipity family of elements, solution of three-dimensional thermoelasticity problems, linear time dependent problems, variational formulation and computer implementation of structural dynamics analysis using implicitly operators, implementation of three-dimensional diffusion and heat transfer analysis, solution of a nonlinear system of equations, and finite element analysis using commercial software packages.

MAE 5673*
Mechanics of Fracture, Contact and Friction. Prerequisite(s): Graduate standing or consent of instructor. Rigorous derivation and presentation of the equations of fracture mechanics, contact and friction. Equations of solid mechanics and mathematical preliminaries, elastic stress field near a crack tip, stress intensity factors, fracture toughness, Griffith solution and J-integral, elastic-plastic fracture, fatigue, Dugdale model and cohesive zone laws, experimental techniques in fracture mechanics, contact mechanics, friction modeling. More advanced topics and projects will be chosen from interfacial crack growth, subsonic and intersonic dynamic fracture, rate- and state-dependent friction laws, fracture and friction at the small scales (nanomechanics), and finite-element analysis using commercial packages.

MAE 5683*
Advanced Materials Science I. Prerequisite(s): ENSC 3313 or equivalent. Notions of energy, entropy, equilibrium, macrostates, and microstates and their relation to material processes and properties. Deriving material properties from equations of state: Maxwell relations. Statistical thermodynamics: predicting material properties from microstates. Partition function. Phase transformations. Thermodynamics of surfaces and defects. Electrochemistry.

MAE 5703*
Optimization Applications. Prerequisite(s): Graduate standing. A survey of various methods of unconstrained and constrained linear and non-linear optimization. Applications of these methodologies using hand-worked examples and available software packages. Intended for engineering and science students. (Same course as CHE 5703*, ECEN 5703* & IEM 5023*)

MAE 5713*
Linear Systems. Prerequisite(s): Graduate standing or consent of instructor. Introduction to the fundamental theory of finite-dimensional linear systems with emphasis on the state-space representation. Mathematical representations of systems; linear dynamic solutions; controllability, observability, and stability; linearization and realization theory; and state feedback and state observer. (Same course as ECEN 5713*)

MAE 5733*
Neural Networks. Prerequisite(s): Graduate standing. Introduction to mathematical analysis of networks and learning rules, and on the application of neural networks to certain engineering problems image and signal processing and control systems. (Same course as CHE 5733* & ECEN 5733*)

MAE 5773*
Intelligent Systems. Prerequisite(s): 5733 or ECEN 5733. Introduction to the state-of-the art intelligent control and system successfully deployed to industrial and defense applications. Emerging intelligent algorithms (e.g., bottom-up, top-down, seminotics); reinforcement learning and hybrid systems; and case studies and design projects. (Same course as ECEN 5773*)

MAE 5803*
Advanced Thermodynamics I. Lab 2. Prerequisite(s): 3223. A rigorous examination of the fundamental principles of engineering thermodynamics; the First Law, Second Law and availability, single phase and multi-phase systems, chemically reactive systems, power generation, solar power, energy storage systems, statistical approaches and molecular simulation tools for microscopic analysis and macroscopic problems.

MAE 5813*
Intermediate Heat Transfer. Prerequisite(s): 3233 or equivalent. Continuation of the topics covered in the undergraduate heat transfer course (3233) with the addition of mass transfer. This course covers problems of heat and mass transfer in greater depth and complexity than is done in the undergraduate heat transfer course and incorporates the subjects that are not included or are treated lightly in that course. Analysis will be given greater emphasis than the use of correlations.

MAE 5823*
Radiation Heat Transfer. Prerequisite(s): 3233 or equivalent and graduate standing or consent of instructor. The mechanism of the transfer of energy by thermal radiation; radiant properties of materials, energy transfer prediction methods and solar energy topics.

MAE 5843*
Conduction Heat Transfer. Prerequisite(s): ENSC 3233. Advanced heat transfer analysis and design, with primary emphasis on conduction.

MAE 5853*
Computational Heat Transfer. Prerequisite(s): 3233, graduate standing, knowledge of FORTRAN. Computational techniques for the solution of two-dimensional heat transfer, fluid flow and related processes in problems of practical interest. A general-purpose computer program used to demonstrate the capabilities of the numerical method through a wide variety of engineering problems.

MAE 5863*
Building Heat Transfer and Simulation. Prerequisite(s): 3223, 3233, ENSC 3233. Conduction, convection and radiation heat transfer applied to building thermal simulation. Solar radiation.

MAE 5873*
Advanced Indoor Environmental System. Prerequisite(s): 4703. Heating, air-conditioning, ventilation and refrigeration systems. System and component analysis, design and simulation.

MAE 5913*
Advanced Aerodynamics. Prerequisite(s): ENSC 3233 or equivalent. Aerodynamics of the subsonic, transonic, supersonic, and hypersonic flow regimes. Derivation of governing equations and fundamental principles. Analytical and computational analysis methods. Recent developments.

MAE 5923*
Guidance and Control of Aerospace Vehicles. Prerequisite(s): 4053 or ECEN 4413 or equivalent. Navigation, guidance and attitude control of aircraft, launch vehicles and spacecraft. Inertial navigation mechanizations and error analysis. Stability augmentation systems.

MAE 5933*
Aeroelasticity. Prerequisite(s): Graduate standing or consent of instructor. Interaction between fluid dynamic, inertial and elastic forces. Development of analytical and computational methods for analysis. Application to a broad range of problems in engineering.

MAE 5943*
Unsteady Aerodynamics and Aeroacoustics. Prerequisite(s): ENSC 3233 or equivalent. Development of governing fluid dynamic equations for unsteady flows; linear unsteady aerodynamics for isolated and cascaded lifting surfaces; acoustics in moving media; three-dimensional duct acoustics; sound generation from isolated airfoils, cascaded airfoils, rotor-stator interactions, multiple pure-tone sources, propellers and jets.

MAE 5953*
Aerospace Systems Engineering. Prerequisite(s): 3253 or equivalent. Aircraft and spacecraft design from a systems perspective, covering basic systems engineering, cost and weight estimation, basic vehicle performance and trade study analysis, safety and reliability, lifecycle analysis, subsystem integration, risk analysis and management, system realization, and multi-disciplinary optimization (MDO). Additional topics include requirements identification and development, and program planning and control.

MAE 5993*
Microstructural Mechanics. Prerequisite(s): Graduate standing or consent of instructor. Build a framework to understand the various microstructures of materials with their respective roles in controlling mechanical properties. Grain size, orientation, surface facets, compositional gradients, and second or multiple phases, in combination with the three-dimensional arrangement of the various types of imperfections, together constitute the microstructure of a material. An emphasis will be placed on new research areas and exposure to methods for controlling and probing microstructures.

MAE 6000*
Research and Thesis. 1-15 credits, max 30. Prerequisite(s): Consent of the head or the graduate committee of the School and approval by the student's advisory committee. Independent research under the direct supervision of a member of the graduate faculty. For students pursuing study beyond the level of the MS degree.

MAE 6010*
Advanced Study. 1-12 credits, max 12. Prerequisite(s): Approval of the student's advisory committee. Study and investigation under the supervision of a member of the faculty along lines of interest well advanced of and supported by the 5000-series courses.

MAE 6123*
Advanced Processing of Materials. Prerequisite(s): Graduate standing or consent of instructor. Rationale for non-traditional machining; various non-traditional machining processes, including electro-discharge machining, electro-chemical machining, plasma arc-, microwave-, and laser assisted processing, waterjet (abrasive) cutting, ultrasonic machining, chemical machining, thermal assisted processing and electron beam machining.

MAE 6133*
Surface Mechanics. Prerequisite(s): Consent of instructor. Models and solutions basic to surface studies. Equations of continuum mechanics, thermal field solutions at sliding interfaces, elasticity, plasticity. Applications of solution techniques to surface, surface layer and interface phenomena.

MAE 6143*
Thermal Analysis of Manufacturing Processes. Prerequisite(s): Graduate standing and consent of instructor. Thermal analysis of various moving heat source problems encountered in a variety of manufacturing processes, including machining, grinding, polishing, casting, welding, energy beam cutting and other tribological applications such as meshing of gears, cams, bearings. Analysis of both transient and steady state conditions.

MAE 6233*
Turbulent Fluid Dynamics. Prerequisite(s): 5233. Isotropic turbulence, turbulent wakes and jets, bound turbulent shear flows, transition, hydrodynamic stability and integral calculation methods for turbulent boundary layers.

MAE 6263*
Computational Fluid Dynamics. Prerequisite(s): 5233. Steam function-vorticity and pressure-velocity simulations of incompressible and compressible flows. Temperature and concentration solutions. Applications to various external and internal flow problems.

MAE 6423*
System Identification. Prerequisite(s): 5473 or 5713 or ECEN 5473 or ECEN 5713. Linear and nonlinear system modeling of random systems. Models of linear time-invariant systems, nonparametric methods and preliminary model development, parameter estimation methods, convergence and consistency, asymptotic distributions of parameter estimates, nonlinear modeling. (Same course as ECEN 6423*)

MAE 6453*
Adaptive Control. Prerequisite(s): 5473 or ECEN 5473 or ECEN 5713 or MAE 5713. Analysis and design of control techniques which modify their performance to adapt to changes in system operation. Review of systems analysis techniques, including state variable representations, linearization, discretization, covariance analysis, stability, and linear quadratic gaussian design. On-line parameter estimation, model reference adaptive systems, self-tuning regulators, stable adaptive systems. (Same course as ECEN 6453*)

MAE 6463*
Advances in Nonlinear Control. Prerequisite(s): 5463 or ECEN 5463. Introduction to vector fields and Lie algebra; controllability and observability of nonlinear systems; local decompositions; input-output and state-space representation on non-linear systems; feedback linearization; controlled invariance and distribution; control of Hamiltonian systems. (Same course as ECEN 6463*)

MAE 6483*
Robust Multivariable Control Systems. Prerequisite(s): 5713 or ECEN 5713. Introduction to multivariable systems: SISO robustness vs. MIMO robustness; multivariable system poles and zeros; MIMO transfer functions; multivariable frequency response analysis; multivariable Nyquist theorem; performance specifications; stability of feedback systems; linear fractional transformations (LFT's); parameterization of all stabilizing controllers; structured singular value; algebraic ricatti equations; H2 optimal control; H-infinity controller design. (Same course as ECEN 6483*)

MAE 6843*
Convection Heat Transfer. Prerequisite(s): 5233 or equivalent. Advanced convective heat transfer in laminar and turbulent flows over external surfaces and inside channels. Heat transfer at high velocities, free convection boundary layers, and mass transfer.

MECHANICAL ENGINEERING TECHNOLOGY (MET)

MET 1103
Introduction to Mechanical Engineering Technology. Lab 2. Introduction to mechanical engineering technology, analytical techniques, and data presentation. Orientation to the mechanical engineering technologist's profession.

MET 1223
Industrial Computer-aided Design. Lab 2. Prerequisite(s): GENT 1153. Computer-aided design (CAD) generation of engineering drawings including three-dimensional product design and modeling.

MET 2103
Industrial Materials. Prerequisite(s): CHEM 1314 or CHEM 1215 or CHEM 1414. A survey of the properties, characteristics and applications of metals, polymers, ceramics and other industrial materials. Terminology, concepts and principles involved in material selection, specification and processing. Laboratory activities include data collection and report generation, determination of material properties, and evaluation of material characteristics.

MET 2313
Fundamentals of Hydraulic Fluid Power. Lab 2. Prerequisite(s): EET 1003 or CS 2103 or EET 1003 or ENGR 1412. Basic fluid power concepts. Standard hydraulic symbols, component design and application, fluid power system considerations, design and operation.

MET 3003
Dynamics. Prerequisite(s): GENT 2323 or ENSC 2113 and MATH 2123 or 2144. Plane motion of particles and rigid bodies. Force-acceleration, work-energy, and impulse-momentum principles. Graphical analysis, mechanisms and vibrations.

MET 3113
Basic Instrumentation. Lab 2. Prerequisite(s): GENT 3323, MATH 2123 and PHYS 1214. Data analysis. Theory, operational characteristics and application of transducers for measurement of strain, force, velocity, acceleration, displacement, time, frequency, temperature, pressure.

MET 3313
Applied Fluid Mechanics. Prerequisite(s): 2313, MATH 2123. Fluid mechanical principles applied to fluid power systems and general fluid systems. Fluid system analysis using Bernoulli and general energy equations, laminar and turbulent flows, flow and pressure measurement, flow forces, lift and drag.

MET 3333
Thermodynamics and Heat Transfer for Electronics. Lab 3. Prerequisite(s): MATH 2133 and junior standing. Principles of thermodynamics and heat transfer important to the design, construction and operation of electronic systems. Basic heat transfer by conduction, convection, and radiation. Heat removal from electronic systems by heat-sinking, free-air convection, forced-air convection and combinations. Identification of specific over-heating problems in electronics systems and the design of appropriate heat removal techniques.

MET 3343
Physical Metallurgy. Lab 3. Prerequisite(s): 2103. Analysis and evaluation of the properties of metals commonly used in product design. Property change caused by hot and cold working, and by heat treatment. Laboratory activities including metallographic specimen preparation, inspection and testing; and standard tests of tensile properties, hardenability, hardness and toughness.

MET 3413
Fundamentals of Pneumatic Fluid Power. Lab 2. Prerequisite(s): 2313, ECT 1003, MATH 1513. Basic pneumatics concepts, gas laws, component design and application, system design considerations. Air logic.

MET 3573
Advanced Production Processes. Lab 3. Prerequisite(s): 1223, 2103, GENT 1153, MATH 1513. Advanced manufacturing and production processes including polymers and plastics, powder metallurgy, foundry, welding and metal forming. Design for assembly (DFA) and design for manufacture (DFM).

MET 4003
Machine Design I. Prerequisite(s): GENT 3323 or ENSC 2143 and MATH 2123 or 2144. Applications of statics and strength to the design of machine components. Problems of choosing materials, impact and fatigue loading.

MET 4013
Parametric Computer-aided Design Modeling. Lab 2. Prerequisite(s): GENT 1153 and MET 1223. Computer-aided drafting and design using parametric, feature-based solid modeling techniques.

MET 4023
Advanced Mechanical Computer-Aided Design. Lab 2. Prerequisite(s): 1223 or equivalent. Computer-aided design methodologies and processes. State-of-the-art technologies and methodologies in 3D modeling and design processes.

MET 4050
Advanced Mechanical Design. 1-3 credits, max 6, Lab 0-2. Prerequisite(s): junior standing and consent of instructor. Special problems in mechanical engineering technology.

MET 4123
Senior Design Projects. Lab 6. Prerequisite(s): 1223, 4003 and ENGL 3323. Selected problems in design integrating principles of drafting, analysis, materials and manufacturing. Design projects are typically supplied by industry.

MET 4203*
Finite Element Methods. Prerequisite(s): 4003. Application of Finite Element Methods to machine component design. Problems involving stress, strain, temperature and vibration will be solved using state of the art Finite Element Software.

MET 4303
Computer Integrated Manufacturing. Lab 2. Prerequisite(s): GENT 1223, MET 1223. Introduction to programming techniques and manufacturing applications of computer numerical control (CNC) and robotics. Machine capabilities and tooling requirements with programs being prepared manually and with COMPACT II computer assistance.

MET 4313
Electrohydraulics and Motion Control. Lab 2. Prerequisite(s): 2313, EET 3104. Principles of electronics as applied to fluid power controls. Trends in modern fluid power systems. Solenoid systems, proportional control, servosystems, programmable controllers, and robotics. Lab includes design, fabrication and operation of practical systems.

MET 4453
Applied Thermodynamics. Prerequisite(s): ENSC 2213 or GENT 3433. Mixtures, psychrometrics, combustion, heat engine cycles, heat pumps cycles, internal and external combustion engines. Refrigeration.

MET 4463
Thermal Fluids Laboratory. Lab 3. Prerequisite(s): 3313, GENT 3433 and GENT 4433. Experimental study of topics in fluid mechanics, thermodynamics, and heat transfer. Interpretation of experimental data and technical report writing.

MET 4883
Tool Design. Lab 3. Prerequisite(s): 2213, 3343. Basic design and development of special tools for processing or manufacturing engineering materials. Design and specification and inspection tools using appropriate techniques of engineering graphics and analysis.

MET 4993
Mechanical Engineering Technology Practice. Prerequisite(s): Junior standing and consent of department head. Supervised industrial experience in mechanical engineering technology practice with minimal continual duration of eight weeks. Comprehensive journal, written report, and oral presentation.

MECHANIZED AGRICULTURE (MCAG)

MCAG 1413
Introduction to Engineering in Agriculture. Prerequisite(s): MATH 1513 or concurrent enrollment. Application of the physical and engineering sciences to agricultural problems. Energy; energy conversion; thermal, electrical, mechanical and fluid systems; equipment calibration; environmental control of agriculture buildings and irrigation system requirements.

MCAG 2313
Surveying. Lab 3. Prerequisite(s): MATH 1613.A study of the equipment and practices used in surveying for small areas. Common practices of plane surveying: differential, profile, and topographic leveling; field notes, accuracy and precision, error and error control, and land measurement.

MCAG 3011
AG Structures. Lab 2. Prerequisite(s): MATH 1513. Study of types of agricultural structures, building materials, construction tools and methods. Laboratory will provide opportunity to apply and develop associated skills.

MCAG 3211
Engines and Power. Lab 2. Prerequisite(s): MATH 1513. Theory, operation, performance and diagnostics of internal combustion engines for mobile applications.

MCAG 3222
Metals and Welding. Lab 2. Welding safety and the principles and applications of gas, stick and MIG welding, and cutting.

MCAG 3232
Lab Management and Project Construction. Lab 2. Prerequisite(s): 3222. Theory and practice of managing secondary school Ag Mechanics laboratories including safety, organization, design, project construction and evaluation of student projects.

MCAG 4101
AG Electrification. Lab 2. Prerequisite(s): MATH 1513. A study of electrical theory and electrical applications in agricultural environments.

MCAG 4112
Land Measurement and Site Analysis. Lab 2. Prerequisite(s): MATH 1513 or equivalent. Methods and techniques used to locate sites and evaluate physical conditions. Includes map interpretation and land description, use of Global Positioning Systems, Rectangular System of Land Description and determination of land elevations, areas and slopes. (Same course as ENVR 4112)

MCAG 4123*
Principles of Food Engineering. Prerequisite(s): MATH 1513. For non-engineers. Application of the engineering approach to solving heat and mass transfer problems in food processing. An introduction to the basic concepts of the conservation laws, fluid flow, heat transfer, refrigeration, freezing, psychrometrics, and energy conservation.

MCAG 4200*
Topics in Mechanized Agriculture. 1-4 credits, max 4. Investigations in specialized areas of mechanized agriculture.

MCAG 4203*
Irrigation Principles. Prerequisite(s): MATH 1513. Sources, measurement and efficient use of irrigation water. Selection of pumping plants and power units. Layout and management of surface and sprinkler systems.

MCAG 4212
Safety and Health in Agribusiness. Lab 2. Prerequisite(s): Junior standing or above. Study of the causes and prevention of accidents in agribusinesses. Investigations including the acute and chronic risks of machinery, animals, gases, confined spaces, outdoor and hazardous materials.

MCAG 4220*
Advanced Methods in Agricultural Mechanics. 1-6 credits, max 6. Prerequisite(s): 4222. Developing agricultural mechanics programs for vocational agriculture and technical schools. Application of agricultural mechanics methods, practices and skills to advanced projects.

MICROBIOLOGY (MICR)

MICR 1513
(L,N)Inquiry-based Biology. Lab 4. Directed inquiry and hands-on study of biological principles. Restricted to elementary education majors or related fields as model course to learn and teach science.

MICR 2002
Science Literacy. Prerequisite(s): Consent of instructor. An introduction to skills needed to identify, read and critically evaluate scientific literature and to manage and communicate research data in written oral and poster formats.

MICR 2123
Introduction to Microbiology. Prerequisite(s): BIOL 1114, CHEM 1225 or CHEM 1515. General principles of the biology of microorganisms, including bacteria, viruses, algae, fungi, protozoa and archea.

MICR 2132
Introduction to Microbiology Laboratory. Lab 4. Prerequisite(s): 2123 or concurrent enrollment. Sterile technique, microscopy, identification of microorganisms, microbial metabolism, microbial genetics and environmental microbiology. Molecular and culture techniques.

MICR 3033
Cell and Molecular Biology. Prerequisite(s): 2123 and 2132 or BOT 1404 or ZOOL 1604 and CHEM 1225 or CHEM 1515 or equivalent. The cell concept and cell morphology, cell macromolecules, organelles, enzymes, energetics, movement of water and materials across membranes, influence of external environment, cellular synthesis, growth and maintenance, control and integration of function, replication, differentiation, origin, and evolution of cells.

MICR 3103
(N)Microbes: Friends or Foes. Explores the impact of microorganisms on human life, the environment, and world history. *This course is designed for non-science majors.*

MICR 3143
Medical Mycology. Lab 4. Prerequisite(s): 2123, 2132. Examination of fungi as animal pathogens; laboratory techniques used in the identification of human and animal pathogens, and differentiation from common contaminants.

MICR 3154
Food Microbiology. Lab 4. Prerequisite(s): 2123, 2132 and CHEM 3015 or 3053. Relationship of microorganisms to food manufacture and preservation, to food spoilage and microbial food poisoning and to various aspects of primary food production. (Same course as FDSC 3154)

MICR 3223
Advanced Microbiology. Prerequisite(s): 2123, 2132; Co-requisite(s): CHEM 3015 or CHEM 3053. Subcellular structure and function of microorganisms. Synthesis, translocation, and metabolism of cellular macromolecular constituents. Substrate transport and metabolism.

MICR 3253
Immunology. Prerequisite(s): 2123 and 2132. Vertebrate host's ability to defend itself against foreign intrusion. Chemistry and biology of the acquired immune response.

MICR 4000
Honors in Microbiology. 1-4 credits, max 4. Prerequisite(s): Consent of departmental honors committee. Supervised study and research in microbiology.

MICR 4001
Professional Transitions in Microbiology and Cell and Molecular Biology. Prerequisite(s): Declared microbiology major with minimum 70 hours earned and consent of instructor. Understanding major areas and employment activities in microbiology, cell biology and molecular biology fields. Evaluating and understanding scientific and professional literature, and making the transition from undergraduate education to postgraduate education or employment.

MICR 4012
Molecular Microbiology Laboratory I. Lab 4. Prerequisite(s): 3223, 4233. Emphasis on good laboratory practices in microbiology and molecular biology; isolation and enumeration of microorganisms; physiological, biochemical, and molecular characterization of aerobic and anaerobic microorganisms. *Must be taken in conjunction with 4112 the following semester. No credit for students with credit in 5012.*

MICR 4112
Molecular Microbiology Laboratory II. Lab 4. Prerequisite(s): 4012. Continuation of 4012. Molecular characterization of prokaryotic and eukaryotic microorganisms utilizing nucleic acids, proteins, cell fractionation, cytology, and antigen-antibody reactions. *No credit for students with credit in 5112.*

MICR 4117
Clinical Microbiology. Lab 12. Prerequisite(s): Concurrent internship in affiliated hospital and all degree requirements for BS in microbiology except 30 hours clinical laboratory science. The theory and laboratory study of pathogenic bacteria, viruses, rickettsiae, fungi, and parasites. Includes isolation, identification, antimicrobial susceptibility testing, and medical significance.

MICR 4123
Virology. Prerequisite(s): 3033 or BIOC 3653; BIOL 3023; Co-requisite(s): 3223. Virus-host interactions, including structure-function of animal, plant and bacterial viruses. Discussion of the molecular biology of virus infection and development. *No credit for students with credit in 5123.*

MICR 4125
Clinical Chemistry I. Lab 9. Prerequisite(s): Concurrent internship in affiliated hospital and all degree requirements for BS in microbiology except for 30 hours clinical laboratory science. The theory and laboratory methodology of analytical biochemistry, clinical microscopy, routine and special procedures, and medical significance.

MICR 4133
Molecular and Microbial Genetics. Prerequisite(s): 2123, 2132, BIOL 3023, CHEM 3015 or 3053; Co-requisite(s): 3223. The properties of macromolecules, from the structure of proteins and nucleic acids to molecular mechanisms of DNA replication and recombination, transcription, protein synthesis, and gene regulation. Gene transfer mechanisms in bacteria and their viruses. Fundamentals of recombinant DNA technology. *No credit for students with credit in 5133.*

MICR 4134
Pathogenic Microbiology. Lab 3. Prerequisite(s): 2123, 2132. Co-requisite(s): 3223. Examination of pathogenic bacteria as they relate to humans, other animals, plants and insects. *No credit for students with credit in 5134.*

MICR 4203
Bioinformatics. Prerequisite(s): 3033 or BIOC 3653 or equivalent. Fundamental concepts of biological sequence information and inferential techniques to assign structure, function, and evolutionary relationship among genes and proteins. No prior programming necessary, but familiarity with computers assumed. *No credit for students with credit in 5203.*

MICR 4214
Microbial Ecology. Lab 4. Prerequisite(s): 2123, 2132 and CHEM 3015 or 3053. Co-requisite(s): 3223. Fundamentals of microbial physiology and genetics of microbial populations under various redox conditions. Species and functional guilds in natural habitat. Community structure and diversity of niches. Population interactions, competition and ecosystem stability. Metabolic activities in natural and managed systems. Microbial capacities and elemental cyclings. Genes and genetic exchange in the environment. Modern nucleic acid tools in microbial identification and evolutionary phylogeny. *No credit for students with credit in 5214.*

MICR 4233
Advanced Cell and Molecular Biology. Prerequisite(s): 3033. Advanced topics in cell and molecular biology including regulatory mechanisms of gene expression, protein function, cell structure and organization, cell division, and development. *No credit for students with credit in 5233.*

MICR 4236
Clinical Hematology. Lab 12. Prerequisite(s): Concurrent internship in affiliated hospital and all degree requirements for BS in microbiology except for 30 hours of clinical laboratory science. Systematized study of diseases, cell maturation and function, principles of hemostasis; methodology used in routine and special hematology studies; and correlation of hematological findings with physiological conditions.

MICR 4246
Clinical Immunology. Lab 12. Prerequisite(s): Concurrent internship in affiliated hospital and all degree requirements for BS in microbiology except for 30 hours clinical laboratory science. Immunologic responses and procedures used in serological determinations; immunohematology, fundamentals of antigen-antibody reactions, blood groups and types, compatibility testing, blood components, and the lab methods used as they relate to the medical significance of immunology and infectious diseases.

MICR 4253
Concepts in Medical Genetics. Prerequisite(s): BIOL 3023. Application of genetic principles in the study of human diseases, including the inheritance, molecular mechanisms, detection, characterization, and discovery of human genes. *No credit for students with credit in 5253.*

MICR 4263
Eukaryotic Genetics. Lab 4. Prerequisite(s): 3033. Integration of genetics and genomics principles, the basic processes of gene transmission, molecular biology of gene expression and evolutionary genetics by gaining social and historical context in which genetics are developed. Focus on the dramatic change in our understanding of human genetics and the role such information has in our view of disability and disease. *No credit for students with credit in 5263.*

MICR 4323
Bioenergetics. Prerequisite(s): 3033 or BIOC 3653. Bioenergetic reactions and mechanisms involved in energy production in plants, animals and microbial systems. *No credit for students with credit in 5323.*

MICR 4325
Clinical Chemistry II. Lab 9. Prerequisite(s): Concurrent internship in affiliated hospital and all degree requirements for BS in microbiology except for 30 hours clinical laboratory science. The theory and laboratory methodology of analytical biochemistry, instrumentation, lab mathematics, routine and special procedures and medical significance.

MICR 4351
Topics in Clinical Laboratory Science. Prerequisite(s): Concurrent internship in affiliated hospital and all degree requirements for BS in microbiology except for 30 hours clinical laboratory science. Principles and practices of the medical laboratory including basic management, quality assurance, education methodology, computer applications, laboratory safety, and special projects in selected areas.

MICR 4353
Photobiology. Prerequisite(s): 3033 or BIOC 3653. The proteins and processes involved in biological photosynthesis, photosensing, and photodamage, including their biological relevance. Involves critical reading of primary literature and examination of protein structures using bioinformatics tools. *No credit for students with credit in 5353.*

MICR 4423
Bacterial Cell Walls: Form and Function. Prerequisite(s): 2123, 2132, and 3223. Topics will include structure and synthesis of membrane and cell wall components (including lipids, peptidoglycan and membrane proteins), mechanisms of transport across the cell wall, roles components of the cell wall play in the survival of the cell (and in the case of pathogens, the ability to cause disease), and antimicrobial agents that affect the cell wall and the mechanisms used to eliminate these agents from the cell. *No credit for students with credit in 5423.*

MICR 4990
Special Problems. 1-3 credits, max 12. Prerequisite(s): Consent of instructor. Investigations in the field of microbiology.

MICR 4993
Senior Honors Project. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A research project under the direction of a faculty member resulting in a written report to be judged by a second faculty member as well. Required for graduation with departmental honors in microbiology.

MICR 5000*
Thesis. 2-6 credits, max 6. Prerequisite(s): Consent of major professor. A student studying for the MS degree enrolls in this course for six hours credit.

MICR 5001*
Professionalism for the Microbiologist. Prerequisite(s): Microbiology graduate student and permission of instructor. Introduces the microbiology graduate student to the standards of the microbiology professional and to basic skills in communication and data retrieval needed by all microbiologists. It is required of all and limited to MS and PhD students in Microbiology & Molecular Genetics.

MICR 5012*
Molecular Microbiology Laboratory I. Lab 4. Prerequisite(s): 3223, 4233. Emphasis on good laboratory practices in microbiology and molecular biology; isolation and enumeration of microorganisms; physiological, biochemical, and molecular characterization of aerobic and anaerobic microorganisms. *Must be taken in conjunction with 5112 the following semester. No credit for students with credit in 4012.*

MICR 5052*
Techniques in Molecular Biology. Lab 2. Prerequisite(s): Graduate student and permission of instructor. Provides the basic skills for scientific thinking and analysis in molecular microbiological research.

MICR 5112*
Molecular Microbiology Laboratory II. Lab 4. Prerequisite(s): 5012. Continuation of 5012. Molecular characterization of prokaryotic and eukaryotic microorganisms utilizing nucleic acids, proteins, cell fractionation, cytology, and antigen-antibody reactions. *No credit for students with credit in 4112.*

MICR 5113*
Advanced Immunology. Prerequisite(s): 3253. Advanced studies with emphasis on the regulation of vertebrate immune responses.

MICR 5123*
Virology. Prerequisite(s): 3033 or BIOC 3653, BIOL 3023. Co-requisite(s): 3223. Virus-host interactions including structure-function of animal, plant, and bacterial viruses. Discussion of the molecular biology of virus infection and development. *No credit for students with credit in 4123.*

MICR 5133*
Molecular and Microbial Genetics. Prerequisite(s): BIOL 3023, CHEM 3015 or CHEM 3053, MICR 2123 and 2132. Co-requisite(s): 3223. The properties of macromolecules, from the structure of proteins and nucleic acids to molecular mechanisms of DNA replication and recombination, transcription, protein synthesis, and gene regulation. Gene transfer mechanisms in bacteria and their viruses. Fundamentals of recombinant DNA technology. *No credit for students with credit in 4133.*

MICR 5134*
Pathogenic Microbiology. Prerequisite(s): 2123 and 2132. Co-requisite(s): 3223. Examination of pathogenic bacteria as they relate to humans, other animals, plants and insects. *No credit for students with credit in 4134.*

MICR 5142*
Techniques in Molecular Biology. Lab 4. Prerequisite(s): Consent of instructor. Comprehensive laboratory course in research techniques involving classical genetics and molecular biology.

MICR 5153*
Emerging Infectious Agents. Prerequisite(s): 4123 or 4134 or consent of instructor. An in-depth discussion of the importance of emerging infectious agents, the molecular basis for their emergence, and the broad spectrum of host-microbe interactions favoring the evolution of new infectious agents.

MICR 5160*
Seminar. 1 credit, max 2. Prerequisite(s): consent of instructor. Required of and limited to all MS and PhD students majoring in microbiology, cell and molecular biology.

MICR 5203*
Bioinformatics. Prerequisite(s): 3033 or BIOC 3653 or equivalent. Fundamental concepts of biological sequence information and inferential techniques to assign structure, function, and evolutionary relationship among genes and proteins. No prior programming necessary, but familiarity with computer desktop assumed. *No credit for students with credit in 4203.*

MICR 5213*
Environmental Microbiology. Prerequisite(s): 3223, BIOL 3653 or equivalent. Microbial processes and diversity. Fundamental and applied aspects of microbial ecology, physiology, energetics, and mechanisms of energy conservation. Microbial transformation of organic, inorganic, and pollutant compounds, and bioremediation. Study of modern molecular tools for the detection of microbes in the natural environment.

MICR 5214*
Microbial Ecology. Lab 4. Prerequisite(s): 2123 and 2132 and CHEM 3015 or 3053; Co-requisite(s): 3223. Fundamentals of microbial physiology and genetics of microbial populations under various redox conditions. Species and functional guilds in natural habitat. Community structure and diversity of niches. Population interactions, competition and ecosystem stability. Metabolic activities in natural and managed systems. Microbial capacities and elemental cyclings. Genes and genetic exchange in the environment. Modern nucleic acid tools in microbial identification and evolutionary phylogeny. *No credit for students with credit in 4214.*

MICR 5233*
Advanced Cell and Molecular Biology. Prerequisite(s): 3033. Advanced topics in cell and molecular biology including regulatory mechanisms of gene expression, protein function, cell structure and organization, cell division, and development. *No credit for students with credit in 4233.*

MICR 5253*
Concepts in Medical Genetics. Prerequisite(s): BIOL 3023. Application of genetic principles in the study of human diseases, including the inheritance, molecular mechanisms, detection, characterization, and discovery of human genes. *No credit for students with credit in 4253.*

MICR 5263*
Eukaryotic Genetics. Prerequisite(s): 3033. Integration of genetics and genomics principles, the basic processes of gene transmission, molecular biology of gene expression and evolutionary genetics by gaining social and historical context in which genetics are developed. Participants are expected to comprehend the dramatic change in our understanding of human genetics and the role such information has in our view of disability and disease. *No credit for students with credit in 4263.*

MICR 5323*
Bioenergetics. Prerequisite(s): 3033 or BIOC 3653. Bioenergetic reactions and mechanisms involved in energy production in plants, animals and microbial systems. *No credit for students with credit in 4323.*

MICR 5353*
Photobiology. Prerequisite(s): 3033 or BIOC 3653. The proteins and processes involved in biological photosynthesis, photosensing, and photodamage, including their biological relevance. Involves critical reading of primary literature and examination of protein structures using bioinformatics tools. *No credit for students with credit in 4353.*

MICR 5423*
Bacterial Cell Walls: Form and Function. Prerequisite(s): 2123, 2132, and 3223. Topics will include structure and synthesis of membrane and cell wall components (including lipids, peptidoglycan and membrane proteins), mechanisms of transport across the cell wall and the roles components of the cell wall play in the survival of the cell (and in the case of pathogens, the ability to cause disease). In addition, antimicrobial agents that affect the cell wall and the mechanisms used to eliminate these agents from the cell will also be discussed. *No credit for students with credit in 4423.*

MICR 5990*
Special Problems. 1-4 credits, max 10. Prerequisite(s): Permission of instructor. Investigations in the field of microbiology.

MICR 6000*
Dissertation. 1-15 credits, max 45. Prerequisite(s): Consent of major adviser. Research in microbiology for the PhD degree.

MICR 6112*
Molecular Biology of Bacterial Viruses. Prerequisite(s): 4123 and 4133. Advanced study of bacteriaphages.

MICR 6120*
Recent Advances in Microbiology. 1 credits, max 6. Prerequisite(s): One graduate course in biochemistry. Discussion and evaluation of recent scientific contributions in terms of the living organism.

MICR 6133*
Cellular Microbiology. Prerequisite(s): A strong undergraduate level background in microbiology, biochemistry or cell biology is expected. The molecular interactions between intracellular parasites and their host cells will be explored, emphasizing the manipulation of normal cellular processes to the benefit of the parasite. The course will involve critical reading of the current literature and development of an understanding of molecular microbe and cell biology research techniques.

MICR 6143*
Advanced Microbial Physiology. Lab 3. Prerequisite(s): 3223 or consent of instructor. Discussion of selected topics in microbial physiology. Critical analysis of research papers.

MICR 6153*
Advanced Molecular Genetics. Prerequisite(s): 4133. Structure, function and regulation of nucleic acids. Gene transfer mechanisms, genetic recombination and plasmid biology. Recent developments in recombinant DNA technology.

MICR 6213*
Molecular Microbial Ecology. Prerequisite(s): 3223 or consent of the instructor. Current questions and recent advances in molecular microbial ecology methodologies and approaches, examination of the phylogenetic and metabolic diversity of Bacteria, Archaea, and microeukaryotics in various ecosystems, microbial community composition and ecophysiology in selected habitats, identification of rare members of the microbial community.

MICR 6253*
Microbial Evolution. Prerequisite(s): 2123, 2132, BIOC 3653, BIOL 3023. The mechanisms and results of microbial evolution in nature and in the laboratory, with emphasis on microbes as model evolutionary systems, molecular evolution, classification and phylogeny, and discussion of protobiology and the probable fate of engineered microbes.

MICR 6304*
Genetics of Simple Eukaryotes. Prerequisite(s): Solid understanding of basic cellular maintenance and propagation processes and consent of instructor. In-depth discussion of lessons learned from simple eukaryotes such as S. cerevisiae (yeast), A. nidulans (fungus), D. melanogaster (fly) and C. elegans (worm).

MICR 6323*
Current Topics in Eukarytic Signal Transduction and Gene Regulation. Prerequisite(s): 3033, BIOC 3653, BIOL 3023. Discussion of current literature on the mechanisms of eukaryotic signal transduction and gene regulation.

MILITARY SCIENCE (MLSC)

MLSC 1000
Leadership Laboratory. 1 credit, max 2, Lab 2. Prerequisite(s): Concurrent enrollment in 1112 and 1212. Learning and practicing basic skills such as rappelling, drill and ceremony, land navigation, individual first aid, individual training in small unit tactics.

MLSC 1112
Foundations of Officership. Team study and activities in basic drill, physical fitness, rappelling, leadership reaction course, first aid, presentations and basic marksmanship. Fundamentals of leadership. Optional weekend exercise. *Concurrent enrollment in MLSC 1000 recommended.*

MLSC 1212
Basic Leadership. Principles of effective leading, communication skills, and organizational ethical values. *Concurrent enrollment in MLSC 1000 recommended. Optional weekend exercise.*

MLSC 2130
Military Physical Conditioning. 1 credit, max 2, Lab 3. Prerequisite(s): Must be enrolled in MLSC theory classes. Participation in and learning to plan and lead a physical fitness program. Development of an individual fitness program and the role of exercise and fitness in person's life.

MLSC 2233
Individual Leadership Studies. Lab 2. Ethics-based leadership skills that develop individual abilities and contribute to the building of effective teams. Skills in oral presentation, writing, planning, coordinating groups, land navigation and basic military tactics.

MLSC 2313
Leadership and Teamwork. Lab 2. Prerequisite(s): 2233. Individual and team aspects of military tactics in small unit operations. Safety assessment, movement techniques, planning for team safety and security and methods of pre-execution checks. Training techniques for continued leadership development.

MLSC 3113
Leadership and Problem Solving. Lab 2. Prerequisite(s): Completion of lower-division MLSC or equivalent, and approval of professor of military science. Practical opportunities to lead small groups in situations of increasing complexity receiving personal assessments and encouragement. Use of small unit defensive tactics and opportunities to plan and conduct training for lower-division students both to develop such skills and as vehicles for practicing leading.

MLSC 3223
Leadership and Ethics. Lab 2. Prerequisite(s): 3113. Analysis of tasks; preparation of written or oral guidance for team members to accomplish tasks. Delegating tasks and supervising. Planning and adapting to the unexpected in organizations under stress. Examination and application of lessons from leadership case studies. Examination of importance of ethical decision-making in setting a positive climate that enhances team performance.

MLSC 4014
Reserve Officers' Training Corps (ROTC) Advanced Camp. Lab 8. Prerequisite(s): 3113 and 3223. A five-week camp conducted at an Army post. Individual leadership and basic skills performance.

MLSC 4123
Leadership and Management. Lab 2. Prerequisite(s): 3113 and 3223. Planning conducting and evaluating activities of the ROTC cadet organization. Articulating goals, putting plans into action to attain them. Assessing organizational cohesion and developing strategies to improve it. Developing confidence in skills to lead people and manage resources.

MLSC 4223
Officership. Lab 2. Prerequisite(s): 3113 and 3223. Continuation of the methodology from MLSC 4123. Identification and resolution of ethical dilemmas. Refining counseling and motivating techniques. Examination of aspects of tradition and law as related to leading as an officer in the Army.

MLSC 4422
The Tactical Planning Process. Prerequisite(s): ROTC advanced course status or consent of department head. The tactical planning process and its components. Computer tactical simulations used to organize and synchronize the process.

MUSIC (MUSI)

MUSI 0500
Student Recital Attendance. Graduation requirement for music degree or certificate candidates. *Graded on a pass/fail basis.*

MUSI 1001
Percussion Techniques. Lab 2. Methods for playing and teaching percussion instruments.

MUSI 1011
Piano Class Lessons. Prerequisite(s): Music major status or consent of instructor. *For students with no previous experience.*

MUSI 1021
Piano Class Lessons. Prerequisite(s): Music major status or consent of instructor.

MUSI 1031
Voice Class Lessons.

MUSI 1071
Single Reed Techniques. Lab 2. Methods for playing and teaching the clarinet and saxophone.

MUSI 1081
Double Reed Techniques. Lab 2. Methods for playing and teaching the oboe and bassoon.

MUSI 1090
Secondary Harpsichord. 1-2 credits, max 8.

MUSI 1091
High Brass Techniques. Lab 2. Methods for playing and teaching the trumpet and French horn.

MUSI 1100
Elective Harpsichord. 1-2 credits, max 8.

MUSI 1110
Elective Organ. 1-4 credits, max 8.

MUSI 1120
Elective Piano. 1-4 credits, max 8.

MUSI 1130
Elective Voice. 1-4 credits, max 8.

MUSI 1140
Elective Brass. 1-4 credits, max 8.

MUSI 1150
Elective Strings. 1-4 credits, max 8.

MUSI 1160
Elective Woodwinds. 1-4 credits, max 8.

MUSI 1170
Elective Percussion. 1-4 credits, max 8.

MUSI 1180
Secondary Organ. 1-2 credits, max 8.

MUSI 1190
Secondary Piano. 1-2 credits, max 8.

MUSI 1200
Secondary Voice. 1-2 credits, max 8.

MUSI 1210
Secondary Brass. 1-4 credits, max 8.

MUSI 1220
Secondary String. 1-2 credits, max 8.

MUSI 1230
Secondary Woodwind. 1-2 credits, max 8.

MUSI 1240
Secondary Percussion. 1-2 credits, max 8.

MUSI 1250
Major Organ. 1-4 credits, max 8.

MUSI 1260
Major Piano. 1-4 credits, max 8.

MUSI 1270
Major Voice. 1-4 credits, max 8.

MUSI 1280
Major Violin. 1-4 credits, max 8.

MUSI 1290
Major Viola. 1-4 credits, max 8.

MUSI 1300
Major Cello. 1-4 credits, max 8.

MUSI 1310
Major Double Bass. 1-4 credits, max 8.

MUSI 1340
Major Flute. 1-4 credits, max 8.

MUSI 1350
Major Oboe. 1-4 credits, max 8.

MUSI 1360
Major Clarinet. 1-4 credits, max 8.

MUSI 1370
Major Saxophone. 1-4 credits, max 8.

MUSI 1380
Major Bassoon. 1-4 credits, max 8.

MUSI 1390
Major Trumpet. 1-4 credits, max 8.

MUSI 1400
Major French Horn. 1-4 credits, max 8.

MUSI 1410
Major Trombone. 1-4 credits, max 8.

MUSI 1420
Major Euphonium. 1-4 credits, max 8.

MUSI 1430
Major Tuba. 1-4 credits, max 8.

MUSI 1440
Major Percussion. 1-4 credits, max 8.

MUSI 1531
Sight Singing and Ear Training I. Lab 2. Development of skills in sight singing and aural perception. *Taken concurrently with MUSI 1533.*

MUSI 1533
Theory of Music I. Lab .5. Choral and instrumental writing and analysis correlated with keyboard skills. *Taken concurrently with MUSI 1531.*

MUSI 1541
Sight Singing and Ear Training II. Prerequisite(s): 1531 and 1533. A continuation of 1531. *Taken concurrently with 1543.*

MUSI 1543
Theory of Music II. Lab .25. Prerequisite(s): 1531 and 1533. A continuation of 1533. *Taken concurrently with 1541.*

MUSI 1623
Introduction to Music Business. Prerequisite(s): Music major status or consent of instructor. A survey of music business procedures, opportunities, technologies and trends.

MUSI 1631
Introduction to Diction for Singers I. Designed for Music Education majors. Introduces and develops skills in pronunciation and diction for singing in English and Italian.

MUSI 1641
Introduction to Diction for Singers II. Designed for Music Education majors. Introduces and develops skills in pronunciation and diction for singing in French and German.

MUSI 1723
Introduction to Music Education. An entry level course designed to socialize the music education major to the role of the music education teacher within U.S. schools. Motivation and discipline, teaching cycles, stimulus variation, multicultural music, music learning theories, music advocacy, foundations of music introduction, structured observational skills.

MUSI 2010
Piano Class Lessons. 1 credit, max 3. Prerequisite(s): 1021 and music major status. Class lessons for music majors (non-keyboard concentration) preparing for the piano proficiency examination.

MUSI 2052
String Instrument Techniques. Methods for playing and teaching the violin, viola, cello and double bass.

MUSI 2071
Flute Techniques. Methods for playing and teaching the flute.

MUSI 2091
Low Brass Techniques. Methods for playing and teaching the trombone, euphonium, and tuba.

MUSI 2250
Major Organ. 1-6 credits, max12. Prerequisite(s): 1250.

MUSI 2260
Major Piano. 1-6 credits, max 12. Prerequisite(s): 1260.

MUSI 2270
Major Voice. 1-6 credits, max 12. Prerequisite(s): 1270.

MUSI 2280
Major Violin. 1-6 credits, max 12. Prerequisite(s): 1280.

MUSI 2290
Major Viola. 1-6 credits, max 12. Prerequisite(s): 1290.

MUSI 2300
Major Cello. 1-6 credits, max 12. Prerequisite(s): 1300.

MUSI 2310
Major Double Bass. 1-6 credits, max 12. Prerequisite(s): 1310.

MUSI 2340
Major Flute. 1-6 credits, max 12. Prerequisite(s): 1340.

MUSI 2350
Major Oboe. 1-6 credits, max 12. Prerequisite(s): 1350.

MUSI 2360
Major Clarinet. 1-6 credits, max 12. Prerequisite(s): 1360.

MUSI 2370
Major Saxophone. 1-6 credits, max 12. Prerequisite(s): 1370.

MUSI 2380
Major Bassoon. 1-6 credits, max 12. Prerequisite(s): 1380.

MUSI 2390
Major Trumpet. 1-6 credits, max 12. Prerequisite(s): 1390.

MUSI 2400
Major French Horn. 1-4 credits, max 8. Prerequisite(s): 1400.

MUSI 2410
Major Trombone. 1-6 credits, max 12. Prerequisite(s): 1410.

MUSI 2420
Major Euphonium. 1-4 credits, max 8. Prerequisite(s): 1420.

MUSI 2430
Major Tuba. 1-6 credits, max 12. Prerequisite(s): 1430.

MUSI 2440
Major Percussion. 1-4 credits, max 8. Prerequisite(s): 1440.

MUSI 2450
Major Harpsichord. 1-4 credits, max 8.

MUSI 2551
Sight Singing and Ear Training III. Prerequisite(s): 1541 and 1543. Further development of skills in sightsinging and aural perception. *Taken concurrently with 2553.*

MUSI 2553
Theory of Music III. Lab .5. Prerequisite(s): 1541 and 1543. Choral and instrumental writing correlated with sightsinging, melodic and harmonic dictation and keyboard skills. *Taken concurrently with 2551.*

MUSI 2561
Sight Singing and Ear Training IV. Prerequisite(s): 2551 and 2553. A continuation of 2551. *Taken concurrently with 2563.*

MUSI 2563
Theory of Music IV. Lab .5. Prerequisite(s): 2551 and 2553. A continuation of 2553. *Taken concurrently with 2561.*

MUSI 2573
(H)Introduction to Music. Instruments, musical forms and styles, and major composers from the 16th century to the present. *For non-majors; no prior musical experience required.*

MUSI 2600
Chamber Ensembles. 1 credit, max 8, Lab 2. Combination of voices, keyboard, and orchestral instruments for performing chamber music, music theater and duo piano repertoire. (Same course as 4600*)

MUSI 2610
University Bands I. 1-2 credits, max 6, Lab 3-5.

MUSI 2620
Symphony Orchestra I. 1-2 credits, max 6, Lab 3. (Same course as 3620 & 5620*)

MUSI 2630
University Choral Ensembles I. 1-2 credits, max 6. (Same course as 3630 & 5630*)

MUSI 2832
Elementary Music Methods. Prerequisite(s): 1723. An overview of effective methods, techniques and materials for teaching music to children in the elementary grades. Theories of child development and implications on music learning; current philosophies or approaches for teaching music (Kodaly, Orff, and Dalcroze); designing and teaching musical activities through which children learn musical concepts and develop musical skills.

MUSI 2842
Intermediate Music Methods. Prerequisite(s): 2832. Second in a series of two vocal method courses for vocal music education majors. Field experience and peer teaching activities. Curriculum design and evaluation; technology for music instruction; multicultural music in the classroom; music for exceptional children; and music in an integrated curriculum.

MUSI 3022
Piano Skills for Vocal Music Education Majors. Prerequisite(s): 2010 or consent of instructor. Development of skills in sight-reading, score reading, and general ensemble accompaniment for vocal music education majors.

MUSI 3110
Elective Organ. 1-4 credits, max 8. Prerequisite(s): 1110.

MUSI 3120
Elective Piano. 1-4 credits, max 8. Prerequisite(s): 1120.

MUSI 3130
Elective Voice. 1-4 credits, max 8. Prerequisite(s): 1130.

MUSI 3140
Elective Brass. 1-4 credits, max 8. Prerequisite(s): 1140.

MUSI 3150
Elective String. 1-4 credits, max 8. Prerequisite(s): 1150.

MUSI 3160
Elective Woodwind. 1-4 credits, max 8. Prerequisite(s): 1160.

MUSI 3170
Elective Percussion. 1-4 credits, max 8. Prerequisite(s): 1170.

MUSI 3180
Secondary Organ. 1-2 credits, max 8. Prerequisite(s): 1180.

MUSI 3190
Secondary Piano. 1-2 credits, max 8. Prerequisite(s): 1190.

MUSI 3200
Secondary Voice. 1-2 credits, max 8. Prerequisite(s): 1200.

MUSI 3210
Secondary Brass. 1-2 credits, max 8. Prerequisite(s): 1210.

MUSI 3220
Secondary String. 1-2 credits, max 8. Prerequisite(s): 1220.

MUSI 3230
Secondary Woodwind. 1-2 credits, max 8. Prerequisite(s): 1230.

MUSI 3240
Secondary Percussion. 1-2 credits, max 8. Prerequisite(s): 1240.

MUSI 3250
Major Organ. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2250.

MUSI 3260
Major Piano. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2260.

MUSI 3270
Major Voice. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2270.

MUSI 3280
Major Violin. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2280.

MUSI 3290
Major Viola. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2290.

MUSI 3300
Major Cello. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2300.

MUSI 3310
Major Double Bass. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2310.

MUSI 3340
Major Flute. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2340.

MUSI 3350
Major Oboe. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2350.

MUSI 3360
Major Clarinet. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2360.

MUSI 3370
Major Saxophone. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2370.

MUSI 3380
Major Bassoon. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2380.

MUSI 3390
Major Trumpet. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2390.

MUSI 3400
Major French Horn. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2400.

MUSI 3410
Major Trombone. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2410.

MUSI 3420
Major Euphonium. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2420.

MUSI 3430
Major Tuba. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2430.

MUSI 3440
Major Percussion. 1-4 credits, max 8. Prerequisite(s): Upper-division examination, 2440.

MUSI 3450
Major Harpsichord. 1-4 credits, max 8.

MUSI 3460
Secondary Harpsichord. 1-2 credits, max 8.

MUSI 3543
(H,I)Music and Culture of Northern Italy. Study of northern Italy's contributions to culture through music and composers, instrument makers, architecture, and visual arts.

MUSI 3552
Introduction to Recording Studio Techniques I. Prerequisite(s): 3592. Introduction to performance and characteristics of studio components. Basic signal flow, basic microphone design and application, recording session procedures, role of assistant engineers.

MUSI 3562
Recording Studio Techniques II. Prerequisite(s): 3552. Introduction to specialized computer applications in music, including introductory music notation, digital audio recording.

MUSI 3573
(D,H)America's Ethnic Music. A survey of the ethnic settlers of America and their musical traditions and literatures. Particular emphasis is given to settlers indigenous to Oklahoma. Students will examine their individual ethnic roots in music, family traditions, and life passages (births, deaths, celebrations).

MUSI 3583
(H,I)Traditional World Music. Survey of the richly diverse music of non-western cultures emphasizing traditional musical practices prior to contact with western media. Exploration of the wide parameters of musical possibilities and the distinct priorities of various musical cultures, in order to gain insight and appreciation of distinctly non-western music. Historical recordings supplemented by video tapes. Knowledge of western classical music notation helpful. *Intended for students having earned at least 40 credit hours.* (Same course as 5583*)

MUSI 3592
Introduction to Music Technology. Introduction to specialized computer applications in music, including music notation, digital audio recording, processing and editing.

MUSI 3610
University Bands II. 1-2 credits, max 6, Lab 3. Prerequisite(s): 4 hours of 2610. (Same course as 2610 & 5610*)

MUSI 3620
Symphony Orchestra II. 1-2 credits, max 6, Lab 3. (Same course as 2620 & 5620*)

MUSI 3630
University Choral Ensembles II. 1-2 credits, max 6. Prerequisite(s): 4 hours of 2630. (Same course as 2630 & 5630)

MUSI 3631
Rehearsal Practicum. Lab 3. Prerequisite(s): 3722 and 3732. Designed for Music Education majors who are within two semesters of student teaching. Permission of instructor is required. Prepares future teachers with classroom skills using one of the choral ensembles or lab choirs as a rehearsal medium.

MUSI 3642
English and Italian Diction and Vocal Literature. Course is designed for vocal performance majors, vocal music education majors and other serious voice students to assist them in mastering correct pronunciation and diction for singing standard English and Italian through the study and use of the international phonetic alphabet, and to familiarize them with many of the composers and songs which comprise the standard English and Italian vocal literature.

MUSI 3652
French Diction and Vocal Literature. Course is designed for vocal performance majors, vocal music education majors and other serious voice students to assist them in mastering correct pronunciation and diction for singing in French through the study and use of the international phonetic alphabet, and to familiarize them with many of the composers and songs which comprise the standard French vocal literature.

MUSI 3662
German Diction and Vocal Literature. Course is designed for vocal performance majors, vocal music education majors and other serious voice students to assist them in mastering correct pronunciation and diction for singing in German through the study and use of the international phonetic alphabet, and to familiarize them with many of the composers and songs which comprise the standard German vocal literature.

MUSI 3712
Basic Conducting. Principles of conducting choral and instrumental groups.

MUSI 3722
Advanced Ensemble Conducting. Prerequisite(s): 3712. Studies in advanced physical conducting techniques and score orientation, score reading, score analysis, and score interpretation.

MUSI 3732
Secondary Choral Methods. Prerequisite(s): 3712. Repertoire, rehearsal procedures, and vocal techniques for the public school choral teacher.

MUSI 3741
Survey of Rock and Roll I. An examination of the cultural and musical elements that led to the advent of Rock and Roll, through an exploration of the evolution of the music from its inception to 1980 through lecture, reading and musical recordings.

MUSI 3743
Foundations of Music Education. Prerequisite(s): Full admission to Professional Education. Interdisciplinary approach including aspects of philosophy, aesthetics, sociology and psychology as they are applied in music in post-elementary public schools.

MUSI 3751
Survey of Rock and Roll II. An examination of the cultural and musical elements that led to the advent of Rock and Roll, through an exploration of the music from 1980 to the present.

MUSI 3753
(H)History of Music to 1600. Prerequisite(s): 1543 or consent of instructor. Aids music majors and other qualified students in understanding the musical styles, forms, schools, composers and instruments that developed in Western civilization from antiquity through the Renaissance period.

MUSI 3763
History of Music from 1600-1800. Prerequisite(s): 1533, 1543 or equivalent. Aids music majors and other qualified students in understanding the musical styles, forms, schools, composers and instruments that developed in Western civilization from the Baroque period through to the Classical period.

MUSI 3772
Counterpoint. Prerequisite(s): 2563 and satisfactory upper-division examination. Analysis and application of contrapuntal techniques of the 18th century.

MUSI 3783
Form and Analysis. Prerequisite(s): 2563 and satisfactory upper-division examination. Analysis of standard repertoire with emphasis on form and structural harmonic analysis.

MUSI 3842
Marching Band Methods. Prerequisite(s): 1723 and 2832 and concurrent enrollment in 2610 or 3610 (marching band). Organizational responsibilities and charting for public school marching bands. *Must be taken concurrently with 2610 or 3610 (marching band).*

MUSI 3852
Secondary Instrumental Methods. Prerequisite(s): 2832; 3712. This course is designed to give instrumental music education majors an in-depth look at administering a public school band program, including history and wind literature, literature selection, preparing budgets, preparing commissioning projects, working with administration, school boards and parent groups, organizational responsibilities, and charting for public school marching bands.

MUSI 3873
History of Music from 1800-present. Prerequisite(s): 1533 and 1543. Aids music majors and other qualified students in understanding the musical styles, forms, schools, composers and instruments that developed in Western civilization from the Romantic period through to the present.

MUSI 3901
Junior Recital. Prerequisite(s): Junior standing and consent of major applied music teacher.

MUSI 4100
Music Industry Internship. 1-8 credits, max 8. Prerequisite(s): 90 credit hours and minimum 2.50 GPA in all music and business courses. Directed practical experiences in an approved work situation related to the music industry.

MUSI 4250
Major Organ. 1-6 credits, max 12. Prerequisite(s): 3250 and successful completion of recital attendance requirements.

MUSI 4260
Major Piano. 1-6 credits, max 12. Prerequisite(s): 3260 and successful completion of recital attendance requirements.

MUSI 4270
Major Voice. 1-6 credits, max 12. Prerequisite(s): 3270 and successful completion of recital attendance requirements.

MUSI 4280
Major Violin. 1-6 credits, max 12. Prerequisite(s): 3280 and successful completion of recital attendance requirements.

MUSI 4290
Major Viola. 1-6 credits, max 12. Prerequisite(s): 3290 and successful completion of recital attendance requirements.

MUSI 4300
Major Cello. 1-6 credits, max 12. Prerequisite(s): 3300 and successful completion of recital attendance requirements.

MUSI 4310
Major Double Bass. 1-6 credits, max 12. Prerequisite(s): 3310 and successful completion of recital attendance requirements.

MUSI 4340
Major Flute. 1-6 credits, max 12. Prerequisite(s): 3340 and successful completion of recital attendance requirements.

MUSI 4350
Major Oboe. 1-6 credits, max 12. Prerequisite(s): 3350 and successful completion of recital attendance requirements.

MUSI 4360
Major Clarinet. 1-6 credits, max 12. Prerequisite(s): 3360 and successful completion of recital attendance requirements.

MUSI 4370
Major Saxophone. 1-6 credits, max 12. Prerequisite(s): 3370 and successful completion of recital attendance requirements.

MUSI 4380
Major Bassoon. 1-6 credits, max 12. Prerequisite(s): 3380 and successful completion of recital attendance requirements.

MUSI 4390
Major Trumpet. 1-6 credits, max 12. Prerequisite(s): 3390 and successful completion of recital attendance requirements.

MUSI 4400
Major French Horn. 1-6 credits, max 12. Prerequisite(s): 3400 and successful completion of recital attendance requirements.

MUSI 4410
Major Trombone. 1-6 credits, max 12. Prerequisite(s): 3410 and successful completion of recital attendance requirements.

MUSI 4420
Major Euphonium. 1-4 credits, max 8. Prerequisite(s): 3420 and successful completion of recital attendance requirements.

MUSI 4430
Major Tuba. 1-6 credits, max 12. Prerequisite(s): 3430 and successful completion of recital attendance requirements.

MUSI 4440
Major Percussion. 1-6 credits, max 12. Prerequisite(s): 3440 and successful completion of recital attendance requirements.

MUSI 4450
Major Harpsichord. 1-4 credits, max 8.

MUSI 4490*
Lessons in Applied Music (Major Field). 1-4 credits, max 4. Prerequisite(s): Bachelor's degree or equivalent performing level in applied major field. Major applied music field.

MUSI 4600*
Chamber Ensembles. 1-2 credits, max 12, Lab 2. Prerequisite(s): 4 hours of MUSI 2600 or equivalent. Combinations of voices, keyboard, and orchestral instruments for performing chamber music, music theater and duo piano repertoire. (Same course as 2600)

MUSI 4810*
Problems in Musical Composition. 1-2 credits, max 8. Prerequisite(s): 1543 and consent of instructor. Practical experience in musical composition.

MUSI 4840*
Special Studies in Music Literature. 1-2 credits, max 4. Prerequisite(s): Junior standing or consent of instructor. Survey of music literature suitable for teaching various levels in applied music.

MUSI 4842
Choral Literature for the Classroom. Prerequisite(s): 3732. Exploration of the vast amount of choral literature available to the choral conductor. Includes repertoire for all ages and all voices.

MUSI 4890*
Special Studies in Music Pedagogy. 1-2 credits, max 4. Prerequisite(s): Junior standing or consent of instructor. Survey of music pedagogical methods suitable for various levels and types of applied music.

MUSI 4901
Senior Recital. Prerequisite(s): Senior standing and permission of major applied music teacher.

MUSI 4912
Orchestration and Arranging. Prerequisite(s): Upper-division standing as a music major or consent of instructor. Orchestrating for instrumental ensembles and arranging for choral ensembles.

MUSI 4940
Student Teaching in Public School Music. 1-12 credits, max 12. Prerequisite(s): Full admission to Professional Education. Directed observation, seminars, and supervised student teaching in selected elementary and secondary music programs. *Graded on a pass-fail basis.*

MUSI 4952*
Music in the School Curriculum. Aims, content and motivation of the music education program in elementary and secondary schools from the standpoint of the classroom teacher, music specialist and administrator.

MUSI 4962*
Music Education Seminar. Research into latest developments of public school choral and instrumental music.

MUSI 4972
Analysis of Music Since 1900. Prerequisite(s): 2563, 3873. Techniques for the analysis of music from the 20th and 21st centuries, including set analysis. *Meets with 5972. No credit for students with credit in MUSI 5972.*

MUSI 4990*
Selected Studies in Music and Music Education. 1-3 credits, max 8. Short-term area studies in music and music education.

MUSI 4993
Senior Honors Project. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided program in musicological research, music composition, or music performance, ending with an honors project under the direction of a faculty member with a second faculty member to complete an examining committee. Required for graduation with departmental honors in music.

MUSI 5002*
Final Degree Performance. Prepare and perform or conduct a public concert or recital of significant repertoire.

MUSI 5012*
Final Degree Paper. Submission of a formal paper that is an interpretive analysis of repertoire performed on the final degree performance, or a formal paper on topics related to the student's applied area.

MUSI 5113*
Introduction to Graduate Studies in Music. Prerequisite(s): Admission to Master of Music program. Understanding of the resources available for research in the field of music. Explanation of the types of research materials needed for classes in the Master of Music degree program, as well as providing the groundwork for success in the professional world as a music educator and performer.

MUSI 5480*
Lessons in Applied Music (Minor Field). 1-4 credits, max 12. Prerequisite(s): Bachelor's degree or equivalent performance level in applied major field.

MUSI 5490*
Lessons in Applied Music (Major Field). 1-4 credits, max 12. Prerequisite(s): Bachelor's degree or equivalent performing level in applied major field. Private Lessons.

MUSI 5512*
Advanced Studies in Music Literature and Pedagogy I. Prerequisite(s): 3753, 3763 or equivalent. Techniques of successful programming, teaching and performance of ensemble literature through a survey of repertoire appropriate to the student's chosen medium.

MUSI 5522*
Advanced Studies in Music Literature and Pedagogy II. Prerequisite(s): 3753, 3763 or equivalent. A continuation of 5512, with emphasis upon music of the 20th century and its attendant specialized performance techniques.

MUSI 5583*
Traditional World Music. Survey of the richly diverse music of non-Western cultures emphasizing traditional musical practices prior to contact with Western media. Historical recordings supplemented by video tapes. Knowledge of Western classical music notation helpful. *Taught in conjunction with 3583*. (Same course as 3583)

MUSI 5610*
University Bands. 1-2 credits, max 12. Large ensembles. (Same course as 2610 & 3610)

MUSI 5620*
Symphony Orchestras. 1-2 credits, max 12. Large ensembles. (Same course as 2620 & 3620)

MUSI 5630*
University Choral Ensembles. 1-2 credits, max 12. Large ensembles. (Same course as 2630 & 3630)

MUSI 5712*
Advanced Studies in Conducting I. Prerequisite(s): 3712 and 3722 or equivalent. Acquisition of an expressive conducting gestural vocabulary as it relates to the student's chosen medium.

MUSI 5722*
Advanced Studies in Conducting II. Prerequisite(s): 5712. A continuation of 5712 focusing upon the gestural vocabulary as it relates to the specific complexities of contemporary music.

MUSI 5733*
Techniques of Pedagogy and Performance. Prerequisite(s): 3712 and 3722 or equivalent. Advanced techniques and modes for preparing music for performance.

MUSI 5742*
Conducting Practicum. Prerequisite(s): 5712, 5722. Supervised conducting opportunities with major OSU ensembles or approved off-campus ensembles.

MUSI 5750*
Seminar in Music History. 3 credits, max 9. Prerequisite(s): 3753 and 3763 or equivalent. Major European musical genres and pedagogical methods of a specified time in musical history. Acquaintance with source materials from the specified period to facilitate a knowledge of performance of genres studied. Topics vary.

MUSI 5842*
Music Repertory. Survey of music literature suitable for teaching various levels in applied music.

MUSI 5962*
Analysis of Musical Styles. Prerequisite(s): 3783 or equivalent. Exploration of techniques appropriate for the analysis of selected music of various styles and genres of the 17th, 18th and 19th centuries, including Schenkerian analytic techniques.

MUSI 5972*
Analysis of Music Since 1900. Prerequisite(s): 2563, 3873. Techniques for the analysis of music from the 20th and 21st centuries, including set analysis. *Meets with 4972. No credit for students with credit in MUSI 4972.*

NATURAL RESOURCE ECOLOGY AND MANAGEMENT (NREM)

NREM 1011
Professions in Natural Resources. An examination of the professions that focus on the ecology and management of natural resources. Exploration of academic and career options. *Graded on a pass-fail basis.*

NREM 1014
(L,N)Introduction to Natural History. Lab 2. The study of living organisms especially their origins, life histories, behaviors, conservation, and unique adaptations for reproducing and relating to their environment. Laboratory emphasis is on observation and investigation of the diversity and adaptations of living organisms.

NREM 1114
Elements of Forestry. Lab 3. Survey of forestry as an art, science and profession including forestry and natural resource management theory, forest resource distribution and ownership, history of forest resource policy development, administration and management of forest resources, forest protection, wildlife interactions, forest recreation, forest ecosystem process, land and tree measurements, mapping, current issues, and career opportunities. *One required two-day field trip.*

NREM 1214
Introduction to Wood Properties and Products. Lab 2. Basic understanding of anatomical, physical and mechanical properties of solid wood and wood products. Macroscopic and microscopic identification of wood. Principles of manufacture of lumber, plywood and wood composites. Biological deterioration of wood and main wood preservation techniques. *One weekend field trip required.*

NREM 2013
(N)Ecology of Natural Resources. Prerequisite(s): BIOL 1114 or PLNT 1213. Introductory focus on understanding and applying general ecological principles to agricultural and natural ecosystems. Emphasis on relationships between climate, soils, agricultural, and natural ecosystems. Topics include nutrient cycles, energy flow, species interactions, biological diversity, productivity, sustainability, and landscape and ecosystem management.

NREM 2103
Forest Measurements I. Lab 2. Prerequisite(s): 1114; MATH 1715 (or MATH 1513 and 1613); STAT 2013 (or concurrent). An introduction to the measurements of forests, forest products, standing trees, growth, and the application of mensurational techniques to timber valuation and analysis. Measurement techniques of non-timber components of forest resources.

NREM 2113
Timber Harvesting. Lab 3. Theory and strategies of planning and management of timber harvesting. Harvesting techniques including felling, bucking, skidding operations, and cable yarding. Timber harvest cost analysis, safety aspects of harvesting, and principles of forest road building. Field practices in road design and surveying. Field trips to industrial timber harvesting operations.

NREM 2134
Dendrology. Lab 4. Identification, taxonomy and distribution of forest trees and shrubs of the United States; their environmental requirements and utilization.

NREM 3083
Geospatial Technologies for Natural Resources. Lab 3. Prerequisite(s): MATH 1483 or 1493 or 1513. Principles and application of geospatial technologies for natural resource ecology and management including remote sensing (aerial photography and satellite data), geographic information systems (GIS) and global positioning system (GPS) technologies.

NREM 3101
Forest Resource Field Studies. Lab 2. Prerequisite(s): 2134 and BOT 1404 and SOIL 2124. One-week summer pre-session field experience at an off-campus site. Field study in the dynamics of forest ecosystems and related components including trees, soils, water, fauna, and associated flora as they relate to site productivity and the production of resource outputs, products, and services.

NREM 3102
Forest Measurements II. Lab 4. Prerequisite(s): 2103. Two-week summer pre-session field experience at an off-campus site. Land, tree, stand and forest-level measurements, and the use and care of measurement equipment. Emphasis on statistical and tactical design of forest inventory methods, and their implementation in the field.

NREM 3103
Natural Resource Field Studies. Lab 6. Three-week summer pre-session field experience at an off-campus site. Field study, analysis, and assessment of natural resource ecosystems at multiple scales with application to integrated management of forest, wildlife, range, water, soil, and recreation resources to sustain a broad array of uses and values, and to understand associated ecological, social, policy, and ethical issues. Includes visitations to private and public natural resource lands and projects.

NREM 3113
Wood Properties. Lab 2. Prerequisite(s): 1214. Cellular and microscopic structure of wood. Properties of cellulose, lignin and hemicellulose. Wood and water relationship; wood drying and treatment systems. Stress-strain systems, rheological characteristics of wood, and assignment of design stresses in structural uses.

NREM 3213
Forest Ecology. Lab 2. Prerequisite(s): BOT 1404. Study of the forest ecosystem, its structure, function, physical environment, biotic components, change over time and management implications.

NREM 3224
Silviculture. Lab 2. Prerequisite(s): 3213. Theory and practice of controlling forest establishment, composition, structure, and growth to meet multiple objectives. Principles and techniques of natural and artificial regeneration, intermediate cultural treatments, and silvicultural systems applicable in various forest cover types. *Two-day field trip is required.*

NREM 3323
Forest Economics and Finance. Prerequisite(s): AGEC 1114. Economic factors and analytical methods influencing decisions in forest resource management; factors affecting the production of wood products; arithmetic of interest and investment criteria; economics of non-market goods.

NREM 3343
(N)Forest Environmental Science. Overview and analysis of forests, their related environments, their associated natural resources, and their tangible and intangible values, emphasizing basic principles of scientific forest management, the use of forest resources by society, natural resource administration and policy, and current issues in forestry. *No credit for NREM in Forestry options.*

NREM 3363
Forest Biometrics. Prerequisite(s): 3102; MATH 2103. The application of statistical methods to forestry problems including stand volume estimation, growth measurement, and volume table construction. Introduction to the use and significance of forest yield tables in forest management. Applications of microcomputing to analysis of forestry data.

NREM 3502
Wildlife Law Enforcement. Prerequisite(s): Junior standing and consent of instructor. Survey of state and federal wildlife laws with emphasis on Oklahoma statutory and regulatory laws pertaining to wildlife. Lectures, guest lectures, videotapes and field exercises.

NREM 3513
Principles of Conservation Biology. Prerequisite(s): 60 credit hours including BIOL 3034. Application of ecological principles to the maintenance and restoration of biological diversity at genetic, population, and community levels. (Same course as ZOOL 3513)

NREM 3613
Principles of Rangeland Management. Prerequisite(s): 2013 or 3213 or BIOL 3034 and SOIL 2124. Overview of the science of applying ecological principles to managing rangeland resources, including rangeland characteristics; goods and services provided by rangelands; primary threats to rangelands; North American rangeland resources; principles of grazing management and current topics in range management.

NREM 3713
Wildland Fire Ecology and Management. Prerequisite(s): 2013 or any ecology course; and BIOL 1114. Fundamentals of wildland fire including chemistry and physics of fire, fuel and weather influences on fire behavior, ecological effects of fire, interaction of fire and vegetation, history of humans and fire, fire management and suppression, and prescribed fire.

NREM 3900
Colloquium on the Environment and Conservation. 1 credit, max 4. Current conservation and environmental concerns presented by scholars and experts emphasizing discovery and solutions. Natural resource agencies and conservation organizations.

NREM 4023
Restoration Ecology. Prerequisite(s): 2013 or BIOL 3034. Application of ecological theory to the practice of ecological restoration to improve populations, communities, and ecosystems degraded directly or indirectly by human activities.

NREM 4033
Ecology of Invasive Species. Prerequisite(s): BIOL 1114; and BOT 1401 and ZOOL 1604 recommended. Ecological principles and their application to invasive species. Population level characteristics; community and ecosystem level effects of a wide variety of taxa including microbial, fungal, plant, invertebrate, and vertebrate examples. Global consequences and governmental policies/programs designed to limit the spread of invasives.

NREM 4213*
Forest Ecophysiology. Prerequisite(s): BOT 1404. The growth and response of trees and forests to environmental, cultural and genetic factors. Application of physiological principles in predicting the effects of cultural practices on tree growth.

NREM 4273
Ecological Genetics. Prerequisite(s): BOT 1404 or ZOOL 1604, STAT 2013 and any ecology course. Physical basis and principles of inheritance and genetic variation in populations, and how they arise, are quantified, and manipulated by nature and man. Concepts in population and quantitative genetics and their relationship to the evolution of natural and managed populations.

NREM 4323*
Timber Management. Prerequisite(s): 3223, 3323. Regulation of forest growing stock to meet management objectives. Land and timber appraisals. Organization of the forest enterprise to meet financial objectives of management.

NREM 4333*
Forest Resource Management: Planning and Decision-Making. Lab 2. Prerequisite(s): 4323. Integrated problem solving, to apply biological, quantitative, economic, political, and administrative principles in solving forest resource management problems.

NREM 4343*
Natural Resource Administration and Policy. Prerequisite(s): Senior standing. Natural resource policy and legislation; ethics relating to natural resources; natural resource organizations and how they function to include structure, supervision, and financing of federal, state, and private natural resource enterprises.

NREM 4353*
Natural Resource Recreation. Ecological, historical, social and policy basis for recreational use and management of natural resources, including an analysis of planning, management, and administrative frameworks for providing a diversity of recreational opportunities, benefits, and resource values.

NREM 4363
Ecotourism and Wilderness Management. Principles, applications, management approaches, case-studies and issues associated with ecotourism and wilderness use for a diversity of values and benefits. Historical, social, cultural, economic, political, and ecological foundations and implications of nature-based tourism and wilderness recreation.

NREM 4393
(I)Forests, People, and Sustainable Development. Prerequisite(s): Consent of instructor. Relationship between people, forests, the land, and associated resources in the developing world, including the ecological and cultural basis for resource use and development. Examines issues of traditional agriculture and deforestation, and explores sustainable strategies for land use, resource management, and community development. *Includes two-week study abroad component.*

NREM 4403*
Wetland Ecology and Management. Lab 3. Prerequisite(s): 3513 or BIOL 3034, or NREM 3213 or consent of instructor. Ecology, classification, restoration, and management of wetlands. Adaptations of wetland plants and animals, structure and function of wetlands, field identification of wetland plants, restoration techniques, wetland classification systems, management and conservation of wetlands, and regulatory processes.

NREM 4411*
Water Quality Laboratory. Lab 3. Prerequisite(s): 4413, previous or concurrent. Techniques to monitor surface water for non-point source pollution. Water sampling strategies, chemical and physical analysis for nutrients, sediment and other constituents, biological analysis, quality control and interpretation of results. *One required field trip.*

NREM 4413*
Watershed Hydrology and Water Quality. Lab 2. A study of the effects of land management on non-point source pollution of surface waters. Basic watershed hydrology and the role of hydrologic processes and watershed characteristics in controlling the quantity and quality of water from watersheds. Forest, range and agricultural land uses. Discussion of methods of non-point source pollution control.

NREM 4414*
Fisheries Management. Lab 4. Prerequisite(s): BIOL 3034. Techniques and principles involved in management of fishes. *Field trip fee required.*

NREM 4424
Fisheries Techniques. Lab 4. Prerequisite(s): 4414, BIOL 3034, and ENGL 3323 strongly recommended. Research techniques and methodology in fisheries science, including sampling design, habitat measurements, sampling gears and abundance estimation, age and growth analysis, recreational surveys, data analysis, and report writing. *No credit for students with credit in 5424*.*

NREM 4464*
Ornithology. Lab 2. Prerequisite(s): ZOOL 1604. Classification, evolution, distribution, identification, life histories, and morphological, ecological, and behavioral adaptations of birds. *Two weekend field trips required.* (Same course as ZOOL 4464*)

NREM 4513*
Wildlife Management. Prerequisite(s): BIOL 3034 or NREM 3213. Biological basis for the management of wildlife populations and habitats, with emphasis on current management problems.

NREM 4524*
Wildlife Management Techniques. Lab 4. Prerequisite(s): 4513, ENGL 3323 strongly recommended. Research techniques and methodology in wildlife science. Experimental design, wildlife population and habitat analysis, wildlife and vegetation sampling techniques, aging and sexing techniques, and report preparation and presentation.

NREM 4543
Wildlife Habitat Ecology. Prerequisite(s): BIOL 3034 or concurrent enrollment. Exploration of relationships among wildlife and the habitat features that limit or sustain their distributions. Topics span global biogeography to Oklahoma ecoregions. Group exercises in original literature discussion and production of habitat models.

NREM 4613
Rangeland Resources Planning. Inventory of ranch resources, survey and evaluation of ranch practices, and economic analysis. Development of a comprehensive ranch management plan. Managing rangeland and ranch resources in a social context. Written and oral reports. *Field trips required.* (Same course as ANSI 4973)

NREM 4783
Prescribed Fire. Lab 3. Prerequisite(s): 3613. When to use prescribed fire and how to use prescribed fire to accomplish specific land management objectives. Writing prescribed fire plans, policy and laws, weather, equipment, conducting burns, and post-burn mop-up. *Field trips required.*

NREM 4793
Advanced Prescribed Fire. Lab 3. Prerequisite(s): 4783 or consent of instructor. Preparing fire plans and executing prescribed fires as the fireboss. *No credit for both NREM 4793 and NREM 5793.* (Same course as 5793*)

NREM 4960
Undergraduate Internship. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Supervised internship with an approved natural resource business, government agency, or nongovernment organization, including a diversity of learning opportunities in a workplace environment. *Maximum credit requires a three month, full-time internship. Bi-weekly progress reports and final paper required. Graded on a pass-fail basis.*

NREM 4980
Undergraduate Research Problems. 1-3 credits, max 3, Lab 1-3. Prerequisite(s): Upper-division standing, GPA of 2.50 or better and consent of instructor. Participation in faculty research or execution of a research problem formulated by the student.

NREM 4990*
Special Topics in Natural Resource Ecology and Management. 1-3 credits, max 12. Advanced topics and new developments in natural resource ecology and management.

NREM 4991
Senior Seminar. Prerequisite(s): Senior standing in Natural Resource Ecology and Management. Career opportunities (talks and field trips); preparation of resumes and interviews. *Graded on a pass-fail basis.*

NREM 5000*
Master's Thesis or Report. 1-6 credits, max 6 (Thesis), 2 (Report). Independent research planned, conducted and reported in consultation with a major professor.

NREM 5020*
Graduate Seminar. 1 credit, max 10. Special topics in Natural Resource Ecology and Management; philosophy, methods and interpretation of research.

NREM 5030*
Special Problems in Natural Resource Ecology and Management. 1-9 credits, max 9. Special problems in areas of natural resource ecology and management other than those covered in the student's thesis research.

NREM 5033*
Ecology of Invasive Species. Ecological principles and their application to invasive species. Discussion of population level characteristics and community and ecosystem level effects of a wide variety of taxa including invasive microbial, fungal, plant, invertebrate, and vertebrate examples. Current global consequences and governmental policies/programs designed to limit the spread of invasives. *No credit for students having completed NREM 4033.*

NREM 5043*
Ecology and Evolution of Symbiosis. Ecology and evolution of symbiotic and mutualistic interactions in different ecosystems. Theory, current questions, and general patterns involving biotic interactions of plants and animals with other plants, animals, or microbes.

NREM 5053*
Global Ecology and Biogeochemistry. Examines key nutrient pools and transformations in the atmosphere, soils, and hydrosphere, with an emphasis on the role of living organisms in nutrient transformations and fluxes. Emphasis placed on processes relevant to biogeochemical cycles at ecosystem and global scales in reference to aspects of global change.

NREM 5103*
Production Ecology of Forested Ecosystems. Prerequisite(s): 3213 or BIOL 3034. Mechanisms driving the growth and productivity of forests, shrublands, and savannas in response to resource availability, genetics, disturbance, and climate. Topics will include the factors affecting the distribution of forests, relationship between leaf area and productivity, the causes for declining productivity with age, effects of diversity on productivity, the proximal causes of increased growth associated with resource additions, the effects of genetics and uniformity on stand growth, and using stand-level mechanisms to predict forest growth.

NREM 5130*
Special Topics in Forestry. 1-3 credits, max 9. Advanced study on special topics in forestry.

NREM 5133*
Advanced Topics in Forest Biometrics. Prerequisite(s): 3363 or equivalent; STAT 5013 concurrently or equivalent. Quantitative description of forest populations and methods for modeling forest growth and development. Sampling techniques for forest populations.

NREM 5193*
Spatial and Non-spatial Data Base Management. Prerequisite(s): One course in statistics and programming experience. Methods of acquiring, managing and analyzing spatial data using geographic information systems. Management of non-spatial data using relational database managers. Development of applications using these tools for evaluating and managing natural resources.

NREM 5424*
Fisheries Techniques. Lab 4. Prerequisite(s): 4414, BIOL 3034, and ENGL 3323 strongly recommended. Research techniques and methodology in fisheries science, including sampling design, habitat measurements, sampling gears and abundance estimation, age and growth analysis, recreational surveys, data analysis and report writing. *No credit for students with credit in 4424.*

NREM 5433*
Fisheries Science. Prerequisite(s): 4414 or equivalent or consent of instructor. Principles of fisheries science as they relate to fish and aquatic biota, their habitats, and the humans who utilize them.

NREM 5464*
Stream Ecology. Lab 4. Prerequisite(s): Course in ecology strongly recommended. Ecology of streams and rivers, physical and chemical properties, biotic assemblages and interactions, ecosystem processes and theories and human impact.

NREM 5523*
Population Ecology. Lab 2.5. Prerequisite(s): BIOL 3034, MATH 1513. Theory and principles of predicting and analyzing population abundance and dynamics. Life history theory, foraging theory, habitat selection, population genetics, and species interactions. (Same course as ZOOL 5523*)

NREM 5563*
Forest Wildlife Ecology. Prerequisite(s): Course in ecology strongly recommended. Vertebrate species diversity in the world's woodland and forested biomes. Changes imposed by land clearing and development and their effects upon wildlife diversity and populations. Options for wildlife conservation, from strict nature reserves to integrating wildlife habitat management into land use practices. *Field trip required.*

NREM 5573*
Grassland and Desert Wildlife Ecology. Prerequisite(s): Course in ecology strongly recommended. Ecology of grasslands and deserts with emphasis on vertebrate species diversity, adaptations to semi-arid and arid ecosystems, and management problems associated with such habitats.

NREM 5583*
Wetland Wildlife Ecology. Prerequisite(s): 4513 or consent of instructor. Ecology and management of wetland dependent wildlife species with an emphasis on the autecology, adaptations for inhabiting wetland systems, and management problems associated with these taxa.

NREM 5654*
Applied Landscape Ecology. Lab 3. Advanced ecology and management of grasslands, shrublands, and forests. Understanding the effects of grazing, fire and other disturbances on biotic and abiotic processes. Vegetation dynamics, wildlife habitat evaluation, woody plant encroachment, rangeland monitoring, and landscape ecology. *Field trips required at additional cost to students.*

NREM 5660*
Special Topics in Rangeland Science. 2-4 credits, max 4. Prerequisite(s): Consent of instructor. Selected topics in rangeland research methods or other rangeland topics.

NREM 5723*
Ecology of Fire Dependent Ecosystems. Prerequisite(s): Any ecology course. Role of fire and the interactions with land use, weather, and climate change in fire-dependent ecosystems. Responses of species composition, diversity, annual net primary productivity, nutrient cycling, and ecosystem management in diverse ecosystems.

NREM 5783*
Prescribed Fire. When to use prescribed fire and how to use prescribed fire to accomplish specific land management objectives. Writing prescribed fire plans, policy and laws, weather, equipment, conducting burns, and post-burn mop-up. *Field trips required.*

NREM 5793*
Advanced Prescribed Fire. Lab 3. Prerequisite(s): 4783 or consent of instructor. Preparing fire plans and executing prescribed fires as the fireboss. *No credit for both 4793 and 5793.*

NREM 6000*
Doctoral Dissertation. 1-15 credits, max 45. Independent research planned, conducted and reported in consultation with major professor.

NREM 6010*
Advanced Topics and Conference. 1-6 credits, max 6. Prerequisite(s): MS degree. Supervised study of advanced topics. A reading and conference course designed to acquaint the advanced student with fields not covered in other courses.

NATURAL SCIENCE (NATS)

NATS 5050*
Report. 1-2 credits, max 2. Prerequisite(s): Enrollment in program leading to MS in natural science. Guidance in reading and research required for MS in natural science degree.

NATS 5990*
Topics in Natural and Applied Sciences. 1-3 credits, max 9. Prerequisite(s): Graduate standing. Special topics in the natural and applied sciences for students interested in topics not normally covered in existing course work.

NUTRITIONAL SCIENCES (NSCI)

NSCI 2111
Professional Careers in Nutritional Sciences. Prerequisite(s): For students interested in Allied Health, Community Nutrition or Nutrition and Exercise or consent of instructor. Career opportunities in health professions. Roles and responsibilities of health care professionals. Routes to professional memberships and current issues in professionalism.

NSCI 2114
(N)Principles of Human Nutrition. Functions of the nutrients in human life processes. Nutrient relationship to health as a basis for food choices. *Open to all University students.*

NSCI 2211
Professional Careers in Dietetics. Prerequisite(s): For students interested in Dietetics and Dietetics and Exercise options or consent of instructor. Career opportunities in Dietetics. Roles and responsibilities of Dietitians. Routes to professional memberships and current issues in professionalism.

NSCI 2850
Special Topics in Nutritional Sciences. 1-3 credits, max 4. Study of specific consumer education issues or topics in nutritional sciences.

NSCI 3133
Science of Food Preparation. Lab 3. Prerequisite(s): HRAD 1114, NSCI 2114, organic chemistry. Scientific principles underlying functions of food ingredients, recipe/menu modification, diet management for disease states and food safety.

NSCI 3223
Nutrition Across the Life Span. Prerequisite(s): 2114 or equivalent. Nutritional needs and dietary concerns of individuals from conception through old age.

NSCI 3440
Nutritional Sciences Pre-professional Experience. 1-3 credits, max 3. Directed practical experience in an approved work situation related to the food or nutrition.

NSCI 3543
(I,S)Food and the Human Environment. Impact of the various factors that affect food availability, production, processing, distribution and consumption of food in the world. International cultures and foods. Challenges of and solutions to the world food crisis.

NSCI 3813
Nutrition Assessment and Counseling Skills. Lab 2. Prerequisite(s): 2114, 3223, HDFS 2113 or PSYC 1113 or SOC 1113. Theory and practice of counseling and interviewing skills as applied to nutrition counseling. Collection and interpretation of anthropometric, biochemical and dietary data necessary to determine nutritional status.

NSCI 3991
Dietetics Career Experience. Prerequisite(s): 2111. Observational career experience in various settings with practicing registered dietitians.

NSCI 4013*
Experimental Foods. Lab 3. Prerequisite(s): 3133 or consent of instructor. Investigations in physical, chemical and sensory, and functional properties of foods and their ingredients. Research project applying food science and nutrition principles to product development.

NSCI 4023
Nutrition and Health Issues. Prerequisite(s): 2114, 3223 and ZOOL 3204. Analysis of the role of specific nutrients in health maintenance and in prevention of chronic disease. Communication of nutrition information to the public.

NSCI 4133
Nutrition for Exercise and Sport. Prerequisite(s): HHP 3114, NSCI 4323 and BIOC 3653 or consent of instructor. Application of principles of nutrient metabolism as they relate to physical activity, sport and health.

NSCI 4323
Human Nutrition and Metabolism. Prerequisite(s): 2114, CHEM 3015, BIOC 3653 or concurrent enrollment in BIOC 3653, and ZOOL 3204. Digestion, absorption and metabolism of nutrients; functions and health implications in the human organism.

NSCI 4365*
Quantity Food Production Management. Lab 5. Prerequisite(s): HRAD 2125, HRAD or NSCI 3553 and a course in accounting or mathematics or consent of instructor. Organizing, purchasing, costing, preparation and service of food in a quantity food production setting.

NSCI 4373
Principles of Nutrition Education. Prerequisite(s): 2114, 3223 or consent of instructor. Analysis of various methods, strategies, theories, resources and evaluation methods for nutrition education.

NSCI 4573
Management in Dietetics. Prerequisite(s): ACCT 2103 or HRAD 2152 and HRAD 2282 and HRAD 3212 and HRAD 3353. Management practices in the field of dietetics including program, clinical and food systems management.

NSCI 4643
Capstone for Nutritional Sciences. Prerequisite(s): Senior standing in NSCI or consent of instructor. Integration of the body of knowledge in nutritional sciences. Examination of the research basis for defining and solving critical issues. *Oral and written reports*.

NSCI 4733
Community Nutrition. Prerequisite(s): NSCI Dietetics, Dietetics and Exercise, or Community Nutrition students only, 2114, 3223 or consent of instructor. Application of nutrition, education and communication principles to community nutrition programs and services. *Field work required.*

NSCI 4850*
Special Unit Studies in Nutritional Sciences. 1-3 credits, max 6. Special units of study in nutritional sciences.

NSCI 4854
Medical Nutrition Therapy I. Prerequisite(s): 3133, 3813, 4323 or concurrent enrollment. Physiological and metabolic bases for dietary modifications in disease states.

NSCI 4864
Medical Nutrition Therapy II. Prerequisite(s): 4854. A continuation of 4854, Medical Nutrition Therapy I.

NSCI 4900
Honors Creative Component. 1-3 credits, max 3. Prerequisite(s): College of Human Environmental Sciences Honors Program participation, senior standing. Guided creative component for students completing requirements for College Honors in College of Human Environmental Sciences. Thesis, creative project or report under the direction of a faculty member in the major area, with second faculty reader and oral examination.

NSCI 5000*
Research in Nutritional Sciences. 1-6 credits, max 6. Prerequisite(s): Consent of adviser. Individual research and thesis that will fulfill the requirements for the master's degree.

NSCI 5011*
Special Topics in Nutritional Sciences. Prerequisite(s): NSCI graduate standing. Orientation to graduate study and research in nutritional sciences.

NSCI 5012*
Public Policy Development in Food, Nutrition and Related Programs. Rationale underlying governmental programs in food and nutrition and human environmental sciences and assessment of the effectiveness of the programs.

NSCI 5013*
Cost Control in Food Service Systems. Prerequisite(s): Admission to Great Plains IDEA online MS in Dietetics. An overview of accounting, cost controls, and financial management in food service. Special emphasis placed on understanding the topics and applying them to the theoretical and/or practical research for food service systems. *Web-based instruction.*

NSCI 5023*
Advanced Nutrition and Health Issues. Prerequisite(s): BIOC 3653 and NSCI 4323/5333 or equivalent or consent of instructor. In-depth analysis of the role of specific nutrients in health maintenance and in prevention of chronic disease.

NSCI 5123*
Research Methods in Nutritional Sciences. Basic components of the research process and application of research methods to nutritional sciences. (Same course as 6453*)

NSCI 5133*
Advanced Nutrition for Exercise and Sport. Prerequisite(s): HHP 3114, NSCI 4323, BIOC 3653 or consent of instructor. Advanced study of nutrition and metabolism relating to physical activity, sports and health.

NSCI 5210*
Contemporary Issues in Food Service. 3-9 credits, max 9. Prerequisite(s): Admission to the Great Plains IDEA online MS in Dietetics program or consent of instructor. Contemporary issues in food service in dietetics; formulation of innovative solutions and processes to enhance effectiveness in the work place.

NSCI 5213*
Entrepreneurship in Food Service and Dietetics. Prerequisite(s): Admission to Great Plains IDEA online MS in Dietetics. An overview of entrepreneurship, characteristics of entrepreneurs and small business development within the context of food service and dietetics. Web-based instruction.

NSCI 5221*
Contemporary Issues in Clinical Nutrition. Prerequisite(s): Acceptance as a dietetic intern. Discern contemporary issues in the practice of clinical dietetics; formulate innovative solutions and processes to enhance effectiveness in the work place. *Graded on a pass-fail basis.*

NSCI 5223*
Advanced Nutrition Across the Life Span. Prerequisite(s): Admission to the Great Plains IDEA online MS in Dietetics. Examination of the influence of normal physiological stresses on nutritional needs throughout the life span. *Web-based instruction*.

NSCI 5231*
Contemporary Issues in Community Nutrition. Prerequisite(s): Acceptance as a dietetic intern. Discern contemporary issues in the practice of community dietetics; formulate innovative solutions and processes to enhance effectiveness in the workplace. *Graded on a pass-fail basis.*

NSCI 5240*
Contemporary Issues in Nutrition. 3-9 credits, max 9. Prerequisite(s): Enrolled in Great Plains IDEA online MS in Dietetics. Contemporary issues in nutrition. *Web-based instruction*.

NSCI 5323*
Nutrition and Physical Activity in Aging. Basic physiological changes during aging and their impact in health and disease. Successful aging with emphasis on physical activity and nutrition. Practical application to community settings. *Web-based instruction.*

NSCI 5333*
Human Nutrition and Metabolism. Prerequisite(s): Intro nutrition, organic chemistry, biochemistry and physiology. Digestion, absorption and metabolism of nutrients; functions and health implications in the human organism.

NSCI 5363*
Maternal and Infant Nutrition. Prerequisite(s): 2114 or equivalent. Nutritional needs and dietary concerns during pregnancy, lactation and the first year of life. Implications for nutrition intervention, education and policy.

NSCI 5373*
Childhood Nutrition. Prerequisite(s): 2114 or consent of instructor. Normal nutritional needs of children, preschool through grade 12. Dietary implications for child care programs, school food service and parent education.

NSCI 5393*
Nutrition and Aging. Prerequisite(s): 2114 or equivalent. Nutritional needs, and dietary concerns of the elderly. Implications for food and nutrition programs, policies, research and education.

NSCI 5403*
Contemporary Issues in Dietetics Practice. Prerequisite(s): Acceptance as a dietetic intern. Contemporary issues in the practice of dietetics; innovative solutions and processes to enhance effectiveness in the workplace.

NSCI 5412*
Dietetic Internship Management Practicum. Prerequisite(s): Acceptance as a dietetic intern. Supervised learning experiences in approved food service management for the achievement of performance requirements for entry level dietitians. *Graded on a pass-fail basis.*

NSCI 5422*
Dietetic Internship Clinical Practicum. Prerequisite(s): Acceptance as a dietetic intern. Supervised learning experiences in approved clinical for the achievement of performance requirements for entry level dietitians. *Graded on a pass-fail basis.*

NSCI 5432*
Dietetic Internship Community Nutrition. Prerequisite(s): Acceptance as a dietetic intern. Supervised learning experiences in approved community nutrition settings for the achievement of performance requirements for entry level dietitians. *Graded on a pass-fail basis.*

NSCI 5553*
International Nutrition and World Hunger. Prerequisite(s): Consent of instructor. Advanced study of the magnitude, causes, and nature of hunger and under-nutrition in low income countries; emphasis on programs, policies and planning directed toward alleviating hunger.

NSCI 5563*
Nutritional Assessment. Prerequisite(s): 3223, 4323, or equivalent. Dietary, physical, and biochemical assessment techniques and their application to patient or client nutritional status assessment in health care systems.

NSCI 5613*
Theory, Research and Practice of Nutrition Education. Prerequisite(s): 4373 or equivalent and consent of instructor. Analyses of various learning and behavior change theories and application in nutrition education.

NSCI 5643*
Advanced Medical Nutrition Therapy. Prerequisite(s): Admission to dietetic internship or consent of instructor. Physiological and metabolic bases for nutritional support in disease.

NSCI 5673*
Manpower Management in Health Care and Related Industries. Prerequisite(s): Consent of instructor. Future role, focus, practices and governance of human resources in health care.

NSCI 5713*
Advanced Community Nutrition. Prerequisite(s): 2114, 3223 and 4733 or equivalent or consent of instructor. Current issues in community nutrition with emphasis on program development and evaluation of community nutrition programs. Analysis of the impact of economic, political, legislative and cultural diversity factors in the field of community nutrition.

NSCI 5743*
Experimental Methods in Nutritional Sciences. Prerequisite(s): A course in biochemistry, a course in statistics, a graduate course in food or nutrition. Experimental design for research in food and nutrition based on analytical laboratory techniques and other research methodology.

NSCI 5753*
Management in Health Care Systems. Prerequisite(s): Consent of instructor. Overview of U.S., international and transcultural health care systems. Futuristic managerial roles of health care professionals and how they affect health and health care in various settings.

NSCI 5783*
Food Technology. Prerequisite(s): Consent of instructor; graduate standing. Principles and pertinent issues in food technology, including concepts, experimental and product design, process development, evaluation, packaging and marketing. *Web-based instruction.*

NSCI 5840*
Masters Creative Component. 1-6 credits, max 6. Prerequisite(s): Consent of adviser. An in-depth application of theoretical models and philosophies.

NSCI 5863*
Sensory Evaluation of Food. Lab 2. Prerequisite(s): 4013 or consent of instructor. Basic principles of physiology and psychology as they pertain to sensory evaluation, importance of sensory evaluation to the food industry, organization and operation of a sensory program or facility, test strategies, design of experiments and testing instruments, discrimination testing, descriptive analysis, and affective testing.

NSCI 5870*
Problems in Nutritional Sciences. 1-4 credits, max 6. Analysis of emerging problems and trends in nutritional sciences.

NSCI 5961*
Seminar in Nutritional Sciences. Prerequisite(s): MS students. Individual and group seminars on current issues and research in nutritional sciences. (Same course as 6961*)

NSCI 6000*
Doctoral Thesis. 1-12 credits, max 30. Prerequisite(s): Consent of major professor.

NSCI 6023*
Macronutrients in Human Nutrition. Prerequisite(s): BIOC 3653 and NSCI 4323/5333 or equivalent or consent of instructor. Application to the human being of metabolic processes which involve essential dietary components.

NSCI 6033*
Phytochemicals in Reduction of Chronic Disease. Prerequisite(s): 4323/5333 or equivalent or consent of instructor. Identification of basic structural, functional and metabolic properties of phytochemicals (substances in plants that have been linked to reducing chronic disease). Special attention placed on health benefits and chronic disease risk reduction.

NSCI 6123*
Micronutrients in Human Nutrition. Prerequisite(s): 6023 or consent of instructor. In-depth study of vitamins and minerals and their interrelationships in metabolism.

NSCI 6233*
Nutrition and Immunology. Prerequisite(s): 6123 or consent of instructor. Principles and issues related to nutrition and immunology. Impact of nutrients and nutritional status on integrity of the immune system.

NSCI 6453*
Advanced Research Methods in Nutritional Sciences. Components of the research process for students who have completed an advanced degree. Development, application and interpretation of research methodology. (Same course as 5123*)

NSCI 6870*
Independent Study in Nutritional Sciences. 1-3 credits, max 6. In-depth analysis of research issues in nutritional sciences.

NSCI 6961*
Advanced Studies in Nutritional Sciences. Critical evaluation of research in nutritional sciences. Individual and group seminars on selected topics. (Same course as 5961*)

OCCUPATIONAL EDUCATION (OCED)

OCED 5000*
Thesis or Report. 2-10 credits, max 10. Students studying for a master's degree may enroll for a total of two credit hours if they write a report or six hours if they write a thesis. Students working on a specialist's degree may earn a maximum of 10 hours credit.

OCED 5010*
Seminar. 1-3 credits, max 6. Graduate student seminars focusing on current and critical issues and common problems relevant to occupational education.

OCED 5113*
Principles of Occupational Education. Underlying principles and evolving concepts in occupational and adult education. Critical analysis of educational programs and service areas and the resulting implications for leadership personnel at all levels of program responsibility.

OCED 5123*
Evaluation of Occupational and Workforce Education Programs and Instruction. Principles of evaluation applied to instructional programs in occupational and workforce education. Techniques and strategies for designing, conducting, reporting, and applying evaluations of programs in occupational/technical schools, government agencies, and public or private sector workplaces.

OCED 5133*
Internationalism, Globalization and Occupational Education. Prerequisite(s): Graduate standing. Preparing a globally competitive workforce. Analysis of comparative international occupational/technical education systems, and critical issues in internationalism and globalization in workforce education development.

OCED 5153*
Curriculum Planning in Occupational Education. Principles and procedures for curriculum planning, development and management in occupational and adult education with analyses of current trends and practices and their implications for program quality.

OCED 5223*
Program Planning for Occupational and Technical Educators. Approaches to program planning designed around continuous improvement methods for problem solving, flow charting, budgeting, gaining program support, and Lifelong Education Program Planning (LEEP) model.

OCED 5232*
Teaching Related Information. Selection of job-related topics common to most occupational programs; procedures for incorporating those topics into the regular curriculum.

OCED 5233*
Advanced Instructional Procedures in Trade and Industrial Education. Advanced methods and procedures for effective teaching and learning in occupational education classrooms and laboratories. Teaching basic education and employment skills and the selection of job-related topics common to most occupations with procedures for incorporating those topics into the regular curriculum.

OCED 5313*
History, Principles and Organization of Workfoce Education. Prerequisite(s): Graduate standing. History, underlying principles and evolving social, political and economic forces acting upon workforce education. In-depth with critical analysis of educational programs and service areas and resulting implications for leadership development and program responsibility.

OCED 5333*
Administration and Supervision of Local Occupational Education Programs. The duties of administrative and supervisory personnel responsible for the development, coordination and promotion of occupational education programs.

OCED 5340*
Special Problems in Occupational Education. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Directed independent study of special topics involving assigned readings, library research, field work or a combination of these.

OCED 5413*
Guidance, Placement and Follow-up in Occupational Education. Teacher-counselor cooperation in occupational student advisement, placement and follow-up.

OCED 5423*
Individualized Competency-based Instruction and Customized Training. Principles, techniques, and technologies for creating and delivering individualized competency-based instruction and customized workplace training. Includes LAP systems and customizing for industry.

OCED 5443*
Interpreting Research in Occupational Education. Seminar on the methods of research, review, synthesis and interpretation with application to particular fields of occupational and adult education.

OCED 5483*
Modern Technology in Occupational Education. Technology developments in occupational and technical education analyzed for instructional and curriculum implications.

OCED 5543*
Occupational Education, Community and Industry Relations. Exploration of strategies for developing meaningful relationships among occupational educators, industry representatives, and community members to increase the likelihood that the needs of students, workers, employers and community members are met.

OCED 5553*
Occupational Education for Students with Special Needs. Techniques and procedures by which occupational education may serve individuals with special needs. Field experiences an integral part of the course.

OCED 5673*
Principles and Practices of Distance Learning in Occupational Education. Prerequisite(s): Graduate student standing. Issues, methods, tools and techniques of facilitating learning at a distance. Development of skills in designing and delivering instruction via current synchronous and asynchronous technologies such as video conferencing and Internet, fostering analysis of current research in distance learning, and encouraging real-world applications of acquired skills and knowledge.

OCED 5720*
Workshop. 1-3 credits, max 10. Professional workshops of various topics and lengths. Each workshop designed to meet unique or special needs of individuals concerned with adult education and human resource development.

OCED 5773*
School-to-Work Transition. Strategies and procedures for coordinating school-to-work transition programs (e.g., cooperative education, youth apprenticeship, career exploration). Planning, organizing, implementing, and evaluating school-related, work-based learning.

OCED 5880*
Internship in Occupational Education. 3-6 credits, max 6. Prerequisite(s): Consent of instructor. Supervised experience working in business, industry, human service, or education settings.

OCED 5910*
Developing and Analyzing Teaching Content. 1-3 credits, max 6. Provides opportunity for experienced teachers to incorporate the latest industrial technology into their course of study.

OCED 6000*
Doctoral Dissertation. 1-25 credits, max 25. Required of all candidates for the Doctor of Philosophy degree. Credit is given upon completion of the dissertation.

OCED 6103*
Philosophy of Occupational Education. Alternative perspectives for developing a philosophic position in occupational and adult education.

OCED 6110*
Graduate Reading in Occupational Education. 1-6 credits, max 6. Prerequisite(s): Graduate standing and consent of supervising professor. Supervised readings of significant literature not included in regularly scheduled courses.

OCED 6113*
Professional Education and Personnel Development for Occupational Education. Prerequisite(s): 6103. Research, trends and innovative practices in professional education and personnel development for occupational education.

OCED 6233*
Contextualized Learning and Communities of Practice. An analysis of communities of practice, situated cognition, constructivism, and information on learning through occupations. Expansion of the understanding and knowledge of an active, student centered teaching/learning process, in work-based learning context.

OCED 6333*
Strategic and Tactical Planning and Development. Theory, practice and trends in concepts and implementation. Analysis of comparisons and articulation among various public and private sector organizations.

OCED 6343*
Financing Occupational Education. Prerequisite(s): Graduate standing. Development of conceptual and legal bases for funding public occupational education programs. Sources of funds, distribution strategies, local, state and federal accountability requirements, and fraud and abuse funds.

OCED 6353*
Education Futures. Critical examination of the relationship between learning and facets of post-industrialism such as socio-economic inequities, rapid technological change, organizational change, and the changing nature of work.

OCED 6871*
Doctoral Seminar: Level 1. Orientation to doctoral program in OCED. *May be taken prior to program application; required of all applicants.*

OCED 6880*
Doctoral Internship in Occupational Education. 1-8 credits, max 8. Prerequisite(s): Consent of instructor. Directed field experiences related to the participant's area of concentration. Practice and testing ideas, theories and concepts learned in graduate study.

OCED 6881*
Doctoral Seminar: Level 2. Preparation of the required tentative proposal for dissertation and the comprehensive doctoral examination. *Required for OCED doctoral candidates.*

PHILOSOPHY (PHIL)

PHIL 1013
(H)Philosophical Classics. Basic works by great thinkers, including Plato, Descartes and Hume.

PHIL 1113
(H)Introduction to Philosophy. Selected philosophical problems: the nature of reality, knowledge, value, social ideals and religion.

PHIL 1213
(H)Philosophies of Life. Introductory ethics and social philosophy. Moral decision-making, the good life, social values, freedom, and responsibility.

PHIL 1313
(A)Logic and Critical Thinking. Formal and informal reasoning, common fallacies, definitions and language functions, patterns of explanation. Practical criticism and development of everyday arguments.

PHIL 3003
(A)Symbolic Logic. Propositional logic and predicate logic with identity. Formal analysis of language.

PHIL 3113
(H)Ancient and Medieval Philosophy. Main systems of Western thought from the Greeks to 15th century Europe. Emphasis on Plato, Aristotle, Augustine, and Aquinas.

PHIL 3213
(H)17th and 18th Century Philosophy. Major philosophers and problems in Western thought from the 17th through the 18th century. Emphasis on Descartes, Hume and Kant.

PHIL 3313
(H)19th and 20th Century Philosophy. Major philosophers and problems in Western thought from Hegel to the present.

PHIL 3413
(H)Ethics. Contemporary and classical views on the nature of moral judgments, moral value, relativity and objectivity, freedom and responsibility.

PHIL 3513
(H)Social Philosophy. Major social thinkers and contemporary issues. Social authority, human rights, political forms and justice. Emphasis on Aristotle, Locke, Mill and Marx.

PHIL 3613
(H)Philosophy of Religion. Nature of religion, religious experience and religious language. God-concepts, theistic arguments, God and evil, God and immortality.

PHIL 3713
(H)Philosophy of Education. Classical and contemporary philosophers who have systematically developed their ideas about education, including Plato, Aristotle, Rousseau, Locke and Dewey.

PHIL 3803
(H)Business Ethics. Ethical issues in business, such as employer-employee duties and loyalties, advertising uses, preferential treatment practices. Analytic grounding in basic theories of ethics.

PHIL 3813
(H)Recent American Philosophy. Dominant trends in American philosophy during the last 100 years, with emphasis on pragmatism.

PHIL 3823
(H)Engineering Ethics. Philosophical analysis of moral issues in engineering practice, such as whistle blowing, conflicts of interest and product liability. Professional codes of ethics.

PHIL 3833
(H)Biomedical Ethics. Moral problems brought about by recent developments in scientific research and medical technology. Abortion, euthanasia, genetic engineering, and human experimentation.

PHIL 3843
(H)Philosophy of Law. Prerequisite(s): Upper-division standing. Philosophical issues related to U.S. law. The relationship between law and morality, the nature and functions of law and grounds of liability.

PHIL 3913
(H)Existentialism. Selected writings and themes in the development of existentialism and related intellectual movements. Subjectivity, phenomenological description, hermeneutics, freedom and value; and such writers as Kierkegaard, Nietzsche, Heidegger, Sartre, Marcel and Buber.

PHIL 3920
Contemporary Philosophical Problems. 3 credits, max 9. Selected contemporary problems and discussions.

PHIL 3923
Contemporary Issues in Philosophy. Selected current controversies and recent trends in philosophy.

PHIL 3933
(H)Creation and Evolution. Critical examination of claims that various Creationist/Intelligent Design models offer better scientific explanations for selected biological phenomena than does the current dominant view of Darwinian Evolution.

PHIL 3943
(H,I)Asian Philosophy. Three main streams of Asian thought: Indian, Chinese and Buddhist. How various thinkers in the three traditions have dealt with questions of being and becoming, knowledge, ethics, and society.

PHIL 4003*
Mathematical Logic and Computability. Prerequisite(s): 3000 or 3003 or MATH 3613 or consent of instructor. The basic metatheorems of first order logic: soundness, completeness, compactness, Löwenheim-Skolem theorem, undecidability of first order logic, Gödel's incompleteness theorem. Enumerability, diagonalization, formal systems, standard and nonstandard models, Gödel numberings, Turing machines, recursive functions, and evidence for Church's thesis. (Same course as MATH 4003)

PHIL 4013
(H)Perspectives on Death and Dying. Issues that arise as individuals confront the fact of mortality. Dying patients, the ethical issues of euthanasia and suicide, the process of grief, death in literature and the arts, and philosophical and religious views on immortality.

PHIL 4113
(H)Philosophy of Art and Literature. Nature of aesthetic objects and experiences; form, meaning and value in the arts; the function of art in society; criteria of criticism of the arts.

PHIL 4313
(H)Philosophy of Mind. Problems in philosophical psychology. Mind and body, freedom and determinism, personal identity and survival, self-knowledge, analysis of mental concepts.

PHIL 4453
(H)Philosophy in Literature. Selected literary works examined for philosophical ideas and themes. Attention to the interrelation of form and content. Thematic approach.

PHIL 4543*
Philosophy in Language. Prerequisite(s): 1313 or 3003. A survey of the development of the philosophy of language, including works of philosophers such as Frege, Wittgenstein, Russell, Strawson, Searle, Donnellan, Grice, and Kripke.

PHIL 4553*
Contemporary Ethical Theory. Debate in ethical theory since Moore. The naturalistic fallacy, intuitionism, and value realism.

PHIL 4713
(H)Philosophy of Science. Philosophical issues related to science and its role in society. Topics include science and common sense, laws and theories, causality, nature of scientific progress.

PHIL 4733
(H)Philosophy of Biology. Selected philosophical topics, such as Darwinism and other theories of evolution, physical reductionism, and issues of genetic engineering.

PHIL 4943*
Indian Philosophy. Prerequisite(s): 3943 or consent of instructor. Study of texts and themes in two main traditions of Indian Philosophy: Hinduism and Buddhism. How these schools present the fundamental nature and knowledge of reality, human existence, the divine, and enlightenment.

PHIL 4953*
East Asian Philosophy. Prerequisite(s): 3943 or consent of instructor. Study of texts and themes in the Chinese and Japanese traditions: Confucianism, Daoism and Zen. How these schools present the fundamental nature and knowledge of reality, human existence, community and enlightenment.

PHIL 4983*
Metaphysics and Epistemology. Prerequisite(s): 12 credit hours of philosophy. The study of the fundamental nature of reality and human knowledge of it.

PHIL 4990*
Special Studies in Philosophy. 1-3 credits, max 10. Selected philosophical topics or works.

PHIL 4991*
Contemporary Philosophy Research. Prerequisite(s): Upper-division standing, at least 12 hours in philosophy completed. Study of leading edge research in philosophy through presentation and discussion of current philosophy journal articles with faculty.

PHIL 4993
Senior Honors Thesis. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis under the direction of a faculty member, with second faculty reader and oral examination. *Required for graduation with departmental honors in philosophy.*

PHIL 5000*
Thesis in Philosophy. 1-6 credits, max 6. Supervised individual work on a thesis for a master's degree.

PHIL 5203*
Proseminar. Introduction to professional oral and written communication in philosophy.

PHIL 5210*
Seminar on a Major Philosopher. 3 credits, max 9. Prerequisite(s): Three courses in philosophy. The writings of a major philosopher and related material.

PHIL 5303*
Topics in Philosophy of Religion. An examination of central topics in the philosophy of religion, such as the existence of God, the problem of evil, divine attributes, miracles, revelation, faith and reason, religious pluralism and exclusivism, and morality.

PHIL 5310*
Seminar on a Field of Philosophy. 3 credits, max 9. Prerequisite(s): Three courses in philosophy. Selected topics in one field of philosophy.

PHIL 5313*
Topics in Social Political Thought. Consideration of a single topic (e.g. justice), topics (e.g. distributive justice and citizenship) of a single philosophical school, or movement (e.g. Marxism) or several movements and schools (e.g. Marxism and liberalism).

PHIL 5323*
Seminar in Ancient Philosophy. Prerequisite(s): 3113. Philosophical problems that characterize ancient Philosophy: form and matter, one and many, universal and particular, actuality and potentiality, stability and change, substance and accidents, first principles and elements. Close reading of Plato and Aristotle.

PHIL 5333*
Seminar in Modern Philosophy. Prerequisite(s): 3213 or 3313. Examination of the metaphysical and epistemological systems of philosophers over 17th-19th century Europe such as Descartes, Spinoza, Locke, Leibniz, Berkeley, Hume, Kant and Hegel.

PHIL 5343*
Seminar in East and West Comparative Philosophy. Prerequisite(s): 3943. Critical comparison between West European and East Asian traditions of philosophy, such as being and non-being, the nature of truth, self, human being, ethics, human rights, community, and religion.

PHIL 5353*
Seminar in Contemporary Continental Philosophy. Prerequisite(s): 3213 or 3313. Themes such as presence and absence, intentionality and constitution, meaning and "being," identity and difference, history and consciousness, practice and power, construction and deconstruction. Philosophers such as Merleau, Husserl, Heidegger, Sartre, Derrida, and Faucault.

PHIL 5363*
Topics in Metaphysics. Prerequisite(s): 3113 or 3213 or 4983. Selected topics that may be approached from an historical or contemporary standpoint, such as idealism, realism, causation, time, universals, personal identity, possibility and free will.

PHIL 5373*
Contemporary Epistemology. Prerequisite(s): 3213 or 3113 or 4983. Recent approaches to the theory of knowledge. Origin and justification of belief and certainty, roles of the senses and the mind, and the nature of truth.

PHIL 5383*
Seminar in American Philosophy. Selected philosophical schools or traditions influential in American thought, such as transcendentalism, pragmatism, or naturalism.

PHIL 5393*
German Idealism. Prerequisite(s): 3113 or 3213. Selected major works of post-Kantian German Philosophy, such as the nature of a philosophical system, identity, and self-consciousness.

PHIL 5423*
Topics in Ethical Theory. Prerequisite(s): 3413. Central problems in ethical theory, such as ethical realism/anti-realism, motivational internalism/externalism, and problems within specific normative systems.

PHIL 5433*
Topics in Philosophy of Law. Prerequisite(s): 3843. In-depth examination of selected topics in philosophy of law, such as punishment, jurisprudence, and principles of legislation. Seminar format.

PHIL 5443*
Topics in Biomedical Ethics. Prerequisite(s): 3833. In-depth examination of selected topics in biomedical ethics, such as implications of the Human Genome Project, ethics of human reproduction, and research ethics. Emphasis on contemporary philosophical thought. Seminar format.

PHIL 5453*
Topics in Professional Ethics. In-depth study of ethical issues faced by business and engineering professionals (e.g., social effects of advertising, environmental impact of professional practice, product safety and consumer protection, whistle blowing, and confidentiality.

PHIL 5610*
Philosophical Issues in Education. 2-3 credits, max 3. Contemporary issues in educational theory and practice. The relation of education to political thought, religion, public law and culture.

PHIL 5910*
Research Problems in Philosophy. 1-3 credits, max 10. Prerequisite(s): Consent of instructor and department head. Individual or group research on specific philosophical problems.

PHYSICS (PHYS)

PHYS 1001
Frontiers of Physics. Student and faculty discussions of current research topics in physics as presented in popular journals. *Graded on pass-fail basis.*

PHYS 1014
(N)Descriptive Physics. A survey course presenting the basic concepts and principles of physics with a minimum of mathematics. Motion, waves, temperature, electricity, magnetism, optics, atomic structure, and nuclear energy. *No credit for students with credit in 1114.*

PHYS 1114
(L,N)General Physics. Lab 2. Prerequisite(s): High school algebra and trigonometry or MATH 1483 or MATH 1715. Algebra-based introductory course covering the basic concepts of physics. Practical examples of the role of physics in other disciplines. Newtonian mechanics, fluids, heat, thermodynamics, waves, sound.

PHYS 1214
(L,N)General Physics. Lab 2. Prerequisite(s): 1114. Continuation of 1114; electricity, magnetism, optics, quantum physics, atomic and nuclear structure.

PHYS 1313
(L,N)Inquiry-based Physics. Lab 3. Properties of matter, motion, light and color, electrical circuits and energy conservation. Recommended for elementary education majors as model course to learn and teach science.

PHYS 2014
(L,N)General Physics. Lab 2. Prerequisite(s): MATH 2144 or concurrent enrollment. Calculus-based introductory course for science, math and engineering majors. Mechanics, waves, heat, and thermodynamics.

PHYS 2114
(L,N)General Physics. Lab 2. Prerequisite(s): 2014 or 2314. Continuation of 2014. Electricity, magnetism, and optics.

PHYS 2314
General Physics for Science Majors I. Lab 2. Prerequisite(s): MATH 2144. Calculus-based introductory course for science and math majors. Conservation of energy and momentum, energy transfer, Newton's Laws, kinematics, relativity.

PHYS 2414
General Physics for Science Majors II. Lab 2. Prerequisite(s): 2014 or 2314. Continuation of 2314. Electrostatics, electric fields and currents, circuits, waves, physical optics, modern physics, nuclear physics, and thermodynamics.

PHYS 3013*
Mechanics I. Prerequisite(s): 2114 or equivalent, and MATH 2233 or concurrent enrollment. Mechanics of particles, systems of particles and rigid bodies.

PHYS 3113*
Heat. Prerequisite(s): 1214 or equivalent and MATH 2163 or concurrent enrollment. Thermometry, heat transfer, elementary theory of specific heat and the three laws of thermodynamics.

PHYS 3213*
Optics. Prerequisite(s): 2114 or 2414 and 3513, or consent of the instructor. Geometrical optics; interference, diffraction, dispersion, absorption, and polarization of light.

PHYS 3313
Introduction to Semiconductor Device Physics. Prerequisite(s): 2114 or equivalent. An introduction to crystal structure, the quantum theory of solids, the physics of semiconductor materials and the pn junction, with an emphasis on applications to semiconductor devices.

PHYS 3322*
Modern Laboratory Methods I. Lab 6. Prerequisite(s): 2014, 2114. Introduction to electric and electronic measurements and computer applications in experimental control, data collection and laboratory computation. Experiments on test instruments, integrated electronics, signal processing, computer interfacing, and data acquisition.

PHYS 3513*
Mathematical Physics. Prerequisite(s): 1214, 2114 or 2414 and MATH 2163. Physical applications of vectors, vector calculus and differential equations. Fourier analysis. Orbit geometry, coordinate systems and transformation of coordinates. Matrices and determinants.

PHYS 3622
Modern Laboratory Methods II. Lab 6. Prerequisite(s): 2014, 2114. Introduction to the operating principles and applications of modern physical methods used in research. Laboratory experiments with lasers, wave propagation, thermometry, radiation detection, optical interferometry, and spectroscopy.

PHYS 3713
Modern Physics I. Prerequisite(s): 2114. Atomic physics, special theory of relativity, and introduction to solid state and nuclear physics.

PHYS 4003*
Computer Simulation Methods in Physics. Prerequisite(s): 3013, 3113, 3313 or consent of instructor. Introduction to computer simulation methods used in the physical sciences. Linear systems, nonlinear systems, molecular dynamics, Monte Carlo methods, cellular automata, simple quantum systems. Some knowledge of either C, FORTRAN, Pascal, or BASIC required.

PHYS 4010*
Special Problems. 1-3 credits, max 9. Prerequisite(s): Consent of instructor. Individual laboratory work of an advanced nature.

PHYS 4113*
Electricity and Magnetism. Prerequisite(s): 2114 and MATH 2233, or their equivalents. Electrostatic fields, magnetic fields of steady currents, induced EMFs, Maxwell's equations and introduction to electromagnetic wave theory. Vector analysis used.

PHYS 4213*
Introduction to Nuclear and Particle Physics. Prerequisite(s): 2114 and 3713 or consent of instructor. Survey of phenomenological aspects of nuclear and particle physics, photon and charged particle interactions with matter, particle detectors, particle accelerators, electromagnetic, strong and weak interactions, models of the nucleus, quark model of mesons and baryons, elementary particles, and symmetries in the Standard Model.

PHYS 4263
Introduction to Solid State Physics. Prerequisite(s): 3013, 3713 or consent of instructor. Structure, specific heat, dielectric properties, lattice vibrations, free electron theory, band structure, and superconductivity of solids.

PHYS 4313*
Molecular Biophysics. Prerequisite(s): 1214 or 2114. Survey of experimental and computational methods for determining the structure and function of biomolecular assemblies such as proteins and membranes. Techniques to be discussed include: X-ray diffraction, nuclear and electron spin resonance, optical spectroscopy, photobiophysics, kinetic modeling, molecular dynamics, Monte Carlo and homology modeling.

PHYS 4413*
Modern Physics II. Prerequisite(s): 3013 and 3713. Atomic and X-ray spectra; one-dimensional Schroedinger equation; nuclear structure; introduction to statistical mechanics and elementary quantum statistics.

PHYS 4423*
Mechanics II. Prerequisite(s): 3013. Lagrangian and Hamiltonian dynamics, calculus of variations, constrained systems, coupled oscillators, continuous systems and waves.

PHYS 4513*
Introductory Quantum Mechanics. Prerequisite(s): 3713. Uncertainty principle, setting up Schroedinger equation (time dependent as well as time independent) and solving it for linear oscillator, hydrogen atom, periodic, and other potentials.

PHYS 4663*
Radioactivity and Nuclear Physics. Prerequisite(s): 3713 or consent of instructor. Natural and artificial radioactivity, decay laws; absorption, detection and measurement of radiations; nuclear transformations.

PHYS 4712*
Senior Project. Lab 6. Advanced individual experimental projects. Project proposal, formal laboratory report, and oral presentation are required.

PHYS 4813*
Electromagnetic Radiation. Prerequisite(s): 3213, 3513, 4113. Electromagnetic wave theory, reflection and refraction of electromagnetic waves; resonant cavities, wave guides, fiber propagation of electromagnetic waves; radiation sources; relativistic description of electromagnetic fields.

PHYS 4993
Senior Honors Thesis. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis under the direction of a faculty member, with second faculty reader and oral examination. *Required for graduation with departmental honors in physics.*

PHYS 5000*
Master's Thesis Research or Report. 1-9 credits, max 9. Prerequisite(s): Consent of major professor. Thesis research or report for master's degree.

PHYS 5110*
Seminar. 1-5 credits, max 20. Prerequisite(s): Graduate standing in physics. Special topics in physics.

PHYS 5113*
Statistical Thermodynamics and Kinetic Theory. Prerequisite: 3113. Fundamental concepts of thermodynamics: first, second and third laws; thermodynamic potentials. Statistical physics: Maxwell-Boltzman, Fermi-Dirac, Bose-Einstein distribution functions. Kinetic theory: transport phenomena, Boltzman H Theorem, the approach to thermodynamic equilibrium.

PHYS 5123*
Geometrical Optics. Prerequisite(s): 3213 or consent of instructor. Foundations of geometrical optics, geometrical theory of optical imaging, geometrical theory of aberrations, image forming instruments. (Same course as ECEN 5803)

PHYS 5133*
Laser Spectroscopy. Prerequisite(s): 5163. Principles of different types of laser spectroscopy based on fluorescence, absorption, saturated absorption, absorption in a cavity: Infrared, Raman, light scattering, four wave mixing, CARS, phase conjugation, two photon absorption, double resonance, and multiphoton ionization.

PHYS 5163*
Lasers. Prerequisite(s): 4813 or equivalent. Semi-classical description of absorption and emission of light by matter; effects of cavities and optical elements; theory of lasers—gas, liquid, solid state and semiconductor. Electro-optics. Techniques of mode-locking, Q-switching, phase conjugation, Fourier transform optics. An introduction to non-linear optics.

PHYS 5213*
Statistical Mechanics. Prerequisite(s): 5113 and 5613 or consent of instructor. Classical and quantum mechanical distribution functions for independent particles; interacting classical and quantum systems, superfluidity, phase transitions and critical phenomena, approximation methods.

PHYS 5220*
Physics Topics for Teachers. 1-6 credits, max 6. Prerequisite(s): Teaching experience or consent of instructor. Special topics for elementary and secondary science teachers to improve their subject matter competence. Content varies, depending on the needs of specific groups of teachers.

PHYS 5263*
Particle Physics. Prerequisite(s): 5613 or consent of instructor. Phenomenology of elementary particles: quark model, electromagnetic, weak, and strong interactions of quarks, leptons, and gauge bosons, Feynman diagram techniques, parton model, gauge symmetries, spontaneous symmetry breaking, Standard model, experimental tests.

PHYS 5303*
Physical Optics. Prerequisite(s): 3213 or consent of instructor. Multiple beam interference, diffractions, imaging, near field optical probes of matter, surface plasmons, light scattering from random media, optical coherence tomography - biomedical applications, negative materials, perfect lenses and super resolution. (Same course as ECEN 5823*)

PHYS 5313*
Electromagnetic Theory. Prerequisite(s): 5453. Electric and magnetic fields in free space and in matter. Boundary value problems, Green's functions, stress tensors, multipole expansions, thermodynamics; electromagnetic waves.

PHYS 5350*
Special Problems. 1-3 credits, max 3. Prerequisite(s): Graduate standing in physics. Special problems of experimental or theoretical nature. Largely individual work with written report required.

PHYS 5413*
Classical Mechanics. Prerequisite(s): 4423 or consent of instructor. Generalized coordinates and advanced dynamics; coupled systems, wave motion; theory of elasticity.

PHYS 5453*
Methods of Theoretical Physics. Prerequisite(s): 3513. Introduction to the various methods and techniques used in theoretical physics.

PHYS 5613*
Quantum Mechanics I. Prerequisite(s): 5453. Postulates of quantum mechanics. Operators, commutation relations, eigenfunctions. Schroedinger, Heisenberg and interaction formalisms, angular momentum and central field problems; nondegenerate perturbation theory.

PHYS 5663*
Solid State Physics I. Prerequisite(s): 4513. Crystal structure, cohesive energy of ionic crystals and metals, specific heats, free electron theory of metals, band theory, Brillouin zones, insulators and alloys; magnetic properties, optical properties and thermal and electrical conductivity of solids.

PHYS 5713*
Solid State Physics II. Prerequisite(s): 5663 or equivalent. Symmetry, dielectric properties, ferroelectrics, magnetic properties, mechanical properties, and defects of solids.

PHYS 5813*
General Relativity. Prerequisite(s): 5453 or consent of instructor. Theory and applications of general relativity: the principle of equivalence, general coordinate invariance, tensors, affine connections, Einstein's field equations, classic tests, application to stellar dynamics, black holes, and cosmology.

PHYS 5960*
Problems in Chemical Physics. 3-6 credits, max 6. Prerequisite(s): Consent of instructor. Intermolecular forces, interaction of radiation with matter in bulk form, dielectric properties of matter, polymer physics and quantum theory of biopolymers.

PHYS 6000*
Doctoral Dissertation Research. 1-15 credits, max 60. Prerequisite(s): Admission to candidacy and permission of major professor.

PHYS 6010*
Advanced Graduate Seminar. 1-3 credits, max 15. Prerequisite(s): Consent of instructor. Special topics of an advanced nature in physics.

PHYS 6113*
Advanced Theory of Solids. Prerequisite(s): 5663. Many-body techniques, transport processes, band theoretical techniques, superconductivity, dynamics of electrons in a magnetic field, and alloys.

PHYS 6213*
Group Theory for Physics. Prerequisite(s): 5453. Group theory and imperfections in crystals. Dislocation theory and color centers.

PHYS 6243*
Semiconductors I. Prerequisite(s): 5113, 5613, 5663. The first part of a survey of the physics of semi-conductors. Bonding and structure, crystal growth, epitaxial growth, band theory, phonons, photons, defects, intrinsic and extrinsic statistics, trapping and recombination.

PHYS 6260*
Special Topics in High Energy Physics. 1-3 credits, max 9. Prerequisite(s): 5263 or consent of instructor. Advanced topics of current interest in high-energy physics: collider physics, supersymmetry, unification, flavor physics, string phenomenology, extra dimensions.

PHYS 6313*
Quantum Mechanics II. Prerequisite(s): 5613. Scattering theory, many-particle quantum mechanics and application to atomic and molecular systems; degenerate and time-dependent perturbation theory.

PHYS 6323*
Quantum Field Theory. Prerequisite(s): 6313 or consent of instructor. Relativistic Quantum Mechanics: Klein-Gordon field, path integral formulation of Quantum Mechanics, Feynman diagrams, Quantum Electrodynamics, relativistic scattering radiative corrections, renormalization and critical exponents, non-Abelian gauge theories, spontaneous symmetry breaking.

PHYS 6343*
Semiconductors II. Prerequisite(s): 6243. The second part of the semiconductors sequence. Transport phenomena, junctions, devices, heterostructures, and optical properties.

PHYS 6413*
Nonlinear Optics. Prerequisite(s): 5163, 5313, and 5613. The response of matter at high radiation powers; nonlinear susceptibilities. Wave propagation in nonlinear medium; three wave and four wave interactions; saturated absorption, optical switching and limiting; two photon and stimulated Raman processes; Self focusing; solitons.

PHYS 6423*
Quantum Optics. Prerequisite(s): 5163, 5613 or consent of instructor. Quantization of Electromagnetic Fields, coherence, quantum entanglement, parametric down conversion, two photon interferometry, Bell's inequalities, quantum teleportation and cryptography, cavity QED.

PHYS 6513*
Advanced Topics in Solid State Physics. Prerequisite(s): 5663 or equivalent. Interaction of radiation and matter, neutron scattering, phase transitions, magnetic resonance and cooperative phenomena.

PHYS 6613*
Advanced Nuclear and Particle Physics. Prerequisite(s): 5263, 6313; or consent of instructor. Renormalization of quantum field theories, spontaneous symmetry breaking, Standard model, flavor physics, grand unification, super-symmetry.

PHYS 6713*
Advanced Electromagnetic Radiation. Prerequisite(s): Consent of instructor. Radiation theory, wave guides, scattering and dispersion relations; relativity.

PHYS 6803*
Photonics I: Advanced Optics. Lab 9. Prerequisite(s): ECEN 3213 or 3813. Advanced optics including spectral and time characteristics of detectors, characteristics of lasers, time, spectral and spatial parameters of laser emission, interferometric techniques, and nonlinear effects such as two-photon absorption and second and third harmonic generations. Ultrashort laser pulses. (Same course as CHEM 6803* & ECEN 6803*)

PHYS 6810*
Photonics II: THz Photonics and THz-TDS. 1 credit, max 4, Lab 1. Prerequisite(s): 6803. THz photonics and THz time-domain spectroscopy (THz-TDS). Concepts and techniques of driving electronic circuitry with ultrashort laser pulses to generate and detect freely propagating pulses of THz electromagnetic radiation using several operational research systems. (Same course as CHEM 6810* & ECEN 6810*)

PHYS 6820*
Photonics II: Spectroscopy II. 1 credit, max 4, Lab 1. Prerequisite(s): 6803. Operating principles and applications of laser spectroscopy of atoms, molecules, solids and complex fluids. Absorption, emission, photon correlation, coherence, time resolved Fourier transform. Raman spectroscopy and non-linear optical. (Same course as CHEM 6820 & ECEN 6820)

PHYS 6830*
Photonics II: Spectroscopy III. 1 credit, max 4, Lab 1. Prerequisite(s): 6803. Advanced spectroscopic instruments and methods used for investigation of semi-conductors and solid state material. Stimulated emission characterized both in wavelength and in time. Time-resolved fluorescence measurements. Multiphotonic excitations. Fast measuring techniques including subnanosecond detectors, picosecond streak cameras, and ultrafast four-wave mixing and correlation techniques. Time-dependent photoconductivity measurements. (Same course as CHEM 6830 & ECEN 6830)

PHYS 6840*
Photonics III: Microscopy I. 1 credit, max 4, Lab 1. Prerequisite(s): CHEM 3553 or consent of instructor. The structure and imaging of solid surfaces. Basics of scanning probe microscopy (SPM). Contact and noncontact atomic force microscopy (AFM). Scanning tunneling microscopy (STM) in air. (Same course as CHEM 6840* & ECEN 6840*)

PHYS 6850*
Photonics III: Microscopy II. 1 credit, max 4, Lab 1. Prerequisite(s): 3553 or consent of instructor. Advanced techniques of scanning probe microscopy (SPM). Magnetic force microscopy, Kelvin force microscopy, scanning, tunneling microscopy (STM) in vacuum. Characterization of materials with SPM. Nanolithography with SPM. Device manufacturing and analysis. (Same course as CHEM 6850* & ECEN 6850*)

PHYS 6860*
Photonics III: Microscopy III and Image Processing. 1 credit, max 4, Lab 1. Prerequisite(s): ECEN 5793. Digital image processing, including projects. Image acquisition and display, image enhancement, geometric operations, linear and nonlinear filtering, image restoration, edge detection, image analysis, morphology, segmentation, recognition, and coding and compression. (Same course as CHEM 6860* & ECEN 6860*)

PHYS 6870*
Photonics IV: Synthesis and Devices I. 1 credit, max 4, Lab 1. Prerequisite(s): 6803 and 6840. Preparation of functional nanostructures and related optical and electronic devices. Physical and chemical methods of thin film deposition. Engineering of prototypes of light emitting diodes, sensors, optical limiting coatings, lithographic patterns. (Same course as CHEM 6870* & ECEN 6870***)**

PHYS 6880*
Photonics IV: Semiconductor Devices, Testing and Characterization. 1 credit, max 4, Lab 1. Prerequisite(s): 6803. Test and characterization of semiconductor and optoelectronic devices. Hall effect, four point probe, CV and IV measurements, optical pump-probe, photoluminescence, and electro-optics sampling. (Same course as CHEM 6880* & ECEN 6880*)

PHYS 6890*
Photonics IV: Semiconductor Synthesis and Devices III. 1 credit, max 4, Lab 1. Prerequisite(s): 6803. Processing, fabrication and characterization of semiconductor optoelectronic devices in class 100/10000 cleanrooms. Cleanroom operation including general procedure for material processing and device fabrication. Device processing using a variety of processing such as mask aligner, vacuum evaporators and rapid thermal annealer. Testing using optical and electrical testing apparatus such as I-V, C-V Hall, and optical spectral measurement systems. (Same course as CHEM 6890* & ECEN 6890*)

PLANT PATHOLOGY (PLP)

PLP 3343
Principles of Plant Pathology. Lab 2. Prerequisite(s): BOT 1404 or BOT 3463 or MICR 2125 or PLNT 2013. Introduction to basic principles and concepts of plant pathology, including the nature, cause and control of biotic and environmentally induced plant diseases, with emphasis on principles and methods of disease management. *Offered in combination with PLP 5343. No credit for both 3343 and 5343.*

PLP 3553
Fungi: Myths and More. Lab 1. Prerequisite(s): BIOL 1114. Explores the impact of fungi on beliefs, culture and society via the colorful folklore and myths of fungi and their role in the environment and human affairs, including diseases of plants, animals and humans exemplified by the Great Bengal famine of 1943, The Irish potato famine, 1840's and the Salem witch trials 1692. Laboratory instruction on use of microscopes, mushroom identification, mechanisms of dispersal, and genetic recombination. (Same course as BOT 3553)

PLP 3663
Turfgrass Integrated Pest Management. Lab 2. Prerequisite(s): 3343, ENTO 2991, 2992. The biology, ecology and identification of fungal, nematode and insect turfgrass pests. Contemporary concepts and applications of integrated control practices available for managing turfgrass pests presented along with decision-making tools for use in turfgrass pest management programs. (Same course as ENTO 3663)

PLP 4400
Special Topics. 1-3 credits, max 3. Prerequisite(s): Consent of instructor. Special topics in Plant Pathology, Entomology or related fields. (Same course as ENTO 4400)

PLP 4922*
Applications of Biotechnology in Arthropod and Pathogen Control. Prerequisite(s): Introductory biology and chemistry or equivalent. Applications of biotechnology in controlling arthropod pests of plants and animals and plant pathogens. Introduction to underlying technology, products being deployed, their effectiveness and associated problems or concerns resulting from their use. (Same course as ENTO 4922*)

PLP 5000*
Research. 1-6 credits, max 6. Research for the MS degree.

PLP 5003*
Plant Nematology. Lab 2. Prerequisite(s): 3343 or concurrent enrollment. General morphology, taxonomy and bionomics of nonparasitic and plant parasitic nematodes. Plant parasitic nematode assay techniques, subfamily identification, symptomology, pathogenicity and control.

PLP 5012*
Plant Virology Laboratory. Lab 4. Prerequisite(s): Previous or concurrent enrollment in 5013. Methods of investigating plant viruses.

PLP 5013*
Plant Virology. Prerequisite(s): 3343 or equivalent; one course in biochemistry or physiology. Transmission, characterization, differentiation, replication, and control of plant viruses; discussion of current literature.

PLP 5104*
Mycology. Lab 4. Prerequisite(s): Graduate standing. A systematic study of the fungi, with emphasis on taxonomy, comparative morphology and fungal biology. Taught in the Department of Plant Pathology. (Same course as BOT 5104*)

PLP 5304*
Phytobacteriology. Lab 3. Prerequisite(s): 3343. Bacteria as plant pathogens, with examination of the taxonomy, genetics, ecology, physiology, host-parasite interaction, and control of phytobacteria.

PLP 5343*
Principles of Plant Pathology. Lab 2. Prerequisite(s): BOT 1404 or BOT 3463 or MICR 2125 or PLNT 2013. Introduction to basic principles and concepts of plant pathology, including the nature, cause and control of biotic and environmentally induced plant diseases. *Offered in combination with PLP 3343. No credit for both 3343 and 5343. Graduate students will be expected to complete extra assignments.*

PLP 5413*
Plant Disease Epidemiology. Lab 3. Prerequisite(s): 3343 or 5043. Introduction to methodology and technical equipment used in epidemiological research and application of epidemiological principles in plant disease control.

PLP 5524*
Integrated Management of Insect Pests and Pathogens. Lab 4. Prerequisite(s): 3343, ENTO 2991 & 2992 or equivalent or consent of instructor. Modern theory and practices for management of insect pests and pathogens in plant production systems, emphasizing an ecologically-based, integrated approach. Basic concepts of pest management, decision-making, cost/benefit analysis, and risk/benefit analysis. (Same course as ENTO 5524)

PLP 5560*
Problems in Plant Pathology. 1-5 credits, max 10. Prerequisite(s): Consent of instructor.

PLP 5613*
Host Plant Resistance. Lab 2. Prerequisite(s): 3343 and ENTO 2991, 2992 or equivalent and a general genetics course; or consent of instructor. Interactions of plants and the herbivorous insects and pathogenic micro-organisms that attack them. Development and deployment of multiple-pest resistant cultivars in crop management systems. (Same course as ENTO 5613)

PLP 5623*
Advanced Biotechnology Methods. Lab 3. Prerequisite(s): BIOC 3653, BIOL 3023 or equivalent or consent of instructor. Overview of current theory and principles of biotechnology and laboratory experience with contemporary techniques and experimental methods used in biotechnology, including genome analysis, gene transfer, identification and isolation of genes and their products, and regulation of gene expression in plants and arthropods. (Same course as ENTO 5623*)

PLP 5700*
Teaching Practicum in Plant Pathology. 1-6 credits, max 6. Prerequisite(s): Graduate student standing. Variable credit offering for graduate students who wish to develop skills in teaching, assessment and course development working in conjunction with a primary instructor.

PLP 5724*
Physiology of Host-Pathogen Interactions. Lab 4. Prerequisite(s): 3343 and BIOC 3653. Physiology of the interactions between plants and pathogens. Mechanisms by which pathogens infect and by which plants resist infection.

PLP 5860*
Colloquium. 2 credits, max 2. Prerequisite(s): 3343. Concepts and principles of plant pathology through discussions of pertinent literature.

PLP 5870*
Scientific Presentations. 1 credit, max 5. Prerequisite(s): Consent of instructor. Preparation and delivery of scientific presentations, including 50-minute seminars, 10-minute talks, and posters. (Same course as ENTO 5870*)

PLP 5992*
Career Skills and Professionalism for Scientists. Prerequisite(s): Graduate standing. For graduate students majoring in science-based fields, especially those nearing graduation. Skills needed for effective job application and interviewing, career development and advancement, communication with professional colleagues and the public, and personal professional development. (Same course as ENTO 5992*)

PLP 6000*
Research. 1-12 credits, max 36. Research for the PhD degree.

PLP 6303*
Soilborne Diseases of Plants. Lab 3. Prerequisite(s): 3343. Soilborne diseases, their reception and importance, the pathogens involved, rhizoplane and rhizosphere influences, inoculum potential, specialization of pathogens, suppressive soil effects, and disease management. Lecture and discussion sessions will emphasize in-depth understanding of problems and complexities associated with studies of soilborne pathogens.

PLANT SCIENCE (PLNT)

PLNT 1213
Introduction to Plant and Soil Systems. Introduction to the concepts of plant and soil systems including cropland, rangeland and pastureland. A systems approach to the importance of plant and soil resources to the producer, consumer and citizen; modern management and production practices; maintenance of natural resources.

PLNT 1223
Plants, Genes and the Consumer. Issues of plant-based food production from both a scientific and a social perspective. The fundamental principles of plant growth and development; how plants function in an agroecosystem and how to utilize these principles to grow food in an environmentally and socially sound manner. The role of genetics and biotechnology. *No credit for Plant and Soil Sciences or Horticulture majors.*

PLNT 2013
Applied Plant Science. Lab 2. Prerequisite(s): 1213 or BOT 1404 or FOR 1123 or HORT 1013. Application of agronomic principles to the management, improvement and use of plants. Structure and growth of crop plants relating to management strategies and adaptation to varying abiotic and biotic factors. Hands-on identification of crops, weeds, and seed quality factors; application of tools and techniques.

PLNT 2041
Professional Development. Prerequisite(s): Sophomore standing in plant and soil sciences. Development of professional and personal goals in plant and soil sciences through identification of personal values and professions, the building of a skills toolbox and networking. *Graded on pass-fail basis.*

PLNT 3111
Weed Control Laboratory. Lab 2. Prerequisite(s): 1213 or HORT 1013; 3211, 3221 and 3231 (or concurrent enrollment in 3211, 3221 and 3231). Identification of common weeds, principles and practices of herbicide application, and application equipment, handling and proper use of herbicides.

PLNT 3211
Principles of Weed Biology and Ecology. Prerequisite(s): 1213 or HORT 1013. Importance of biological growth, activity, and ecological role of selected crop and weed species in controlling growth patterns of each organism. *May concurrently enroll in 3221, 3231.*

PLNT 3221
Principles of Herbicide Chemistry. Prerequisite(s): 1213 or HORT 1013 and 3211 (or concurrent enrollment in 3221). Weed control terminology, understanding modes of action for selected herbicide families and their activity on plant growth. *May concurrently enroll in 3211, 3231.*

PLNT 3231
Principles of Agronomic Weed Control. Prerequisite(s): 1213 or HORT 1013, 3211 and 3221 (or concurrent enrollment in 3211 and 3221). Basic principles and practices of weed control for agronomic crops and pastures and knowledge on the safe and effective use of herbicides.

PLNT 3554*
(N)Plant Genetics and Biotechnology. Lab 2. Prerequisite(s): BIOL 1114. Basic principles of heredity. Interrelationship between classical genetics and molecular genetics emphasized. Mendelian genetics, cytogenetics, mutations, gene regulation and genetic engineering.

PLNT 3782
Seed Technology. Prerequisite(s): 1213. Factors determining seed quality and utilization during growth, harvest, and storage. Modern techniques to determine seed quality for optimum processing and utilization of seed crops. *Minimum of two field trips required.*

PLNT 3790
Seed and Plant Identification. 1 credit, max 2, Lab 3. Prerequisite(s): 1213. Identification and classification of agronomically important crop and weed species from seed and from seedling, vegetative, flowering or mature plants.

PLNT 4080
Professional Internship. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Internship must be at an approved agribusiness unit or other agency serving agronomic agriculture. Requires a final conference with on campus adviser and a written report. *Graded on a pass-fail basis.*

PLNT 4113*
Advanced Weed Science. Prerequisite(s): 3111 and 3221. Integrated approach for weed management. Weed life cycles and biology, weed crop interferences, herbicide families and their characteristics, and finally a systematic and integrated weed management system. Methods of conducting and interpreting research results in appropriate topics.

PLNT 4123*
Plant-Environment Interactions. Prerequisite(s): BOT 1404. Environmental impact on plant life cycle; (i.e. germination, flowering and senescence); plant growth responses (e.g. photosynthesis, phototropism, biomass production) to light quality, precipitation, temperature, and population or community changes.

PLNT 4353*
Plant Breeding. Prerequisite(s): 3554 or equivalent. Basic principles dealing with the improvement of plants through application of genetic principles.

PLNT 4470*
Problems and Special Study. 1-3 credits, max 12, Lab 1-3. Prerequisite(s): Consent of instructor. Problems in plant science selected from topics in range and turf, plant breeding and genetics, crop management and physiology, and weed control.

PLNT 4571
Senior Seminar. Prerequisite(s): Senior standing in plant and soil sciences. Career opportunities (talks and field trips); preparation of resumes and interviews. *Graded on a pass-fail basis.* (Same course as SOIL 4571)

PLNT 4613*
Forage and Grazinglands Resource Management. Prerequisite(s): 1213 or BOT 1404. Designing forage systems that optimize yield potential, economical livestock production and pasture system development.

PLNT 4673*
Cropland Ecosystems. Lab 2. Prerequisite(s): 2013. Designing sustainable cropping systems that optimize yield potential, economic and environmental benefit based upon climatic and social conditions.

PLNT 4772*
Oilseed, Pulse and Mucilage Crops. Prerequisite(s): 1213. Production, utilization and improvement of oilseed, pulse and mucilage crops with special emphasis on peanuts and soybeans.

PLNT 4783*
Cotton Production. Prerequisite(s): 1213. Production, utilization and improvement of cotton. Several other agronomic fiber crops briefly discussed.

PLNT 4990
Senior Thesis in Plant and Soil Sciences. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Supervised undergraduate research in topics related to plant and soil sciences. Completion of an approved research project based on a thesis topic in plant or soil science will include submission of a written report and a public defense of the work.

PLNT 5000*
Master's Thesis. 1-6 credits, 6 max total credits under Plan I, and 2 max total credits under Plan II. Prerequisite(s): Consent of adviser. Research planned, conducted and reported in consultation with a major professor.

PLNT 5020*
Graduate Seminar. 1 credit, max per semester 1 credit on MS program and 2 credits on a PhD program required. Prerequisite(s): Graduate standing. Philosophy of research, methods of research, or interpretation of research.

PLNT 5110*
Problems and Special Study. 1-4 credits, max 6. Prerequisite(s): Consent of instructor. Supervised study of special problems and topics not covered in other graduate courses.

PLNT 5112*
Herbicide Fate in the Environment. Prerequisite(s): 4113. Processes involved in the behavior and fate of herbicides in air, soil, and water. Reaction, movement, and dissipation of herbicides in soil.

PLNT 5230*
Research. 1-4 credits, max 4. Prerequisite(s): Consent of a faculty member supervising the research. Supervised independent research on selected topics.

PLNT 5293*
Plant Response to Water Stress. Prerequisite(s): BIOC 3653, BOT 3463. Physiological ramifications of water deficit stress on cells, tissues, plants and canopies. Discussion of the soil/plant/atmosphere continuum, and avoidance and tolerance mechanisms leading to drought resistance. Photosynthesis, transpiration, and water-use efficiency and their relationship to biomass accumulation and crop yield.

PLNT 5403*
Physiological Action of Herbicides. Prerequisite(s): BOT 3463. The mode of action, uptake and translocation, and metabolism of herbicides in crops and weeds.

PLNT 5414*
Plant Breeding Theory, Methods and Strategies. Prerequisite(s): 3554, 4353 and STAT 5013, or consent of instructor. Development and application of statistical and genetic principles to breeding methodology of self- and cross-pollinated crops; emphasis on selection methods pertinent to plant improvement; examination of philosophies and strategies employed in private and public plant breeding programs.

PLNT 5433*
Biotechnology in Plant Improvement. Prerequisite(s): 3554, 4353, and BIOL 3014 or consent of instructor. Use of emerging technologies in cell biology and molecular genetics to study and manipulate plants. Emphasis on genetic systems which influence productivity and end-product utilization. The integration of biotechnology into plant breeding programs and issues concerning the release of genetically engineered organisms into the environment.

PLNT 5443*
Advanced Genetics. Prerequisite(s): 3554; BIOC 3653. Concepts of eukaryotic genetics with emphasis on classical, molecular, and quantitative genetics.

PLNT 5452*
Cytogenetics. Prerequisite(s): 5443 or concurrent enrollment in BOT 5232. Behavior of chromosomes, cellular organelles and cytoplasm in relation to genetic behavior.

PLNT 5863*
International Agricultural Research Systems. Organization, management and budgeting of agricultural research systems with emphasis on developing countries. Analysis of research and training priorities, budgeting, staffing and management of projects.

PLNT 6000*
Doctoral Thesis. 1-6 credits, max 36. Prerequisite(s): Consent of adviser. Independent research to be conducted and reported with the supervision of a major professor as partial requirement for the PhD degree.

PLNT 6010*
Advanced Topics and Conference. 1-6 credits, max 12. Prerequisite(s): MS degree. Supervised study of advanced topics. A reading and conference course designed to acquaint the advanced student with fields not covered in other courses.

PLNT 6410*
Topics in Plant Breeding and Genetics. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Selected topics in the statistical and experimental analysis of quantitative traits, evolutionary development of domesticated plants and animals, and techniques used in breeding crop plants.

POLITICAL SCIENCE (POLS)

POLS 1010
Studies in American Government. 1-2 credits, max 2. Special study in American government to allow transfer students to fulfill general education requirements as established by Regents' policy.

POLS 1113
American Government. Organization, processes and functions of the national government of the United States. Satisfies, with HIST 1103 or 1483 or 1493, the State Regents requirement of six credit hours of American history and American government before graduation.

POLS 2013
(S)Introduction to World Politics. Analysis of the major concepts in international relations - power, sovereignty, self-help, cooperation, dependency, and introduction to the dominant theoretical approaches to its study realism, pluralism, Marxism, and feminism.

POLS 2023
(S)The Individual and the Law. Introduction to the U.S. Constitution, legal reasoning, legal research techniques, and topical issues of U.S. public law.

POLS 2033
Introduction to Public Administration. Public administration, including administration, administrative organization, decision-making, governmental public relations and administrative responsibilities.

POLS 2113
(S)Introduction to Comparative Politics. A comparative study of the political processes and institutions of contemporary societies. Introduction to the concepts and methods of comparative politics.

POLS 2993
Honors Tutorial in Political Science. Prerequisite(s): 1013, honors standing, and invitation by head of department. For the special needs of the sophomore-level honors student majoring in political science who wishes to study individualized topics at an accelerated pace in a tutorial format. After mastering basic principles in an area of interest the student will conduct independent research under close faculty supervision and prepare a report or reports.

POLS 3003
(I,S)The Soviet Union: History, Society and Culture. A comprehensive view of the Soviet Union, stressing those issues in the political, economic, technological, geographical and cultural spheres which are most relevant to the current situation. *Accessible to beginning undergraduates.* (Same course as HIST 3003 & RUSS 3003)

POLS 3033*
International Law. The nature and scope of public international law, with emphasis on problems related to the recognition of states and governments, jurisdiction over nationals and aliens, and state responsibility in cases of expropriation and revolutionary damage.

POLS 3043
Politics of the Global Economy. Theory and practice of international political economics. The patterns of association between political and market-based processes among nation states. Emphasis on interactions among advanced industrial states, transnational phenomena, and opportunities and pitfalls in north-south relations.

POLS 3053
(I,S)Introduction to Central Asian Studies. A comprehensive view of newly-emerged Central Asian states examining the history, politics, economics, geography, and culture of Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan as reflected in their thoughts, religion, literature, and architecture, in the past, and the strategic importance of their natural wealth for the present and future. (Same course as GEOG 3053, HIST 3053 & RUSS 3053)

POLS 3100
Political Science Internship. 1-6 credits, max 6. Prerequisite(s): Consent of department. Internship education experience in a specific subfield in the discipline of political science.

POLS 3103
Introduction to Political Inquiry. Prerequisite(s): 60 credit hours or 45 hours with GPA of 3.25, including 2113. The scope and methods of political science. Scientific methodology applied to political phenomena, hypothesis, measurement, literature review, research designs, introductory data analysis and writing in political science.

POLS 3123
(I)Politics of Russia/Former Soviet Union. Political processes, governmental institutions and public policies of post-Soviet Russia. Parties, elections and citizen participation in government.

POLS 3143
(I)Politics of Western Europe. State-society relations in key West European countries, including political processes, governmental institutions, cultural pluralism and gender relations.

POLS 3163
(I)Politics of Africa. Analysis of processes, institutions and contemporary trends in the politics of selected African countries, including political development, democratization, conflict, political role of the military, political economy, and social movements.

POLS 3193
(I,S)Politics of Latin America. Analysis of processes, institutions and contemporary trends in the politics of selected Latin American countries; political development, democratization, political role of the military, political economy and social movements.

POLS 3223
(I)Politics of East Asia. Political processes, governmental institutions and administration in China, Japan, and Korea.

POLS 3313
(I)Politics of the Middle East. Analysis of political institutions and processes with emphasis on selected countries of the Middle East; the social and economic basis of politics; nationalism, political development and factors of instability and change.

POLS 3353
Parties and Interest Groups. Political parties and interest groups as institutions; their role in elections and government.

POLS 3414
Political Campaigns and Candidacy. Lab 2. Planning, fundraising, targeting, public opinion, support operations, voter contact, the mass media and candidate activities. Lab work in campaigns or government offices.

POLS 3423
(S)Voting and Elections. Electoral systems and their relationship to political development, political socialization, issue emergence, voting patterns and electoral cycles.

POLS 3453
(S)The Legislative Process. The power and organization of legislatures, as well as the selection and behavior of legislators. Special attention given to the U.S. Congress.

POLS 3483
The American Presidency. The politics of presidential selection, removal and succession; formal and informal powers of the president; relations with Congress, the national judiciary and national executive branch; proposed reforms and the vice-presidency.

POLS 3493*
Public Policy. Prerequisite(s): Any one of 1013, 2033, 2113, ECON 1113, 2123, SOC 1113, PHIL 2113. Identification of policy options open to policy makers and examination of measurements and rationales underlying governmental programs.

POLS 3513
Public Opinion and Polling. The nature of public opinion. Public opinion polling, the factors influencing opinion formation, and the effects of public opinion on policy and policy makers.

POLS 3523
Money, Media and Politics. Prerequisite(s): 1113. Techniques used by successful candidates for elective office to present their positions to the voting public. Beginning with the basic elements of fundraising exploration of current campaign finance laws, funding techniques and campaign budgeting. Message development, media production and ad placement. Preparation of a fundraising strategy.

POLS 3533
Political Lobby and Grassroots Organization. Prerequisite(s): 1113. Traditional special interest lobbying and the rapidly emerging local grassroots constituent movement. New federal laws pertaining to lobbying and rules that govern the conduct of state lobbying. The implications of technology and the potential advent of a plebiscite form of government. Development of complete grassroots strategy on an issue either at the federal or state level. (Same course as JB 3533)

POLS 3613*
State and Local Government. Political processes, government and administration of American states, cities and counties; special emphasis on Oklahoma.

POLS 3663
Introduction to Political Thought. The teachings of the three lasting traditions of Western political thought: classical, Christian and modern.

POLS 3683
American Politics in Contemporary Film. Prerequisite(s): 1113. The effect of politics on contemporary film. Exploration of the often subtle political imagery and symbolism contained in film.

POLS 3733
Incident Management and Tactical Operations. Strategic management of an emergency incident through the use of the Incident Management System. A thorough study of the IMS system and tactical decision-making forming the base for case study analysis and emergency operations simulations.

POLS 3763
Mitigation and Recovery. Prerequisite(s): 3813. Introduction to recovery and mitigation activities for emergency managers. Covers components, policies, programs and organizations related to recovery and mitigation, illustrates course concepts with case studies.

POLS 3813
Aim and Scope of Emergency Management. An overview of the history and philosophy of the current emergency management system. Concepts, issues and programs associated with the development of an emergency management program. Local, state and federal roles and responsibilities for responding to disasters and emergencies with emphasis on man-made natural and technological hazards.

POLS 3893
Terrorism and Emergency Management. A general introduction to the basic concepts for preparedness, response and command functions at the scene of a potential terrorist incident.

POLS 3953
(D,S)Minorities in the American Political System. Prerequisite(s): 1113. Examination of mass and elite level behavior of minorities in the contemporary U.S. political system.

POLS 3973
(D)Race, Politics and Sports. Prerequisite(s): 1113. Historical, as well as the contemporary relationship, between race, politics and sports in the U.S. political system.

POLS 3983
(S)Courts and Judicial Process. The American judiciary and legal process from a political perspective with particular emphasis on judicial organization and powers, recruitment, fact-finding, decision-making, impact of decisions, the legal profession and relations among courts. Oklahoma judicial organization.

POLS 3993
Legal Research and Analysis. Prerequisite(s): 2023 or HONR 2013. Introduction to legal research methods, including state and federal reported cases, digests, annotated codes, state and federal administrative regulations, and computerized legal research, as well as an introduction to legal reasoning and analysis and the preparation of case briefs and memoranda.

POLS 4000*
Topics in American Politics. 3 credits, max 6. Prerequisite(s): 1113 and 45 earned hours or consent of instructor. In-depth examination of critical topics and issues in American politics, including American political behavior and political leadership. May be repeated with different topics.

POLS 4010*
Topics in International Relations. 3 credits, max 6. Prerequisite(s): 2013 or 2113 or consent of instructor. In-depth examination of critical topics and issues in International Relations. May be repeated with different topics.

POLS 4013*
American Foreign Policy. Major problems and policies of American foreign relations since World War II and description of foreign formulation and aid administration.

POLS 4020*
Topics in Comparative Politics. 3 credits, max 6. Prerequisite(s): 2013 or 2113 or consent of instructor. In-depth examination of critical topics and issues in Comparative Politics. May be repeated with different topics.

POLS 4053
(I)War and World Politics. Foreign policies of major powers, areas of tension and sources of international conflict.

POLS 4100*
Problems of Government, Politics and Public Policy. 1-6 credits, max 6. Prerequisite(s): 60 credit hours, or 45 hours with GPA of 3.25, including 1013. Special problem areas of government, politics and public policy concentrating on topics not covered in other departmental course offerings.

POLS 4113*
International Institutions. The organization, procedures, functions and role of international institutions, with emphasis on the United Nations and related agencies.

POLS 4223
Comparative Political and Social Movements and the Politics of Protest. Prerequisite(s): 1113. The origins, activities and impact of political and social movements. Concepts and theoretical approaches related to political and social movements and these concepts and approaches to case studies of several contemporary movements in the United States, Latin America, and Europe.

POLS 4353*
Administrative Law. Legal powers, limits, and procedures of administrative agencies with emphasis on federal and state administrative procedure acts.

POLS 4363*
Environmental Law and Policy. Statutory law, case law, and administrative practices relating to regulation of the environment including environmental impact statements, pollution, public lands, and preservation law.

POLS 4403*
Urban Politics and Management. Problems of governing and managing American metropolitan areas.

POLS 4413*
Government Budgeting. The politics, planning and administration of government budgets. (Same course as 5320*)

POLS 4453*
Public Personnel Administration. Problems, processes, and procedures of public personnel administration. (Same course as 5333*)

POLS 4553
American Political Thought. A survey of the major developments in American political thought from the Colonial period to the present, followed by a topical analysis of important recent theoretical developments in political science.

POLS 4573
Democratic Theory. Investigates the origins, development, and continuing challenges of theories of democratic government, with particular emphasis on the American political tradition. Topics include citizenship, accountability, voting and elections, federalism, and institutional design.

POLS 4593*
Natural Resources and Environmental Policy. Current issues in the law, politics and administration of energy, land, water, mineral and other natural resources policy with particular emphasis on relations to environmental policies and law.

POLS 4623
(S)Oklahoma Politics. Prerequisite(s): 1113. Introduction to Oklahoma Politics. Topics include the evolution of Oklahoma political institutions; the struggle to shape the Oklahoma political culture with special attention to the role of race and woman suffrage; political issues; the structure of Oklahoma political institutions at the state and local levels; and elections.

POLS 4653
(H)Contemporary Political Thought. An analysis of 19th and 20th century political ideas, with emphasis on the rise and fall of ideologies along side controversies over relativism, positivism, pragmatism, and resurgent religious faiths.

POLS 4670*
Topics in Political Theory. 3 credits, max 6. In-depth examination of critical topics and issues in classic, modern, or American political theory. May be repeated with different topics.

POLS 4693
(S)Women in Politics. Changing role of women in government and politics. Voting behavior, public opinion, women in government, and the women's movement.

POLS 4963
U.S. Constitution: Civil Rights. Prerequisite(s): 2023 or 3983 recommended. Development of principles of constitutional law by the Supreme Court concerning individual and group rights, with particular emphasis on equal protection of the laws concepts in matters of race, gender, wealth, citizenship, legislative reapportionment and voting rights, government employment and affirmative action programs. Legal research techniques.

POLS 4973*
U.S. Constitution: Civil Liberties. Prerequisite(s): 2023 or 3983 recommended. Development of principles of constitutional law by the Supreme Court concerning freedom of speech expression, religious liberty, property rights, 5th and 14th amendments due process concepts and procedure requirements at national and state level.

POLS 4980*
Topics in Public Law. 3 credits, max 6. Prerequisite(s): 2023 and 3983 or 3993 or consent of instructor. In-depth examination of critical topics and issues in Public Law. May be repeated with different topics.

POLS 4990*
Independent Study. 1-3 credits, max 9. Application of major relevant theoretical perspectives to selected case studies of political problems and issue areas. Theories and attendant case studies selected by visiting faculty members.

POLS 4993
Political Science Honors Thesis. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis under the direction of a faculty member, with second faculty reader and oral examination. Required for graduation with departmental honors in political science.

POLS 5000*
Thesis. 1-6 credits, max 6.

POLS 5013*
Quantitative Methods of Political Analysis. Required of all graduate students. Fundamental methodological issues in the scientific study of politics. Logic of science, principles of research design and computer data manipulation and analysis.

POLS 5020*
Research in Public Administration, Public Policy and Politics. 1-6 credits, max 6. Individually supervised research.

POLS 5023*
Foundation of Political Science. Overview of the foundational works, theories and approaches that define the discipline of political science and serve as bridges across its subfields.

POLS 5030*
Internship in Public Administration and Government. 1-6 credits, max 6. Individually supervised internships in administrative and governmental career areas. Paper required.

POLS 5040*
Readings in Politics, Public Policy or Public Administration. 1-6 credits, max 6. Prerequisite(s): Consent of supervising professor. Readings in the student's major area of study.

POLS 5100*
Advanced Problems in Government, Politics, and Public Policy. 3 credits, max 6. Special seminar, topics vary from semester to semester.

POLS 5103*
Research Methods. Prerequisite(s): Graduate standing. Overview of research design, including conceptualization and operationalization, literature review, deductive and inductive theorizing, hypothesis testing, quantitative and qualitative data collection and analysis.

POLS 5113*
Seminar in Public Program Evaluation. Methodology of evaluation research in public programs. Emphasis will be placed on designing and interpreting evaluative studies rather than the mastery of particular mathematical, statistical or computer skills.

POLS 5133*
Politics and Political Economy in the European Union. The institutions and policy-making process of the European Union (EU) and the theoretical traditions in the study of European integration. The institutional form of the EU and the type of European policy that is emerging.

POLS 5143*
Social and Political Perspectives in Europe. Examination of the current and historical social, cultural and political landscapes of European societies. Material related to identity politics, citizenship, democratization and collective memory feature regularly in the course.

POLS 5210*
Seminar in International Relations. 3 credits, max 6. Research on the dynamics and institutions of international politics.

POLS 5213*
Seminar in the International Political Economy. Prerequisite(s): Graduate standing. Research on the mechanics and theories of interaction between economic and political phenomena. (Same course as INTL 5213*)

POLS 5300*
Seminar in Emergency Management. 1-3 credits, max 6. Topics in emergency management such as terrorism, emergency management planning-mitigation, response, and recovery, or delivering emergency medical services (EMS).

POLS 5303*
Introduction to Disasters and Hazards. Prerequisite(s): Graduate standing. Explores the range of natural, technological, and terrorist hazards and disasters. Provides an overview of the body of disaster research on mitigation, preparedness, response, and recovery.

POLS 5313*
Public Management. Introduction to the general principles of management as they are applied in the public sector. Systems theory, organization design, and techniques of supervision.

POLS 5320*
Seminar in Public Budgeting and Finance. 3 credits, max 6. Major processes and practices involved in governmental budgeting in the United States at national, state and local level. (Same course as 4413*)

POLS 5323*
Urban Politics and Management. Introduction to the concepts, processes and techniques of managing urban political systems to include problems of leadership, decision-making, general management and group behavior.

POLS 5333*
Seminar in Public Personnel Administration. Current practices, problems and issues in public sector personnel administration, including merit system, civil service reform collective bargaining, and equal opportunity and affirmative action.

POLS 5343*
Seminar in Fire and Emergency Services Administration. Introduction to policies, procedures and administrative process required to deliver fire and emergency services; detailed examination of the social, political and economic issues that have an impact on service delivery and organizational approaches.

POLS 5353*
Seminar in Design, Structure and Processes of Public Organizations. Administration in the public sector, stressing traditional and emerging organization structures. Awareness of administrative processes and environment that include program design, implementation, and administrative accountability.

POLS 5363*
Public Sector Dispute Resolution. Prerequisite(s): Senior or graduate standing. Labor relations and employment issues in the public sector, and the various methods for resolving government personnel conflicts without resort to violence or litigation. Focus on labor law, employment law and Alternative Dispute Resolution as they apply to government employment.

POLS 5373*
Populations at Risk. Describes populations at risk for increased injury, death and property loss. Identifies policies, programs and resources for risk reduction. Applies research for purposes of planning and capacity building.

POLS 5383*
Disaster Recovery. Prerequisite(s): 5683. Processes, conditions and components of recovery in disaster contexts. Topics include environmental, economic, housing, infrastructure, and policy. Roles of voluntary organizations; securing and managing resources.

POLS 5393*
Politics of Disaster. Prerequisite(s): Graduate standing and 5303 or consent of instructor. Situates disaster phases in the political context at the local, national, and international levels. Examines research on specific events and their interactive effects between the political system and various phases of disaster.

POLS 5410*
Seminar in Comparative Politics and Government. 3 credits, max 6. Research in the political processes and governmental institutions of foreign countries.

POLS 5510*
Seminar in Political Behavior. 1-3 credits, max 6. Examination of contemporary theories of political behavior with emphasis on empirical studies.

POLS 5513*
Seminar in Political Psychology. Examination of psychological theories as they pertain to political behavior, including attitude change, political cognition, public opinion and decision-making.

POLS 5613*
Seminar in Public Policy. Public policy process including policy design, implementation and change. Approaches to public policy including design science, rational choice, policy sciences, normative models, and institutionalism.

POLS 5620*
Seminar in Natural Resource Policy, Law, and Administration. 3 credits, max 9. Analysis of the legal and public policy aspects of environmental regulation, including special emphasis on one of three components: environmental law, administrative law, and national resource law and policy.

POLS 5633*
Practical Environmental Compliance. Environmental decision-making, reading and understanding environmental statutes and regulations, and effectively dealing with the EPA. Environmental permitting and enforcement, policies and procedures. Review of hazardous waste regulations with emphasis on ground water problems.

POLS 5643*
Regulatory Risk Analysis. Risk-based decision making, government's risk analysis paradigm, risk analysis policy, and social aspects of risk assessment. Review of the RCRA corrective action, CERCLA (Superfund) remedial action, and NEPA environmental impact study programs.

POLS 5653*
Risk Assessment in Emergency Management Planning. Risk assessment for the emergency manager and fire department manager. Concepts of risk assessment, its use in emergency management planning, and its limitations. Applications to emergency management. Specifically designed for FEMP students, but of interest to students in environmental management.

POLS 5663*
Community Relations in Environmental and Emergency Management. Preparation for the environmental manager, emergency manager, and fire department manager to communicate and negotiate with the public and media concerning environmental threats to human health routine and non-routine releases of chemicals and radioactive materials. Strategies for community-based planning, emergency preparedness, environmental response, site damage, and conflict management.

POLS 5673*
Understanding and Responding to Terrorism. Exploration of the experience of non-state terrorism in the U.S. and Western European democracies in the late 20th century. Understanding terrorism as a political, social, and historical phenomenon; the current and future threat of terrorism, both foreign and domestic; governmental choices in responding to terrorism in democratic societies and; U.S. anti-terrorism policies and considerations that emergency responders face in preparing for and responding to terrorist incidents.

POLS 5683*
Emergency Management and Public Policy in the United States. Examination of natural and man-made disasters in the U.S. along with the policies and programs intended to prevent, respond to, mitigate, and recover from such events. The evolution of the U.S. Emergency Management System, the emergency management profession, and future directions in emergency policy.

POLS 5693*
Emergency Management in the International Setting. Introduction to emergency management in the international setting. Provides background for students who may work with international assistance programs or who may become involved in the delivery of emergency management services abroad as part of an international assistance effect.

POLS 5710*
Seminar in American Political Institutions. 1-3 credits, max 6. American institutions, including Congress, the presidency, courts, political parties, and interest groups.

POLS 5713*
Seminar in Public Law. Literature of public law in the United States. Overview of the approaches that shape the theoretical and empirical contours of the public law field and contribute to multidisciplinary law and social science studies.

POLS 5720*
Seminar in American Politics. 3 credits, max 6. Theories and research in American governmental institutions and political processes.

POLS 5743*
Seminar in Political Communication. Examination of recent theories within politics and the media, including effects of media on opinion, role of media as a political institution and the role of media during elections.

POLS 5810*
Seminar in Women and Politics. 3 credits, max 9. Prerequisite(s): Graduate standing. Research on a variety of topics concerning women and politics, including women's movements, women and elections, and public opinion.

POLS 5903*
Practicum in Fire and Emergency Management Administration. Prerequisite(s): Consent of instructor. Supervised practicum in fire and emergency management administration.

POLS 6000*
Doctoral Dissertation Research. 1-12 credits, max 60. Prerequisite(s): Admission to candidacy and consent of major professor. Research for PhD dissertation. Minimum of 24 hours must be used on plan of study.

POLS 6003*
Seminar in Fire and Emergency Management. Prerequisite(s): Graduate standing. Examines scope of the fire and emergency management field as an area of academic inquiry.

POLS 6013*
Qualitative Methods for Fire and Emergency Managers. Prerequisite(s): Graduate standing. Qualitative methods for collecting and analyzing data from fire and emergency management field.

POLS 6123*
Quantitative Methods for Fire and Emergency Managers. Prerequisite(s): Graduate standing and 5013 or consent of instructor. Descriptive, inferential, and non-parametric statistics with collection and analysis of data from fire and emergency management field.

POLS 6133*
Seminar in Fire and Emergency Management Research Survey. Prerequisite(s): Graduate standing and 5103, 6013, and 6123. Survey of the academic literature in the fields of fire and emergency management. Development of a research article for submission to a professional journal or conference.

POLS 6143*
Methods for Disaster Research. Prerequisite(s): Graduate standing and 5303; 5013 or 5103. History and scope of methods for disaster research.

POLS 6153*
Pedagogical Methods for Fire and Emergency Management Instruction. Prerequisite(s): Graduate standing. History of FEMA education, review of instructional methods, and research on educational methods in field.

POLS 6203*
Comparative and International Dimensions of Fire Service. Prerequisite(s): Graduate standing and 5343 or consent of instructor. Comparative analysis of the organization, management, and policies of fire and emergency response services in other countries.

POLS 6213*
Political Context of Fire and Emergency Management. Prerequisite(s): Graduate standing and 5343 or consent of instructor. Analysis of political environment impacting fire service including federalism and intergovernmental relations, interest groups, other public agencies, and private sector organizations.

POLS 6313*
Mitigation. Prerequisite(s): Graduate standing and recommended 5303, 6143 and 6153. Structural and non-structural mitigation approaches to hazard reduction; description of policies, programs, and planning methods relevant to all governmental levels; and review of research and case studies of mitigation efforts.

POLS 6323*
Preparedness and Planning. Prerequisite(s): Graduate standing and 5303 or consent of instructor. Planning and training for hazards and disaster management at the organizational level; review of public education and preparedness efforts at the household and community level, review of research on disaster planning.

POLS 6333*
Disaster Response. Prerequisite(s): Graduate standing and 5303 or consent of instructor. Review of scientific literature on human and organizational behavior in response to disasters. Identification of actors involved in emergency response, their roles and responsibilities. Examination of human response in context of organizational structures and resources including emergency operating centers. Review of local and national government response policies.

POLS 6343*
Organizational Behavior in Disaster. Prerequisite(s): Graduate standing and 5303 or consent of instructor. Theoretical overview of organizational behavior in a disaster context. How organizations respond, adapt, fail and succeed when disrupted by disaster. Role of formal and informal organizational structures in confronting disasters.

PSYCHOLOGY (PSYC)

PSYC 1113
(S)Introductory Psychology. Principles, theories, vocabulary and applications of the science of psychology.

PSYC 2313
Psychology and Human Problems. Prerequisite(s): 1113. Personality dynamics and their application to personal, cultural and vocational experience.

PSYC 2583
(S)Developmental Psychology. Prerequisite(s): 1113. The nature of pertinent studies, causes, and theories of human developmental phenomena across the life span.

PSYC 2593
Psychology of Human Sexuality. Prerequisite(s): 1113. Survey of behavioral, personality and psychophysiological components of human sexuality, with special emphasis on the delineation of facts from sexual myths.

PSYC 2743
(S)Social Psychology. Theories and applications of social cognition, the self, pro-social and aggressive behavior, groups, attitudes and the environment.

PSYC 3013
Psychology of Motivation. Prerequisite(s): 1113. Examines the initiation, persistence and achievement of goal-directed behavior. Theory, research and applications of these concepts are emphasized.

PSYC 3073
(N)Neurobiological Psychology. Prerequisite(s): 1113. Neural bases of human experience and behavior. Topics include sensation and perception, motivation and emotion, learning and thinking.

PSYC 3113
(N)Comparative Psychology. Prerequisite(s): 1113. Comparative study of behavior characteristics of selected samples of the animal kingdom from protozoa to humans.

PSYC 3214
Quantitative Methods in Psychology. Lab 2. Prerequisite(s): 1113, MATH 1513 or consent of instructor. Design and evaluation of research in psychology including scales of measurement, basic research designs, and quantitative procedures for data analysis, with emphasis on problems encountered in psychological research.

PSYC 3413
Psychology of Social Behaviors. Prerequisite(s): 1113, 3214. Contemporary theoretical and methodological issues in social psychology with special emphasis on the social psychology of the experiment and experimentation with the social aspects of human behavior.

PSYC 3443
(S)Abnormal Psychology. Prerequisite(s): 1113, and 60 credit hours or 45 hours with GPA of 3.25. Review of major approaches to conceptualizing abnormal behavior including dynamic, social and learning-based theories. Discussion and illustration of the major forms of mental illness such as neuroses, psychoses and character disorders.

PSYC 3513
Psychology of Learning. Prerequisite(s): 1113, 3413. Behavior change as a function of experience from relatively simple learning processes such as classical and instrumental conditioning to relatively complex processes such as verbal learning and concept identification.

PSYC 3713
Psychology of Memory. Prerequisite(s): 1113 and three additional hours of psychology. Body of contemporary research on human memory and the process of knowledge acquisition with a focus on processes and strategies inside the human mind.

PSYC 3823
Cognitive Psychology. Prerequisite(s): 1113, 3214 or equivalent. Cognitive processes. Thinking, problem solving, visual imagery, attention, and memory search. Both theory and application emphasized.

PSYC 3914
Experimental Psychology. Lab 2. Prerequisite(s): 1113, 3214 or equivalent and five additional hours in psychology. Problems, methods, and applications of experimental psychology.

PSYC 3990
Undergraduate Seminar. 1-6 credits, 6 max. Prerequisite(s): Consent of instructor. For honors students and other outstanding students. Special topics in psychology.

PSYC 4123
(S)Psychology of Women. Prerequisite(s): 1113. Sex differences and the development of sex role behavior. Encompasses the psychological dynamics of developmental and social issues for women.

PSYC 4133
(S)Psychology of Minorities. Prerequisite(s): 1113. Review of psychological theories and research pertinent to minority group status.

PSYC 4143
Psychology and Law. Lab 1. The new psycho-legal literature reviewed with emphasis on the psychological basis of voir dire, eyewitness behavior, courtroom persuasion, jury deliberation and mental health issues.

PSYC 4153
Psychology and Mass Media. Prerequisite(s): 1113. Survey of empirical evidence concerning the role of mass media in human psychological functioning. Psychological correlates of television and movie viewing; psychological needs met by media; the impact of various media content on behavior and cognition; and current social issues such as psychological effects of television violence, television sexuality, social stereotypes and advertising.

PSYC 4183*
Current Issues in Clinical Psychology. Prerequisite(s): 1113, 3443 and three additional credit hours in psychology. Problems of the individual in contemporary society and various clinical approaches that have been proposed as possible solutions to these problems.

PSYC 4213
(S)Conflict Resolution. Prerequisite(s): 1113. Interpersonal conflict studied from psychological perspectives. Types and uses of conflict, and conditions for constructive dispute settlement.

PSYC 4223*
Decision Making and Problem Solving. Prerequisite(s): 1113 or consent of instructor. An examination of the research literature on individual decision-making and problem solving with dual emphases on theory and application. A thorough prior understanding of the human cognitive system is desirable, but not required.

PSYC 4333*
Personality. Prerequisite(s): 1113, 3443, or consent of instructor. Basic assumptions, research, and clinical issues relating to the major personality theories.

PSYC 4343*
Language Development. Prerequisite(s): 1113 or consent of instructor. Current theory and research on the development of language throughout the lifespan. The nature of language, first language acquisition, second and third language acquisition, brain and language, language processing, social aspects of language, gender differences in language use and language processing, language use by older adults, language use directed at older adults, language disorders, and language use in special populations.

PSYC 4483
(S)Psychology of Parent Behavior. Prerequisite(s): 1113. Historical and contemporary conceptions of parent-child relationship and approaches to communication and discipline; special problems in parenting.

PSYC 4493*
History of Psychology. Prerequisite(s): 1113. History of psychology as an aspect of European intellectual history. Psychological thought from early philosophical roots to modern conceptions of psychology as a science.

PSYC 4813*
Psychological Testing. Prerequisite(s): 1113 and 3214. Quantitative aspects of measurement and testing, with emphasis on scaling, standardization, reliability and validity. Basic principles of construction and the ethics of use.

PSYC 4880
Senior Honors Thesis. 1-6 credits, max 6. Prerequisite(s): 3214, departmental invitation, senior standing, Honors College participation. A guided reading and research program ending with an honors thesis under the direction of a senior faculty member. *Required for graduation with departmental honors in psychology.*

PSYC 4883
Current Issues in Psychology. Prerequisite(s): 3214, 3914. A capstone course examining current issues in psychology, their relationship to current issues in other academic disciplines, and their relevance in an educated society.

PSYC 4990*
Special Problems. 1-6 credits, max 6. Prerequisite(s): 1113, 3214 and consent of instructor. For honors students and other outstanding students. Experimental or library research.

PSYC 5000*
Thesis. 1-6 credits, max 6. Required of all graduate students majoring in psychology and writing a thesis.

PSYC 5113*
Psychopathology. Prerequisite(s): Graduate standing in psychology or consent of instructor. Principles of diagnosis and treatment of major disorders.

PSYC 5120*
Psychology Workshop. 2-6 credits, max 6. Provides an opportunity to study specific psychological problems, both applied and theoretical.

PSYC 5153*
Cognitive Assessment. Lab 1. Prerequisite(s): 3443, 4813; graduate standing in the clinical program of the Department of Psychology, the doctoral school or counseling psychology program or the psychometry program, or consent of instructor. Cognitive and intellectual assessment of children, adolescents and adults. Fundamental skills in administration, scoring, and interpretation of cognitive tests and report writing. Application of cognitive tests to specific clinical problems.

PSYC 5193*
Ethics and Professional Development in Psychology. Prerequisite(s): Graduate standing in the Department of Psychology. Principles of ethics with a focus on the guidelines and standards for psychology. Legal and ethical issues for the practice of clinical psychology.

PSYC 5304*
Quantitative Methods in Psychology I. Lab 2. Prerequisite(s): 3214 or equivalent. Hypothesis testing, chi-square, student's t, bivariate correlation and linear regression in psychology. Critical thinking regarding the application of statistical methods is stressed. The use of contemporary statistical software for analyses is covered.

PSYC 5314*
Quantitative Methods in Psychology II. Prerequisite(s): 5304. Higher-order analysis of variance designs, correlation and regression techniques, and analysis of covariance, with emphasis on applications to psychological experimentation. Computer applications of all procedures using SPSS and/or SAS during the lab.

PSYC 5333*
Systems of Psychotherapy. Prerequisite(s): 5113; graduate standing in the clinical program of the Department of Psychology or consent of instructor. The major approaches to psychotherapy. Methods for creating multiple impact for behavioral change, including interpersonal, social, community and preventative interventions.

PSYC 5380*
Research. 1-12 credits, max 24. Prerequisite(s): Consent of instructor. Research project on some psychological problem.

PSYC 5620*
Seminar in Psychology. 1-12 credits, max 12. Prerequisite(s): Consent of instructor. Consideration of special topics that are particularly timely or technical in nature.

PSYC 5660*
Teaching Practicum. 1-2 credits, max 2. Prerequisite(s): Consent of instructor. Primarily for graduate students with well-defined new teaching responsibilities.

PSYC 5823*
Cognitive Processes. Theory and experimental research findings dealing with human thought processes from a developmental and functional standpoint.

PSYC 6000*
Dissertation. 1-16 credits, max 60. Research and report thereon by graduate students in partial fulfillment of requirements for the Doctor of Philosophy degree.

PSYC 6083*
Principles of Behavior Therapy. Prerequisite(s): Graduate standing in the clinical program of the Department of Psychology or consent of instructor. Principles and procedures of behavior therapy and modification.

PSYC 6133*
Ethnic and Cultural Diversity in Psychotherapy. Prerequisite(s): Six credit hours of psychology and consent of instructor. Increasing understanding and appreciation of ethnic and cultural diversity in the psychotherapy context. Critical examination of theory and research related to psychotherapy with multicultural populations.

PSYC 6143*
The Psychology of Substance Abuse. Prerequisite(s): Consent of instructor. Introduction to psychological classification of psychoactive substance (alcohol and drug) use disorders. Theory and research on psychological, biological, and environmental factors that are concomitants of substance abuse. Overview of major research techniques and treatment modalities in this area.

PSYC 6173*
Child Psychopathology and Treatment. Prerequisite(s): 2583, 3443 or equivalent; graduate standing in the clinical program of the Department of Psychology, the doctorate school psychology program or the psychometry program, or consent of instructor. Theoretical positions and issues in child psychopathology. Procedures used in the treatment of psychological disorders of children.

PSYC 6223*
Research Design. Prerequisite(s): 3914 and doctoral level standing. Experimental techniques in psychophysics, sensory processes, attention and perception, motivation and emotion, and learning and memory.

PSYC 6233*
Clinical Research Design. Prerequisite(s): 5304 and 5314 or consent of instructor. Methodology and research practices in clinical psychology, including experimental design, research practice, data analysis and interpretation, ethics, and dissemination of research findings.

PSYC 6253*
Seminar in Human Development. Prerequisite(s): Consent of instructor. Behavioral aspects of development from the prenatal period to senescence. Normal development contrasted to exceptional development.

PSYC 6353*
Psychology of Motivation. Prerequisite(s): 3914. Outline of theory and research in human and animal motivation.

PSYC 6393*
Psychology of Language. Review of data and theories of speech and language behaviors. Laboratory techniques and experimental designs will also be reviewed to emphasize understanding of psycholinguistic research.

PSYC 6443*
Behavioral Medicine. Prerequisite(s): Graduate standing in the clinical program of the Department of Psychology; consent of instructor. An advanced graduate course for students in training for a PhD in clinical psychology. General considerations for psychophysiological disorders, general intervention strategies in behavioral medicine, including biofeedback and specific consideration and intervention strategies for specific disorders.

PSYC 6453*
Pediatric Psychology. Prerequisite(s): Graduate standing in the Department of Psychology; consent of instructor. Overview of the field of pediatric psychology, including historical perspectives, theoretical underpinnings, and application to a variety of child health problems. Childhood chronic illness, injury prevention, pain management, and consultation and intervention in medical contexts.

PSYC 6483*
Neurobiological Psychology. Prerequisite(s): 3073 and 3914 or consent of instructor. Physiological, neuroanatomical, and neurochemical underpinnings of human behavior. Emphasis on effects of central nervous system dysfunctions on behavioral processes ranging from sensation to concept formation.

PSYC 6523*
Family Treatment Methods. Prerequisite(s): Graduate standing in the clinical program of the Department of Psychology or the doctorate counseling psychology program. Introduction to techniques and philosophies of family treatment. Includes marital counseling and emphasis on family dynamics.

PSYC 6563*
Advanced Social Psychology. Prerequisite(s): 2743. History, theory and experimentation of dynamic interaction of group membership and individual behavior.

PSYC 6583*
Developmental Psychobiology. Prerequisite(s): 3073 or equivalent; consent of instructor. An exploration of the biological aspects of human development with particular emphasis on the physiological, ethological, and genetic perspectives.

PSYC 6613*
Experimental Learning Theories. Prerequisite(s): Nine credit hours of psychology. Basic concepts and empirical findings in animal and human learning.

PSYC 6640*
Clinical Practicum. 1-12 credits, max 17. Prerequisite(s): Graduate standing in the clinical program of the Department of Psychology. Practicum experience for graduate students in the clinical psychology program.

PSYC 6650*
Practicum. 1-16 credits, max 16. Prerequisite(s): Graduate standing in the clinical program of the Department of Psychology. For the marriage and family practicum only, doctoral level counseling psychology students may also enroll. Practicum experience for graduate students in the clinical program of the Department of Psychology who are doing supervised practicum in specific clinical areas of specialization.

PSYC 6723*
Child Diagnostic Methods. Prerequisite(s): 5153, graduate standing in the clinical program in psychology or the doctoral school psychology program or consent of instructor. Administration and interpretation of diagnostic instruments used specifically with children.

PSYC 6753*
Assessment of Personality. Prerequisite(s): Graduate standing in the clinical or counseling program or consent of instructor. Personality assessment and training in the practice of clinical assessment. Trait theory and assessment, techniques of test construction, contemporary assessment techniques including the MMPI-2, test result interpretation and communication, and behavioral methods of assessment.

RELIGIOUS STUDIES (REL)

REL 1103
(H)The Religions of Mankind. Major world religions such as Hinduism, Buddhism, Judaism, Christianity and Islam with a view to understanding the general nature of religion and its various dimensions.

REL 2013
(H)The Old Testament and Its Study. A study of the Hebrew Scriptures with emphasis upon content, historical background, the history of its study and the critical analysis and theological interpretation of selected passages.

REL 2023
(H)The New Testament and Its Study. A study of the writings of the New Testament in their historical contexts and the methods used in their study. Emphasis interpreting selected New Testament passages.

REL 3223
(H)The Teachings of Jesus in Historical Context. Prerequisite(s): 2023. The teachings of Jesus in light of modern historical research. Emphasis on interpreting selected passages from the Gospels.

REL 3243
(H)Paul and the Early Church. Prerequisite(s): 2023. The letters of Paul in their historical context with special emphasis on his theology and ethics.

REL 3573
(H,D)The Religions of Native Americans. Prerequisite(s): 1103. Selected tribal worldviews, belief systems and religious ceremonies as depicted in oral traditions, songs, and literature. Emphasis on Northern and Southern Plains Indians.

REL 3613
African Cultures and Religion. Key ideas, values and achievements in African culture and tradition as found in literature, art, and music viewed in historical and religious perspective.

REL 3713
Religion, Culture and Society. Prerequisite(s): 1103, ANTH 2353, SOC 1113. An introduction to the scientific study of religion. Religious activity in both tribal and technological societies studied in the light of contemporary interpretations of culture and of social behavior. (Same course as SOC 3713)

REL 4050
Studies in Religion. 1-6 credits, max 6. Independent studies, seminars and courses on selected topics in religion.

REL 4113
(H,I)The World of Islam: Cultural Perspectives. The cultural heritage of the world of Islam explored through its expression in the art, architecture, and literature of the Muslim peoples.

REL 4330
Seminar in Biblical Studies. 3 credits, max 9. Prerequisite(s): Two courses in Biblical studies. Selected topics in the academic study of the Bible.

RESEARCH, EVALUATION, MEASUREMENT AND STATISTICS (REMS)

REMS 4052
Measurement and Evaluation in the School. Prerequisite(s): Full admission to Professional Education. Construction and selection of classroom tests. Contrasts between criterion-referenced and norm-referenced measurement strategies. Grading techniques, rudiments of standardized test selection and score interpretation, and the basic statistics used to summarize and analyze test results.

REMS 5000*
Master's Thesis. 1-6 credits, max 6. Prerequisite(s): Consent of instructor.

REMS 5013*
Research Design and Methodology. Required of all graduate students in education. An introduction to the concepts of research design, methodology, sampling techniques, internal and external validity, and the scientific method in educational problem solving. Critical analysis of educational research studies and the writing of proposals. *No credit for student with credit in 5015.*

REMS 5320*
Seminar in Research, Evaluation, Measurement and Statistics. 3-6 credits, max 6. Prerequisite(s): Consent of instructor. In-depth exploration of contemporary problems of research, evaluation, measurement, and statistics.

REMS 5373*
Educational Measurements. Appropriate applications of tests in the schools. Development of teacher-made tests, selection of standardized tests, interpretation of test results, understanding of the statistics reported in testing literature, uses of test results, and recent developments in educational measurement.

REMS 5953*
Statistical Methods in Education. Statistical methods needed by conductors and consumers of research in education and the behavioral sciences. Introduction to interpretation and application of descriptive and inferential statistics.

REMS 6000*
Doctoral Dissertation. 1-25 credits, max 25. Prerequisite(s): Consent of instructor. Required of all candidates for doctorate in applied behavioral studies. Credit given upon completion and acceptance of dissertation.

REMS 6003*
Analyses of Variance. Prerequisite(s): 5013 and 5953 and admission to a doctoral level program or consent of instructor. A thorough examination of analysis of variance procedures as they relate to principles of experimental design in education and behavioral sciences.

REMS 6013*
Multiple Regression Analysis in Behavioral Studies. Prerequisite(s): 6003 or consent of instructor. Applications of multiple regression as a general data analysis strategy for experimental and non-experimental research in behavioral sciences.

REMS 6023*
Psychometric Theory. Prerequisite(s): 6013 or consent of instructor. Theoretical basis for applying psychometric concepts to educational and psychological measurement. The Classical True Score model and applications to instrument development and design of studies for evaluating instrument quality.

REMS 6033*
Factor Analysis in Behavioral Research. Prerequisite(s): 6013 or equivalent. In-depth analysis of principal components and factor analysis methods, including maximum likelihood methods. Confirmatory factor analysis methods are also introduced.

REMS 6323*
Doctoral Seminar in REMS. Prerequisite(s): Permission of instructor. Theory and applications of selected advanced research and evaluation methods.

REMS 6373*
Program Evaluation. Prerequisite(s): 5013 and admission to a doctoral level program or consent of instructor. Contexts, purposes and techniques of evaluating educational programs. Evaluation design, information collection, analysis, reporting and uses of results for programs ranging from individual lessons to nationwide multi-year projects. Special emphasis on evaluation requirements of federally funded programs.

REMS 6383*
Program Evaluation II. Prerequisite(s): 6373. Practical application of principles and standards by conducting a program evaluation.

REMS 6663*
Applied Multivariate Research in Behavioral Studies. Prerequisite(s): 6013 or consent of instructor. An overview and analysis of multivariate procedures commonly applied to educational and behavioral research. Emphasis on conceptual design and application of these procedures.

REMS 6850*
Directed Reading. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Directed reading for students with advanced graduate standing.

RUSSIAN (RUSS)

RUSS 1115
Elementary Russian I. Lab 1.5. Understanding, speaking, reading, and writing. Method of instruction is audio-lingual.

RUSS 1225
Elementary Russian II. Lab 1.5. Prerequisite(s): 1115 or equivalent. Continuation of 1115.

RUSS 2115
(I)Intermediate Russian I. Prerequisite(s): 1225 or equivalent. Continuation of 1225. Russian grammar, composition and conversation.

RUSS 2225
(I)Intermediate Russian II. Prerequisite(s): 2115 or equivalent. Continuation of 2115.

RUSS 3003
(I)The Soviet Union: History, Society and Culture. A comprehensive view of the Soviet Union, stressing those issues in the political, economic, technological, geographical, and cultural situation. *Accessible to beginning undergraduates.* (Same course as HIST 3003 & POLS 3003)

RUSS 3053
(I,S)Introduction to Central Asian Studies. A comprehensive view of newly-emerged Central Asian states examining the history, politics, economics, geography, and culture of Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan as reflected in their thoughts, religion, literature, and architecture, in the past, and the strategic importance of their natural wealth for the present and future. (Same course as GEOG 3053, HIST 3053 & POLS 3053)

RUSS 3113
Russian Conversation. Prerequisite(s): 2225 or equivalent. Development of conversational skills in formal and informal Russian language; study of oral communication and idioms; vocabulary enhancement.

RUSS 3123
(H)Russian Culture and Civilization. Art, literature, music, architecture, and contemporary life of Russia. Course taught in English.

RUSS 3223
Russian Composition. Prerequisite(s): 2225 or equivalent. The development of all forms of written communication in Russian through practice in writing compositions, letters, reports, and other documents in Russian.

RUSS 4013
Survey of Russian Literature I. Prerequisite(s): 20 credit hours of Russian or equivalent. Survey of Russian literature from its beginning to late nineteenth century with readings in Russian of representative texts. Course conducted in Russian.

RUSS 4023
Survey of Russian Literature II. Prerequisite(s): 20 credit hours of Russian or equivalent. Survey of Russian literature from late nineteenth century to post-Soviet era with readings in Russian of representative texts. Course conducted in Russian.

RUSS 4113
(H)Russian Literature in Translation I. Russian literature from its beginning to mid-19th century: Pushkin, Lermontov, Goncharov, Gogol, Turgenev, and Dostoevsky. Readings in English. Classes conducted in English.

RUSS 4123
Russian Literature in Translation II. Russian and Soviet literature from mid-19th century to present: Tolstoy, Chekhov, Gorky, Zamiatin, Sholokhov, Pasternak, Bunin, Solzhenitsyn, Arzhak (Daniel), Tertz (Sinyavsky), Voznesensky, and Evtushenko. Readings in English. Classes conducted in English.

RUSS 4223
Russian Reading Skills. Prerequisite(s): 20 hours. Russian or equivalent proficiency. Acquisition of skills in vocabulary enrichment, stylistic analysis and advanced proficiency in reading various styles of contemporary written Russian (newspaper, political, business).

SOCIAL FOUNDATIONS (SCFD)

SCFD 3223
Role of the Teacher in American Schools. Prerequisite(s): Declaration of intention to pursue a program in Professional Education. One half-day per semester on-site lab required. A review of the school as an institution and an introduction to the role of the teacher as a professional in the schools. Socialization of the student socio-economic class and education, the nature of multicultural education, school experiences of women and ethnic groups, school governance, professional organizations, ethics and the nature of teaching.

SCFD 4123
(S)History of Education. The development of major educational ideas and programs with emphasis on the growth of public education in the United States from the Colonial period to the present.

SCFD 4913
(I)International Problems and the Role of the School. Prerequisite(s): Junior or senior standing. Extends the student's intercultural awareness by focusing on international problems and expanding their meaning to include the school and its relationship to existing international concerns in other types of societies. Consideration of such international problems as natural resources, environment, food supply, urbanization, and conflict resolution.

SCFD 5000*
Master's Report or Thesis. 1-6 credits, max 6. Students studying for a master's degree enroll in this course for a total of 2 credit hours if they write a report, or 6 hours if they write a thesis.

SCFD 5720*
Education Workshop. 1-8 credits, max 8. For teachers, principals, superintendents, and supervisors who have definite problems in instruction or administration. Students must register for the full number of credit hours for which the workshop is scheduled for a particular term.

SCFD 5850*
Directed Study. 1-3 credits, max 3. Directed study for master's level students.

SCFD 5873*
Culture, Society and Education. Cultural assumptions, constructions and social practices in childhood and education in a variety of societies. Children's family, community and school lives. Anthropological and comparative perspective.

SCFD 5883*
Educational Sociology. The manner in which social forces and institutions influence education and the educational system in the United States.

SCFD 5913*
Introduction to Qualitative Inquiry. Examination of the major approaches and fieldwork techniques of qualitative research as well as the challenges associated with conducting this form of inquiry.

SCFD 5990*
Problems and Issues in Social Foundations. 1-3 credits, max 3. In-depth exploration of a contemporary problem or issue in the social foundations of education.

SCFD 6000*
Doctoral Dissertation. 1-25 credits, max 25. Required of all candidates for the Doctor of Philosophy degree. Credit is given upon completion of the dissertation.

SCFD 6023*
Comparative Education. A systematic investigation of educational institutions in various nations for the purpose of an enlarged, critical view of American education. Researching specific transnational educational theories.

SCFD 6113*
Theoretical Foundations of Inquiry. Exploration of the history and philosophical assumptions undergirding theories, methods and issues of ethics and rigor associated with both qualitative and quantitative research in education and related fields. An in-depth overview of research paradigms through readings and discussions. Foundational doctoral-level research course.

SCFD 6123*
Qualitative Research I. Prerequisite(s): 6113 or consent of instructor. The traditions, philosophies, and techniques of qualitative research, including participant observation, interviewing and document analysis. Practice in qualitative techniques and in preliminary data analysis.

SCFD 6190*
Qualitative Research: Selected Methods. 3 credits. Designing and conducting a limited study in order to get a "hands-on" feel for the focal method. Methods such as case study, grounded theory, ethnography, biography, historical social science, life history, phenomenology, and discourse analysis.

SCFD 6193*
Qualitative Research II. Prerequisite(s): 6123, 6133 or consent of instructor. Various approaches to qualitative data analysis, including the use of computer applications. Additional attention to issues of writing, representation, reflexivity, and reciprocity. Practice in analytic techniques and writing research.

SCFD 6443*
Ethics and Moral Education. Interdisciplinary perspective of traditional and contemporary ethical theories, focusing on application to professional practice and moral education. Moral development, the moral life, feminist ethics, and character education.

SCFD 6501*
Curriculum and Social Foundations Doctoral Seminar I. Orientation to doctoral study primarily for students in the PhD program in Curriculum and Social Foundations.

SCFD 6511*
Curriculum and Social Foundations Doctoral Seminar II. Orientation to the professoriate primarily for students in the PhD program in Curriculum and Social Foundations.

SCFD 6630*
Topics in Philosophy of Education. 3-6 credits, max 6. Consideration of topic or topics (e.g. childhood and modern subjectivity) that are of great concern to the field of philosophy of education.

SCFD 6823*
History of Education. History of elementary, secondary, and higher education with emphasis on Western society and the American schools. Discussion of historiography and historical methods with research emphasis on the impact of institutional development in a pluralistic society.

SCFD 6850*
Directed Reading. 1-6 credits, max 6. Directed reading for students with advanced graduate standing to enhance students' understanding in areas where they wish additional knowledge.

SCFD 6853*
Cultural Anthropology in Education. Understanding and critically reflecting on educational issues from a cultural anthropological perspective. Developing the knowledge and skills needed to understand cultural influences on teaching and learning.

SCFD 6880*
Internship in Education. 1-8 credits, max 8. Directed off campus experiences designed to relate ideas and concepts to problems encountered in the management of the school program.

SCFD 6883*
Transforming Pedagogies. Contemporary pedagogical theories and school reform initiatives, including origins, purposes, underlying philosophical assumptions, cultural contexts, and implications for schooling.

SCFD 6910*
Practicum. 1-6 credits, max 6. The student carries out an acceptable research problem (practicum) in a local school situation. Credit given upon completion of the written report.

SCFD 6983*
Diversity and Equity Issues in Education. Many social, historical and cultural constructions of "difference" and the impact in personal and professional relationships in education and related human service fields. Categories of race, class, and gender, but may also include ethnicity, sexual orientation, and special needs.

SCFD 6990*
Seminar in Social Foundations. 1-3 credits, max 3. In-depth seminar focusing on a contemporary problem or issue in the social foundations of education.

SOCIOLOGY (SOC)

SOC 1113
(S)Introductory Sociology. Coming to terms with the requirements for living in a complex social world. Sociological concepts used to assist students in understanding the social influences in day-to-day life.

SOC 2123
Social Problems. Exploration in selected social issues in contemporary American society, such as deviance, poverty, sexism, racism and ageism.

SOC 3113
Theoretical Thinking in Sociology. Prerequisite(s): Six credit hours of sociology, including 1113. Sociological theory in three broad areas: the emergence of social theory, the major schools of social theory and the relevance of theory to sociological research.

SOC 3133
(D,S)Racial and Ethnic Relations. The historical and sociological dimensions of race and ethnicity in global society and understanding of the controversies and conflicts that race and ethnicity have generated in the global experience.

SOC 3213
(D,S)American Society and Culture. The social structure and organization of American society. Approaches to our contemporary national experience through the relational character of ideas and the social and historical experience of their producers.

SOC 3223
(S)Social Psychology. Social basis of personality development and behavior, including symbolic environment, self and group motivation, attitudes and opinions, and social roles.

SOC 3323
(S)Collective Behavior and Social Movements. Analyzes panics, crazes, riots and social movements emphasizing institutional and social psychological origins and consequences.

SOC 3423
(S)Urban Sociology. Urbanization as a worldwide process. The demography and ecology of cities and metropolitan regions. Urban planning and future development.

SOC 3523
(S)Juvenile Delinquency. Juvenile delinquency behavior in relation to family, school, church, peers, community and institutional structures. The extent of delinquent expressions, varieties of delinquency, comparative international perspectives and new trends of females in delinquency and gang behavior.

SOC 3713
Religion, Culture and Society. Recommended: 1113, ANTH 2353, REL 1103. An introduction to the scientific study of religion. Religious activity in both tribal and technological societies studied in the light of contemporary interpretations of culture and of social behavior. (Same course as REL 3713)

SOC 3952
Applied Sociology. Prerequisite(s): Sociology majors or consent of instructor or adviser. Application of sociological theory and methods to various job situations.

SOC 3993
(S)Sociology of Aging. Sociological problems of aging, including the analysis of the behavior of the aged within the framework of social institutions.

SOC 4023*
Juvenile Corrections and Treatment Strategies. Prerequisite(s): 3523 or 4333. The juvenile justice system, emphasizing the juvenile court, diversion and youth service bureaus as well as the more traditional training schools and foster homes. Experimental treatment strategies with institutionalized delinquents.

SOC 4033
(I,S)Comparative Perspectives of Criminal Justice Systems. Study of criminal justice systems in different nation states and culture context from a different comparative perspective.

SOC 4043
(D,S)Gender and Work. Prerequisite(s): One upper-division course. Consideration of unpaid, paid and volunteer work and gender differences. Linkages between economy, work and family with examples from United States and less developed countries.

SOC 4133
Social Research Methods. Prerequisite(s): 1113 and 3113. Applying sociological theory to designing quantitative and qualitative research; methods of data collection, processing and analysis; basic skills in computer analysis of social data. Research project included.

SOC 4153
Sociology of Health and Illness. Critically analyzes the social production of disease and illness in modern society from a sociological perspective. Examines the social organization of Medicare care, including critical issues affecting healthcare and health insurance in the United States. Focuses on the meanings and experiences of illness, as well as on contemporary critical debates such as environmental and health, bioengineering, and bioethics.

SOC 4213
(S)Sexuality in American Society. Prerequisite(s): Junior standing or consent of instructor. Sociological aspects of sexual behavior, attitudes and belief systems in society. Similarities and differences in males and females in all types of sexuality.

SOC 4243
Quantitative Methods in Sociology. Prerequisite(s): 1113, 3113, 4113. Strategies and procedures in the analysis of quantitative sociological data, including the use of statistical computer programs.

SOC 4313
Sociology of Law and Punishment. Focus on issues concerning the relationship between law, punishment and society. Examines both classical and contemporary sociological and legal scholars. Current penal policies will be examined as well.

SOC 4333
(S)Criminology. Summary of sociological and psychological research pertaining to crime causation and crime trends. Modern trends in control and treatment.

SOC 4383
(S)Social Stratification. Systems of class and caste, with special attention to the United States. Status, occupation, income, and other elements in stratification.

SOC 4433
(S)Environmental Sociology. Critical assessment of the social causes and consequences of problems with resource scarcity and environmental degradation. Environmental problems viewed as social problems, requiring an understanding of the structural conditions producing environmental problems and inhibiting resolutions.

SOC 4443
Sociology of Law and Legal Institutions. Prerequisite(s): 3523 or 4333. Criminal and civil law as mechanisms of social control; conflict and consensus models of legislation; legality doctrine and its application by police, prosecution and defense, courts and administrative agencies of control. Decision processes in the criminal justice system, personnel, case loads, and related areas. Native American law; federal policy and trust status, criminal and civil law, tribal jurisdiction, tribal courts.

SOC 4453
(S)Environmental Inequality. Prerequisite(s): 1113. Considers the connection between environmental problems and race/ethnicity and class inequality. Focuses on environmental justice/equity, social movements, health, policy and risk at the local, national and global levels.

SOC 4463
(S)Technology and Society. Exploration of various aspects of the relationship between society and technology. Analysis of arguments about the role of technology in society. Examination of the social contexts within which technology is created and discussion of the mechanisms and processes through which technology is embraced or discarded, such as peer review, politics, religion, and legal frameworks.

SOC 4473
Oklahoma Environmental Sociology. Critical assessment of the social causes and consequences of environmental problems in Oklahoma, both historical and contemporary. Examines the Land Run, the Dust Bowl, the Oil Boom, land ownership and use patterns.

SOC 4533
(I,S)World Population Problems. Fertility, mortality and migration, and other factors related to population size, density, and composition; the population explosion, worldwide famine, birth control, and other serious social issues.

SOC 4643
(S)Sociology of Gender. Explores the social organization of gender from diverse theoretical and empirical perspectives using a global experience.

SOC 4663
Undergraduate Capstone Seminar in Sociology. Prerequisite(s): Majors; senior standing; 3113, 4133, 4243. Concluding course for Sociology majors. Application of the skills, knowledge and expertise acquired in Sociology, including critical thinking, writing, theory and methods.

SOC 4723
(S)American Marriage, Family, and Male-Female Relationships. The sociological relationship between marriage and family and other institutional structures and systems, especially work and the economy. Male and female roles and relationships in mate selection, sexuality, marriage, divorce, and other intimate situations.

SOC 4850
Internship in Sociology. 1-4 credits, max 4. Prerequisite(s): 3952, completion of 12 hours of sociology, or consent of internship coordinator. Field experience in a variety of work settings.

SOC 4923
Sociology of Punishment. An overview of correctional work focusing on probation, parole and institutions. A survey of contemporary alternatives to conventional imprisonment.

SOC 4950
Current Topics in Sociology. 1-12 credits, max 12. Special topics in sociology; topics vary from semester to semester.

SOC 4990*
Exploration of Sociological Issues. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Examines sociologically significant topics and issues.

SOC 4993
Senior Honors Thesis. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis under the direction of a senior faculty member, with second faculty reader and oral examination. Required for graduation with departmental honors in sociology.

SOC 5000*
Thesis in Sociology. 1-6 credits, max 6.

SOC 5001*
Graduate Proseminar. Prerequisite(s): Admission to Sociology graduate program. Introduction and orientation to the graduate program in the Department of Sociology.

SOC 5013*
Creative Component in Sociology. A guided course serving as the final requirement for graduate students in the Department of Sociology's Master of Science degree, non-thesis option.

SOC 5063*
Seminar in Social Inequality and Stratification. Prerequisite(s): Graduate standing. Provides comprehensive overview and analysis of theories and research in social inequality and social stratification. Includes: study of classical and contemporary theories, development of research in the field, dynamics of inequalities and current and future perspectives.

SOC 5113*
Classical Sociological Theory. Prerequisite(s): 3113 or equivalent. Major trends in sociological thought. The emergence of sociological theory in Europe and America.

SOC 5123*
Contemporary Sociological Theory. Prerequisite(s): 3113 or equivalent. Critical examination of significant theoretical formulations, 1920 to the present. Relation between theoretical development and current research emphasis.

SOC 5213*
Techniques of Population Analysis. Prerequisite(s): Graduate standing. Examination of primary techniques and statistics employed in studies of population characteristics. Examination of sources of demographic data, methods employed in the collection and analysis of data on population characteristics, composition and change.

SOC 5223*
Culture, History and World Systems. Prerequisite(s): Admission to Graduate College and international studies program. The modern world system and its new social formations resulting from increasing globalization. Examination of cultural, socio-economic, and political changes in developed and developing societies. Modern societies, their historical developments, the cultural politics of difference, and the re-emergence of ethnic groups worldwide. Existing theoretical models of change for profit and non-profit organizations. (Same course as INTL 5223*)

SOC 5243*
Social Research Design. Prerequisite(s): 3113; 4133 or equivalent; graduate standing. Techniques in design, data collection, and interpretation of data for sociological research.

SOC 5263*
Quantitative Analysis of Social Research. Prerequisite(s): 3133; 4133 or equivalent; graduate standing. Advanced techniques in sociological research and data analysis focusing on the formulation of substantive research questions and application of a variety of research procedures to answer such questions.

SOC 5273*
Qualitative Research Methods. Examination of ethnographic studies and implementation issues connected with qualitative research. *Research project required.*

SOC 5323*
Seminar on Collective Behavior and Social Movements. Prerequisite(s): Graduate standing. Examination of major theoretical and empirical approaches employed in the study of social movements. Exploration of problems on the nature and current theories of social movements including individual versus group approaches. Grassroots resistance, community organizing, political conflicts, and revolutions.

SOC 5333*
Global Population and Social Problems. Prerequisite(s): Graduate standing. Study in world, regional and national population characteristics, changes and associated problems and cultural influences.

SOC 5343*
Sociology of Law and Punishment. Advanced study in the sociology of law and punishment. Focus on both classical and contemporary sociological and legal research. An interdisciplinary and comparative approach is also emphasized.

SOC 5463*
Seminar in Environmental Sociology. Critical overview of contemporary developments in environmental sociology. Environment concern, disasters, health issues, risk assessment, and environmental conflict.

SOC 5473*
Seminar on the Contemporary Environmental Movement. Critical overview of contemporary theory and research on the environmental movement. Analysis of crucial movements dynamics, including historical development, central organizing themes, strategies and tactics, and movement activities, environmental health movements, and transnational movement campaigns.

SOC 5493*
Seminar in Environmental Justice. Considers racial, class and equity implications of environmental degradation and regulation. Includes discussion of controversies over the siting of hazardous facilities in urban and rural areas, the extraction of resources from native lands, national and transnational export of toxic waste to the South and the development of a distinct environmental justice movement.

SOC 5553*
Seminar in Medical Sociology. Advanced study in the sociology of medicine, including the doctor-patient relationship, the social meanings of health and illness, epidemiology, health care delivery, and the medicalization of American society. Analysis of the sociology of organic illness and mental illness using readings from both classical and contemporary sources.

SOC 5573*
Seminar On Victimology. Critical overview of contemporary theory and research on victimology. Relationships between victim and offenders, social institutions such as media, police, business, advocacy groups, and various social movements.

SOC 5583*
Comparative Criminal Justice Systems. Examines crime and criminal justice in a global world. Compares the current major legal traditions with the U.S. criminal justice system.

SOC 5593*
Seminar on Organization and Administration in Law Enforcement and Society. Critical overview of contemporary theory and research on administration in law enforcement and society.

SOC 5663*
American Pluralism, Race and Ethnicity in American Life. Prerequisite(s): Graduate standing. Analysis of the dynamics of intercultural and intergroup relations in America with special emphasis on the examination of major conceptual perspectives that have characterized the study of race and ethnicity in American life.

SOC 5763*
Contemporary Organizational Theory. Prerequisite(s): Graduate standing. Advanced study of contemporary theories used to explain, predict and understand organizations. Behavior of populations of organizations.

SOC 5793*
Seminar on Organizational Deviance. Overview of contemporary theory and research on organizational deviance. Defining acceptable risk. Organizational structures, processes, and standard operating procedures that produce mistake, misconduct and disaster.

SOC 5813*
Myths and Realities of Organizational Change. Prerequisite(s): Graduate standing. A critical examination of the various theories and models that address change and improvement processes in complex organizations. Theoretical and methodological validity of assumptions underlying such organizational theories and models.

SOC 5950*
Seminar in Sociology. 1-3 credits, max 25. Prerequisite(s): Graduate standing. Special seminar; topics vary from semester to semester.

SOC 5980*
Internship. 1-6 credits, max 6. Supervised field placement.

SOC 5990*
Advanced Problems and Issues in Sociology. 1-9 credits, max 9. Prerequisite(s): Consent of instructor. Group enrollment or individual research enrollment as needed. Graduate level analysis of special problems and issues in sociology not covered in other department offerings.

SOC 6000*
Dissertation. 1-12 credits, max 18.

SOC 6213*
Theory of Social Structure. Prerequisite(s): Six hours of undergraduate sociology or equivalent. Relationship between human thought and the social context within which it arises.

SOC 6263*
Seminar on Community Policing. A critical overview of the current research literature devoted to community policing. The nature of community policing programs. Strategies of program evaluation. Emerging theoretical frameworks in assessing programmatic success. Police organizational dynamics and change.

SOC 6390*
Seminar in the Family, Marriage and Male-Female Roles in American Sociology. 2-3 credits, max 6. Analysis of published research in sociology of family, marriage and male-female roles and relationships with special emphasis on American society.

SOC 6460*
Advanced Studies in Environmental Sociology. 1-6 credits, max 6. Prerequisite(s): 5463 or consent of instructor. Intensive examination of selected topics in environmental sociology.

SOC 6463*
International Issues in Environmental Sociology. Prerequisite(s): Graduate standing. Advanced study of the international context of environmental issues.

SOC 6493*
Sociology of Disaster. Critical examination of contemporary theory and research on the social aspects of disasters. Social system response to large-scale crises. Vulnerability, warnings, preparedness, recovery, mitigation, and sustainability.

SOC 6653*
Seminar in Social Psychology. Development and critical analysis of theory and research in social psychology.

SOC 6673*
Development of Social Thought. Historical and analytical studies of major contributions to social thought leading toward the works of modern theorists.

SOC 6753*
Seminar in Deviance and Criminology. Current research and theory in criminology, penology and deviance in modern society.

SOC 6763*
Seminar in Theory of Criminal Behavioral Analysis. Critical overview of contemporary theory and research on criminal behavioral analysis.

SOC 6853*
Seminar in Symbolic Interactionism. Symbolic interactionism, a major contemporary school of thought in sociology and psychology, emerging from philosophical pragmatism with special emphasis on the thoughts of George H. Mead and its derivatives including dramaturgy, existential social psychology, and phenomenological.

SOC 6950*
Seminar in Social Gerontology. 2-3 credits, max 6. A theoretical and practical examination of the sociological implications, both individual and societal, of an aging population.

SOIL SCIENCE (SOIL)

SOIL 2124
(N)Fundamentals of Soil Science. Lab 2. Prerequisite(s): CHEM 1215. Principal physical, chemical and biological properties of the soil related to plant growth; soil testing and fertilizer usage; formation and classification of soils, rural and urban land use.

SOIL 3433*
(N)Soil Genesis, Morphology, and Classification. Lab 3. Prerequisite(s): 2124. Basic principles dealing with how and why soils differ, their descriptions, geographic distributions and modern classification of soils. Soil genesis and classification a prerequisite to sound land use planning and land management.

SOIL 3883
Sustainable Agriculture Concepts and Practice. Principles of sustainable agriculture for improved farm management. Analysis of farming systems for indicators of sustainability.

SOIL 4210*
Describing and Interpreting Soils. 1 credit, max 3, Lab 3. Prerequisite(s): 2124. Describe and classify soil properties in the field and interpret for suitable agriculture, urban, and other land uses.

SOIL 4213*
Precision Agriculture. Lab 2. Prerequisite(s): MATH 1513, senior standing. Introduction to the concepts of precision agriculture including analysis of spatial variability, relationships of fertility and crop response, geographical information systems, variable rate technology, optical sensing, global positioning systems, and yield monitoring. Case studies included for detailed analyses. (Same course as BAE 4213*)

SOIL 4234*
Soil Nutrient Management. Lab 2. Prerequisite(s): 2124. Soil fertility and use of fertilizer materials for conservation, maintenance, and improvement of soil productivity and to minimize environmental concerns.

SOIL 4363*
Environmental Soil Science. Prerequisite(s): BIOL 1114 and CHEM 1215. Presentations of soil processes and interpretation for natural resource management; land reclamation; identification of wetlands; oil and soil damages; impact of fertilizer, pesticide and other agricultural chemicals on soil and water quality; water resources; long-term soil erosion and landscape formation; transformations of manure, sewage sludge, and other organic by-products.

SOIL 4463*
Soil and Water Conservation. Prerequisite(s): SOIL 2124. Assess the importance, quality and quantity of soil and water as natural resources for ecosystems and societies. Principles of soil erosion processes and management practices to decrease erosion in urban, cropland and rangeland systems. Understand the principles of hydrology cycle to improve water use efficiency of precipitation and irrigation resources. Examine resource mismanagement that have resulted in desertification, salinization and deforestation.

SOIL 4470*
Problems and Special Study. 1-3 credits, max 12, Lab 1-3. Prerequisite(s): Consent of the instructor. Problems in soil science selected from topics in soil chemistry and fertility, soil physics, soil biology, soil conservation, and soil morphology.

SOIL 4483*
Soil Microbiology. Prerequisite(s): 2124 and BIOL 1114 or consent of instructor. An overview of microorganisms living in the soil and their activities which are significant to agricultural practices and the environment. *No credit for both 4483 and 5583.*

SOIL 4563*
Dynamics of Wetland, Forest and Rangeland Soils. Prerequisite(s): 2124. Dynamics of soils that receive minimal or no production input. Identification of wetland soils and the biogeochemical reactions occurring in wetland soil environments. Nutrient cycling, physical, chemical, and biological properties of forest and rangeland soil systems.

SOIL 4571
Senior Seminar. Prerequisite(s): Senior standing in plant and soil sciences. Career opportunities (talks and field trips); preparation of resumes and interviews. *Graded on a pass-fail basis.* (Same course as PLNT 4571)

SOIL 4683*
Physical Properties of Soils. Prerequisite(s): 2124 and PHYS 1114. Soil physical properties and processes, and their influence on plant growth.

SOIL 4863*
Animal Waste Management. Prerequisite(s): 2124. Aspects of animal waste management related to animal nutrition, system design, land application, and economic acceptance.

SOIL 4893*
Soil Chemistry and Environmental Quality. Prerequisite(s): 2124 and CHEM 1225. Chemical and colloidal properties of clays and organic matter in soil systems, including ion exchange, retention, and precipitation; soil acidity and salinity; mineral weathering and formation; oxidation-reduction reactions; trace and toxic elements, water quality, land application of wastes, and soil remediation.

SOIL 5000*
Master's Thesis. 1-6 credits, 6 max total credits under Plan I, and 2 max total credits under Plan II. Prerequisite(s): Consent of adviser. Research planned, conducted and reported in consultation with a major professor.

SOIL 5020*
Graduate Seminar. 1 credit, max per semester 1 credit on MS program and 2 credits on a PhD program required. Prerequisite(s): Graduate standing. Philosophy of research, methods of research, or interpretation of research.

SOIL 5110*
Problems and Special Study. 1-4 credits, max 6. Prerequisite(s): Consent of instructor. Supervised study of special problems and topics not covered in other graduate courses.

SOIL 5111*
Research Methods in Plant and Soil Sciences. Prerequisite(s): Graduate standing. Exploration of various methodologies helpful in field scale research. Application and understanding biometry as it relates to research result interpretation.

SOIL 5224*
Soil Chemical Processes and Impact on Environmental Quality. Lab 2. Prerequisite(s): 4893 and CHEM 2113 or CHEM 3324 or equivalent. Chemical and physical properties of soil minerals as they pertain to solution chemistry; nutrient and contaminant availability and speciation as dictated by ion exchange, precipitation/dissolution, and adsorption reactions; soil acidity; surface chemistry and adsorption reactions. Review of current research in soil and environmental chemistry literature and writing of scientific peer-reviewed articles.

SOIL 5230*
Research. 1-4 credits, max 4. Prerequisite(s): Consent of a faculty member supervising the research. Supervised independent research on selected topics.

SOIL 5353*
Advanced Soil Genesis and Classification. Lab 2. Prerequisite(s): 3433. Processes and factors of soil formation. Comparison of world soil morphology and classification systems.

SOIL 5383*
Advanced Soil Microbiology. Prerequisite(s): 2124 and BIOL 1114 or consent of instructor. A comprehensive overview of microorganisms living in the soil and their activities which are of agricultural and environmental significance. Provide experience in analytical skills related to soil microbial processes. *No credit for both SOIL 4483 and 5383.*

SOIL 5483*
Soil Biodegradation and Bioremediation. Prerequisite(s): 4483. A comprehensive overview of microorganisms living in soil and their activities of agricultural and environmental significance, emphasizing their roles in improving soil quality, and biodegradation and bioremediation of soil.

SOIL 5613*
Laboratory Methods of Soil, Plant and Environmental Analysis. Lab 4. Prerequisite(s): SOIL 4893 and CHEM 2113 or 3353 or equivalent. Methods in soil and environmental sample analysis. Presentation and discussion of the theory behind chemical analysis of soils, plants, and waste materials for agricultural and environmental purposes. Hands-on laboratory analysis of personal soil samples. Theory and practices of common laboratory techniques and equipment/instrumentation such as colorimetric spectroscopy, charge analysis of soils, forms of acidity, phosphorus extractions and behavior, ICP-AES. The course is heavily lab based.

SOIL 5813*
Soil-Plant Nutrient Cycling and Environmental Quality. Prerequisite(s): 4234 or equivalent. Theory and application of soil plant relationships in production and non-production environments. Nutrient cycling, mass balance, soil nutrient supply and plant response. Methods to reduce the impact of nutrients on environmental quality, soil-plant buffering and response models.

SOIL 5990*
Soil Physical Analyses. 1-2 credits, max 2. Prerequisite(s): 4683. Principles and techniques.

SOIL 6000*
Doctoral Thesis. 1-6 credits, max 36. Prerequisite(s): Consent of instructor. Independent research to be conducted and reported with the supervision of a major professor as partial requirement for the PhD degree.

SOIL 6010*
Advanced Topics and Conference. 1-6 credits, max 12. Prerequisite(s): MS degree. Supervised study of advanced topics. A reading and conference course designed to acquaint the advanced student with fields not covered in other courses.

SPANISH (SPAN)

SPAN 1115
Elementary Spanish I. Pronunciation, conversation, grammar, and reading. Includes language lab work. *Students may not receive credit for both this course and SPAN 1153.*

SPAN 1153
Accelerated Elementary Spanish I. Prerequisite(s): 1-2 years high school Spanish or equivalent. Accelerated presentation of basic skills of the Spanish language for students with previous experience, but who are not yet ready for SPAN 1225. *Students may not receive credit for both this course and SPAN 1115.*

SPAN 1225
Elementary Spanish II. Prerequisite(s): 1115 or equivalent. Continuation of 1115. Includes language lab work.

SPAN 1253
Accelerated Elementary Spanish II. Prerequisite(s): 3-4 years high school Spanish or equivalent. Accelerated presentation of the second phase of Spanish language skills for students with previous experience, but who are not yet ready for SPAN 2115.

SPAN 2115
(I)Intermediate Spanish I. Prerequisite(s): 1225 or equivalent. Further development of speaking, listening, reading, and writing skills along with short cultural and literary readings.

SPAN 2232
(I)Intermediate Reading and Conversation. Prerequisite(s): 2115 or equivalent. Skill consolidation with emphasis on short literary readings ad conversation. *May be taken concurrently with 2233.*

SPAN 2233
(I)Intermediate Composition and Grammar. Prerequisite(s): 2115 or equivalent. Skill consolidation with emphasis on composition and grammar with some conversation. *May be taken concurrently with 2232.*

SPAN 3013
Survey of Latin-American Literature. Prerequisite(s): 20 hours of Spanish or the equivalent. Development of the literature written in Spanish in the new world.

SPAN 3023
Survey of Peninsular Literature I. Prerequisite(s): 20 credit hours of Spanish or equivalent. Development of literature in Spain from the medieval period to 1700.

SPAN 3033
Survey of Peninsular Literature II. Prerequisite(s): 20 hours of Spanish or the equivalent. Development of literature in Spain from 1700 to the present.

SPAN 3203
Advanced Conversation. Prerequisite(s): 20 credit hours of Spanish or equivalent proficiency. Practice in conversation skills, designed to bring students to a high level of proficiency in speaking and listening. Class conducted in Spanish.

SPAN 3213
Advanced Grammar and Composition. Prerequisite(s): 20 hours of Spanish or equivalent proficiency. Study of advanced grammar and stylistics with emphasis on composition skills, designed to bring students to a high level of proficiency in writing.

SPAN 3463
Advanced Diction and Phonetics. Lab 1. Prerequisite(s): 2232 and 2233, or equivalent. Required course for teacher certification/licensure. Spanish speech sounds and intonation patterns, with practice to improve the student's pronunciation.

SPAN 4123
Hispanic Poetry. Prerequisite(s): 3013 or 3023 or 3033. Detailed study of representative poetry from Spain or Latin America.

SPAN 4133
Hispanic Prose. Prerequisite(s): 3013, 3023 or 3033. Detailed study of representative prose works from Spain or Latin America.

SPAN 4163
Don Quixote. Prerequisite(s): One 3000- level Spanish course or equivalent. Seminar devoted to Cervantes' novel.

SPAN 4173
Hispanic Drama. Prerequisite(s): One 3000-level Spanish course or equivalent. Reading and interpretation of dramatic works selected from the Hispanic literatures.

SPAN 4223
20th Century Hispanic Literature. Prerequisite(s): One 3000-level Spanish course or equivalent. Major 20th century Hispanic writers.

SPAN 4253
Masterpieces of Hispanic Literature I. Prerequisite(s): One 3000-level Spanish course or equivalent. Reading and analysis of classics selected from the Hispanic literatures.

SPAN 4263
Masterpieces of Hispanic Literature II. Prerequisite(s): One 3000-level Spanish course or equivalent. Reading and analysis of classics selected from the Hispanic literatures. A continuation of 4253.

SPAN 4323
Hispanic Civilization I. Prerequisite(s): 2232 and 2233, or equivalent. Reading and discussion of selected texts outlining the development of contemporary Spanish civilization.

SPAN 4333
Hispanic Civilization II. Prerequisite(s): 23 credit hours of Spanish or equivalent. Reading and discussion of selected texts outlining the development of contemporary Hispanic civilization outside the Iberian peninsula.

SPAN 4413
Advanced Stylistics. Prerequisite(s): 3213. Continuation of 3213, emphasizing further development of grammar and composition in a variety of contexts.

SPAN 4550
Seminar in Spanish. 1-3 credits, max 9. Prerequisite(s): One 3000-level Spanish course, or equivalent. Readings and discussion of vital subjects in Spanish.

SPAN 5110*
Advanced Hispanic Studies. 1-3 credits, max 9, Lab TBA. Prerequisite(s): 22 hours of Spanish or graduate standing in foreign language.

SPECIAL EDUCATION (SPED)

SPED 3202
Educating Exceptional Learners. Lab 2. Learning characteristics, needs and problems of educating the exceptional learner in the public schools. Implications of the learning, environmental and cultural characteristics; planning and program assistance available for accommodating the exceptional learner in regular and special education programs; observation of exceptional learners.

SPED 4723*
Transition into Adulthood for Individuals with Disabilities. Strategies for preparing youth and young adults with disabilities for transitioning into adulthood.

SPED 4753*
Techniques of Behavior Management and Counseling with Exceptional Individuals. Techniques to develop and evaluate programs of behavior change for exceptional students including counseling with the exceptional individual and conferencing with professionals and parents.

SPED 5000*
Master's Thesis. 1-6 credits, max 6.

SPED 5320*
Seminar in Applied Behavioral Studies. 3-9 credits, max 9. In-depth exploration of contemporary problems of applied behavioral studies.

SPED 5573*
Communication Strategies for Individuals with Severe and Profound Disabilities. Methods for communicating with severely or profoundly disabled persons and for facilitating their communication through speech, sign, assistive devices and technology.

SPED 5620*
Practicum with Exceptional Learners. 1-8 credits, max 8, Lab 1-8. Prerequisite(s): Consent of instructor. Supervised individual and group experience with exceptional learners. The particular experience (learning disability, mental retardation, gifted, etc.) determined by the student's field of specialization.

SPED 5623*
Characteristics of Students with Mild/Moderate Disabilities. Educational, psychological and physiological characteristics of individuals with mild and moderate disabilities. Professional roles of the teacher, professional ethics, and assessment of children with disabilities.

SPED 5633*
Behavior Characteristics of Exceptional Individuals. Individual differences and problems that exceptional individuals experience. Educational programs and resources available to assist administrators, teachers and parents in dealing with unique individual needs.

SPED 5643*
Counseling Parents of Exceptional Children. Aiding the classroom teacher and other professional personnel in the understanding of unique activities and interpersonal relations involved in counseling with parents of exceptional children.

SPED 5653*
Play Therapy in Special Education. Theories and practices of the principles of play therapy. The application of play therapy for special education children. Supervised clinical experience with children with emotional, social and psychological problems.

SPED 5673*
Improving Literacy Skills of Individuals with Disabilities. Normal language development and variations from norms demonstrated by exceptional learner. Assessment techniques and intervention strategies appropriate for exceptional infants and children; theoretical approaches to language training, formal and informal; assessment techniques and techniques for exceptional individuals.

SPED 5683*
Models of Instruction in the Inclusive Classroom. Current techniques, models and approaches used to teach students with mild and moderate disabilities and the theoretical bases for these techniques and approaches in inclusive classrooms. Professional roles of the teacher of students with mild and moderate disabilities, including communication with other teachers.

SPED 5733*
Teaching Strategies for Students with Physical and Health Disabilities. Prerequisite(s): 5523 and graduate student standing. Design and implementation of educational programs, collaboration with families and other professionals, and advocacy for students with disabilities.

SPED 5743*
Planning and Instruction in Special Education. Knowledge and skills related to research-based, validated "best" practices for determining curriculum and implementing instruction for students with exceptionalities.

SPED 5783*
Assessing Students with Disabilities. The practice and practicality of the assessment process used in schools for students with disabilities.

SPED 5824*
Characteristics of Interventions for Individuals with Emotional Behavioral Problems. Characteristics, identification, intervention instructional strategies, and resources available for working with learners with emotional and behavioral disorders. Exploration of a wide range of theoretical approaches.

SPED 5883*
Classroom and Behavior Management. Classroom and behavior management strategies designed to improve learning and behavior within instructional settings.

SPED 5993*
Culturally Responsive Teaching in Special Education. Examination of the influence of ethnic, socioeconomic class, and gender factors on students with disabilities. Ethnographic inquiry through Service-Learning field placements for understanding cultural diversity and special education. Teaching attitudes and expectations, and curricular and instructional strategies for improving students' school performance.

SPED 6000*
Doctoral Thesis. 1-25 credits, max 25. Required of all candidates for doctorate in applied behavioral studies. Credit given upon completion and acceptance of thesis.

SPED 6183*
Legal Aspects in Special Education. Familiarization and analysis of legal rights and responsibilities of students, educators, and administrators in special education; federal and state mandates, case law and recent legal developments affecting special education.

SPED 6543*
School and Interagency Collaboration. Prerequisite(s): Graduate student status or instructor permission. An advanced course to examine models for interdisciplinary teamwork in the design, delivery and evaluation of services for students with disabilities and at risk. Both school-based and interagency collaborative services and strategies for communicating with multiple stakeholders are emphasized.

SPED 6603*
Current Trends and Issues in Special Education. Current research and literature regarding the education of exceptional children.

SPED 6743*
Single Subject Design in Special Education. Prerequisite(s): Permission of instructor. Conduct research utilizing single subject and single case study design with emphasis on special education. Advanced procedures in single subject research methodology, including design strategies and experimental control are emphasized.

SPED 6850*
Directed Reading. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Directed reading for students with advanced graduate standing.

SPED 6880*
Internship in Education. 1-8 credits, max 8, Lab 3-24. Directed off-campus experiences designed to relate ideas and concepts to problems encountered in the management of the school program.

SPEECH COMMUNICATION (SPCH)

SPCH 2713
(S)Introduction to Speech Communication. Principles and techniques of preparing for, participating in and evaluating communication behavior in the conversation, the interview, group discussion and the public speech. A competency-based approach.

SPCH 3703
Small Group Communication. General systems approach to small group processes. Special consideration given to group roles, norms, leadership and decision-making. Participation in various types of discussion groups.

SPCH 3723
Business and Professional Communication. Oral communication encounters in business and professional settings. The interview, informative briefing, talking-paper, small group interaction and informative, integrative and persuasive speeches.

SPCH 3733
(S)Elements of Persuasion. Principles and concepts of interpersonal and public persuasive encounters. The instrumental and interactive nature of persuasion. Designing and participating in actual persuasive campaigns.

SPCH 3743
Advanced Public Speaking. The preparation and delivery of various types of public speeches.

SPCH 3793*
Communication in Interviews. General principles of interviewing. Specific guidelines for the interviewer in survey, journalistic, counseling, selection, appraisal, legal, medical, and sales interviews.

SPCH 4010
Independent Study in Speech Communication. 1-3 credits, max 3. Prerequisite(s): Consent of instructor. Supervised research projects in speech communication.

SPCH 4710
Topics in Speech Communication. 1-3 credits, max 6. Selected current topics in speech communication.

SPCH 4743*
Problems of Interpersonal Speech Communication. Application of communication theory to interactions in person-to-person settings. Identification and management of barriers related to the concepts of perception, attraction, self-disclosure, listening and conflict.

SPCH 4753
(I)Intercultural Communication. Social and cultural differences between individuals from diverse backgrounds as possible barriers to effective communication.

SPCH 4763
Organizational Communication. The interface between communication theory and organizational structure. Nature of communication problems in organizations, strategies for overcoming such problems and the design of effective communication systems in organizational settings.

SPCH 4793
(S)Nonverbal Communication. Nonverbal aspects of speech communication.

STATISTICS (STAT)

STAT 2013
(A)Elementary Statistics. Prerequisite(s): MATH 1483 or 1513. No credit for business majors. An introductory course in the theory and methods of statistics. Descriptive measures, elementary probability, samplings, estimation, hypothesis testing, correlation and regression. *No credit for students with credit in 2023 or 2053.*

STAT 2023
(A)Elementary Statistics for Business and Economics. Prerequisite(s): MATH 1483 or 1513. Basic statistics course for undergraduate business majors. Descriptive statistics, basic probability, discrete and continuous distributions, point and interval estimation, hypothesis testing, correlation and simple linear regression. *No credit for students with credit in 2013 or 2053.*

STAT 2053
(A)Elementary Statistics for the Social Sciences. Prerequisite(s): MATH 1483 or MATH 1513. No credit for business majors. An introductory course in the theory and methods of statistics. Descriptive measures, elementary probability, sampling, estimation, hypothesis testing, correlation and regression. *No credit for students with credit in STAT 2013 or 2023.*

STAT 2331
SAS Programming. Prerequisite(s): A different programming language or consent of instructor. SAS as a general purpose programming language, data representation, input/output, use of built-in procedures, report generation. (Same course as CS 2331)

STAT 3013
Intermediate Statistical Analysis. Prerequisite(s): 2013, 2023 or 2053. Applications of elementary statistics, introductory experimental design, introduction to the analysis of variance, simple and multiple linear regression, nonparametric statistics, survey sampling and time series. Data analysis using Excel included.

STAT 4013
(A)Statistical Methods I. Prerequisite(s): 60 credit hours including MATH 1513. Basic experimental statistics, basic probability distributions, methods of estimation, tests of significance, linear regression and correlation, analysis of variance for data that are in a one way, a two-way crossed, or in a two-fold nested classification. *No credit for students with credit in 4053.*

STAT 4023
Statistical Methods II. Prerequisite(s): 3013 or 4013 or 4033 or 4053. Basic concepts of experimental design. Analysis of variance, covariance, split-plot design. Factorial arrangements of treatments, multiple regression in estimation and curvilinear regression, enumeration data. *No credit for students with credit in 4063.*

STAT 4033
Engineering Statistics. Prerequisite(s): MATH 2163. Probability, random variables, probability distributions, estimation, confidence intervals, hypothesis testing, linear regression. *No credit for students with credit in STAT 4073.*

STAT 4043*
Applied Regression Analysis. Prerequisite(s): One of 4013, 4033, 4053, 5013 or equivalent. Matrix algebra, simple linear regression, residual analysis techniques, multiple regression, dummy variables.

STAT 4053
(A)Statistical Methods I for the Social Sciences. Prerequisite(s): MATH 1513. Basic experimental statistics, basic probability distributions, methods of estimation, tests of significance, linear regression, calculation and analysis of variance for one and two-way classifications. *No credit for students with credit in STAT 4013.*

STAT 4063*
Statistical Methods II for the Social Sciences. Prerequisite(s): 3013 or 4013 or 4033. Basic concepts of experimental design. Analysis of variance, covariance, split-plot design. Factorial arrangements of treatments, multiple and curvilinear regression, enumeration data. *No credit for students with credit in STAT 4023.*

STAT 4073
Engineering Statistics with Design of Experiments. Prerequisite(s): MATH 2163. Random variables and basic probability distributions, estimation, confidence intervals, hypothesis testing, basic analysis of variance, factorial arrangement of treatments and fractional factorial experiments, elementary quality control. *No credit for students with credit in STAT 4033.*

STAT 4091*
Statistical Analysis System. Prerequisite(s): 4013 or equivalent. SAS dataset construction, elementary statistical analysis, and use of statistics and graphics procedures available in the SAS package. (Same course as CS 4091*)

STAT 4203*
Mathematical Statistics I. Prerequisite(s): MATH 2163. Introduction to probability theory for students who are not graduate majors in statistics or mathematics. Probability, dependence and independence, random variables, univariate distributions, multivariate distributions, moments, functions of random variables, moment generating functions.

STAT 4213*
Mathematical Statistics II. Prerequisite(s): 4203 and MATH 3013. Statistical inference for students who are not graduate majors in statistics or mathematics. Sampling distributions, maximum likelihood methods, point and interval estimation, hypothesis testing.

STAT 4910*
Special Studies. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Special subjects in statistics.

STAT 4993
Senior Honors Project. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors project under the direction of a faculty member, with a second faculty reader and an oral examination. *Required for graduation with departmental honors in statistics.*

STAT 5000*
Research in Statistics. 1-6 credits, max 6. Methods of research and supervised thesis or report.

STAT 5013*
Statistics for Experimenters I. Prerequisite(s): Graduate standing and MATH 1513. Introductory statistics course for graduate students. Descriptive statistics, basic probability, probability distributions, fundamentals of statistical inference, hypothesis testing, regression, one-way classification, analysis of variance, comparative experiments, correlation and linear regression, introduction to categorical data analysis.

STAT 5023*
Statistics for Experimenters II. Prerequisite(s): Graduate standing and 4023 or 5013. Analysis of variance, covariance, use of variance components and their estimation, completely randomized, randomized block and Latin square designs, multiple comparisons.

STAT 5033*
Nonparametric Methods. Prerequisite(s): One of 4023, 4043, 5023 or consent of instructor. A continuation of 4013 and 4023, concentration on nonparametric methods. Alternatives to normal-theory statistical methods; analysis of categorical and ordinal data, methods based on rank transforms, measures of association, goodness of fit tests, order statistics.

STAT 5043*
Sample Survey Designs. Prerequisite(s): One of 4013, 4033, 5013 or consent of instructor. Constructing and analyzing personal, telephone and mail surveys. Descriptive surveys including simple random, stratified random designs. Questionnaire design, frame construction, non-sampling errors, use of random number tables, sample size estimation and other topics related to practical conduct of surveys.

STAT 5053*
Time Series Analysis. Prerequisite(s): 4043. An applied approach to analysis of time series in the time domain and the frequency domain. Descriptive techniques, probability models for time series, autoregressive processes and forecasting. Box-Jenkins methods, spectral analysis and use of computers.

STAT 5063*
Multivariate Methods. Prerequisite(s): 4043 and 4023 or 5023. Use of Hotelling's T-squared statistic, multivariate analysis of variance, canonical correlation, principal components, factor analysis and linear discriminate functions.

STAT 5073*
Categorical Data Analysis. Prerequisite(s): 5223, 5023 or equivalent or concurrent enrollment. Analysis of data involving variables of a categorical nature. Contingency tables, exact tests, binary response models, loglinear models, analyses involving ordinal variables, multinomial response models. Computer usage for analysis is discussed.

STAT 5093*
Statistical Computing. Prerequisite(s): 5123 or 4203, 5013 or equivalent, CS 1113 or equivalent. Random variable generation; numerical calculations of maximum likelihood estimators, quasi-likelihood estimators, probabilities, and quantiles; computer intensive exact tests and distributions; randomized tests; bootstrap and jack knife methods, Monte Carlo simulations Markov Chain Monte Carlo methods for Baysian estimation.

STAT 5123*
Probability Theory. Prerequisite(s): MATH 2163 and one other course in MATH that has either 2144 or 2153 as a prerequisite. Basic probability theory, random events, dependence and independence, random variables, moments, distributions of functions of random variables, weak laws of large numbers, central limit theorems.

STAT 5133*
Stochastic Processes. Prerequisite(s): 5123 and MATH 2233, MATH 3013. Definition of a stochastic process, probability structure, mean and covariance function, the set of sample functions, stationary processes and their spectral analyses, renewal processes, counting processes, discrete and continuous Markov chains, birth and death processes, exponential model, queuing theory. (Same course as IEM 5133* & MATH 5133*)

STAT 5213*
Bayesian Decision Theory. Prerequisite(s): 5223. Statistical spaces, decision spaces, loss and risk, minimum risk decisions, conjugate families of distributions, Bayesian decisions.

STAT 5223*
Statistical Inference. Prerequisite(s): 5123 and MATH 3013. Sampling distributions, point estimation, maximum likelihood methods, Rao-Cramer inequality, confidence intervals, hypothesis testing, sufficiency, completeness.

STAT 5303*
Experimental Design. Prerequisite(s): 5023 or 4023 with consent of instructor. Review of basic concepts and principles of comparative experiments, the role of randomization in experimentation, interpretation of effects and interactions in multi-factor designs, error term selection principles, multiple comparisons, split-unit experiments, incomplete block designs, confounding of factorial effects in 2^n and 3^n series of factorials, single and fractional replication optimum seeking designs, pooling of experiments over time and space, crossover and switch back designs.

STAT 5323*
Theory of Linear Models I. Prerequisite(s): 5223, and MATH 3013, and one of 4023 or 5023. Multivariate normal distributions of quadratic forms, general linear models, Markov theorem, variance components, general linear hypotheses of full rank models.

STAT 5333*
Theory of Linear Models II. Prerequisite(s): 5323. Maximum likelihood estimation; missing data structures; balanced incomplete block design; less than full rank models; general mixed models; intrinsically linear models; sequential estimation.

STAT 5513*
Multivariate Analysis. Prerequisite(s): 5323. Multivariate normal distribution, simple, partial and multiple correlation, multivariate sampling distributions. Wishart distribution, general T-distribution, estimation of parameters and tests of hypotheses on vector means and covariance matrix. Classification problems, discriminate analysis, and applications.

STAT 5910*
Seminar in Statistics. 1-6 credits, max 12. Special studies for master's students. Survey and discussion of research in mathematical statistics and statistical methods.

STAT 6000*
Research and Thesis. 2-10 credits, max 30. Prerequisite(s): Consent of advisory committee. Directed research culminating in the PhD thesis.

STAT 6113*
Probability Theory. Prerequisite(s): 5123 and MATH 5143. Measure theoretical presentation of probability, integration and expectation, product spaces and independence, conditioning, different kinds of convergence in probability theory, statistical spaces, characteristic functions and their applications.

STAT 6203*
Large Sample Inference. Prerequisite(s): 5223 and 6113. Different types of convergence in probability theory, central limit theorem, consistency, large sample estimation and tests of hypotheses, concepts of asymptotic efficiency, nonparametric tests.

STAT 6223*
Advanced Statistical Inference. Prerequisite(s): 6113. Point estimation, maximum likelihood, Cramer-Rao inequality, confidence intervals, Neyman-Pearson theory of testing hypothesis and power of test.

STAT 6910*
Special Problems. 1-6 credits, max 12. Investigation of special problems in the theory and application of statistics using current techniques. Special studies for PhD level students.

STUDENT DEVELOPMENT (SDEV)

SDEV 1113
Orientation in Student Athletics. To assist students to better understand and comply with the academic and athletic demands on student-athletes at a NCAA Division I university, including NCAA compliance issues.

SDEV 3013
Leadership Concepts. Prerequisite(s): 12 hours completed course work. Increases undergraduate student competence through the study of leadership concepts. Stresses communications, decision-making, leadership styles and theories and group dynamics. Attempts integration of theoretical concept with reality of application within the university community.

SDEV 3091
Student Development Theory for Orientation Leaders. Prerequisite(s): Consent of instructor. Theories of student development. Topics include helping skills, student leadership community building, communication skills, and multicultural sensitivity. Application of theory to university orientation programs.

SDEV 3092
Student Development Training for Resident Assistant. Theories of student development. Topics include helping skills, community building, communication skills, and multicultural sensitivity. Application of theory to living groups.

SDEV 5000*
Master's Thesis. 1-6 credits, max 6. Prerequisite(s): Consent of instructor.

SDEV 5173*
Introduction to Student Affairs. History, philosophy, and goals of student affairs units in colleges and universities; emphasis on practitioner roles and responsibilities.

SDEV 5213*
Student Development Theory. Examination of theories describing patterns of growth and development during the college years. Implications for the design of education practice on the college campus.

SDEV 5223*
Career Development for College Students. In-depth exploration of issues and contemporary theory related to the topic of career development for college students.

SDEV 5320*
Seminar in Student Development. 3-6 credits, max 6. Prerequisite(s): Consent of instructor. In-depth exploration of contemporary problems of applied behavioral studies.

SDEV 5333*
Effective Leadership in Student Services. Prerequisite(s): 6173 or consent of instructor. The organization and management of student services operations in postsecondary institutions. Models for policy and decision-making as well as leadership and supervision issues.

SDEV 5433*
Group and Cultural Interventions in Student Affairs. Prerequisite(s): Consent of instructor. Explores group theory, dynamics and cultural dimensions as these factors relate to working with college students and advising student groups in a higher education environment.

SDEV 5463*
Legal Issues in Student Affairs. Prerequisite(s): 5173 or 6173. Legal issues confronted by entry-level student affairs practitioners, how to recognize these issues, and how to act within the parameters of the law.

SDEV 5733*
Environmental Theory and Student Affairs. Prerequisite(s): Consent of instructor. Examination of campus environmental theory providing an understanding of campus environments approach to student affairs practice.

SDEV 6000*
Doctoral Dissertation. 1-9 credits, max 9. Prerequisite(s): Consent of instructor. Required of all candidates for doctorate in applied behavioral studies. Credit give upon completion and acceptance of dissertation.

SDEV 6173*
Administrative Issues in Student Affairs. Develops an understanding of the history, philosophy, student life, critical issues and administration of student personnel work in higher education.

SDEV 6213*
Higher Education Student Personnel Services. Prerequisite(s): 6173 or consent of instructor. Higher education student personnel services such as: admissions, orientation, student activities, financial aids, housing, and counseling.

SDEV 6220*
Internship in Higher Education Student Personnel. 3 credits, max 3. Prerequisite(s): 6213 or consent of instructor. Work and study opportunities under supervision in areas of student housing, student activities, financial aid, foreign student advisement, student personnel administration, student union, group facilitation and other appropriate work situations.

SDEV 6850*
Directed Reading. 1-6 credits, max 6. Prerequisite(s): Consent of instructor. Directed reading for students with advanced graduate standing.

TELECOMMUNICATIONS MANAGEMENT (TCOM)

TCOM 3153
(I)International Telecommunications Business Environment. Prerequisite(s): 2103 or consent of instructor. This course concentrates on understanding the implications and challenges of utilizing telecommunications networks in today's global business environment. Emphasis will be placed on identifying the major players in the global information infrastructure, standards setting bodies and procedures, and the various regulatory processes encountered. Students will research the telecommunications industry in other countries and develop comprehensive written reports.

TCOM 3203
Telecommunications Industry Foundations. Prerequisite(s): Consent of instructor. Emerging trends in the telecommunications industry. Past events, regulatory and legal implications, strategic direction of organizations with respect to telecommunications.

TCOM 3223
Network Design Principles. Prerequisite(s): MSIS 3223. Management science principles applied to telecommunications network design. Specific topics will include mathematical programming, network models, simulation, and queuing theory.

TCOM 5012*
Telecommunications Laboratory. Prerequisite(s): ECEN 5553, TCOM 5123 or co-requisite. Familiarization with the hardware used to move voice, data and video traffic. Data network experiments include set up and operation of a small LAN, interconnection of these LANs via bridges or routers, and attachment of voice and video modules to the LANs. Telephone network experiments include installation of small PBXs and interconnection of them to the campus phone system, and interconnection of the lab PBXs with crosspoint switches and fiber. Video experiments include interconnection and operation of a small two-camera studio, and digitizing and transferring the video over the laboratory telephone system. Practical operating aspects and standards of distance transmission devices, switching equipment media for transmitting data, voice and video signals. Handling information problems within selected environments.

TCOM 5113*
Industry Overview and Telecommunications Applications. Prerequisite(s): Graduate standing and consent of program director. Overview of telecommunications industry, technology, regulatory environment, and current topics in telephone services (wireless and wireline), business data services, CATV, and Internet services and providers (including JAVA and HTML). Managerial and strategic aspects of telecommunications technologies. Guest speakers from the telecommunications industry.

TCOM 5123*
The Upper Layers of Telecommunications Systems. Applied technical coverage of selected topics from the upper layers of the OSI model. Network and Transport layers using, TCP/IP, IPX/SPX, as well as security issues and other multi-layer protocol suites. Other topics include flow control, RSVP, encryption, compression, and LAN/WAN applications.

TCOM 5143*
Telecommunications Systems Analysis, Planning and Design I. Prerequisite(s): ECEN 5553 and consent of program director. The fundamentals behind systems analysis and design of telecommunication systems from a managerial perspective. Financial analysis of telecommunication projects, fundamentals of mathematical modeling and queuing theory, and other management tools that are key to the design and analysis of telecommunication networks.

TCOM 5153*
International Telecommunications Management. Prerequisite(s): Graduate standing and consent of program director. Investigation of the institutions that affect the use of telecommunications. The various parts of the federal government involved, such as the Department of Commerce, the FCC and the Department of State. The role of international institutions, including the ITU, UNESCO, and the various satellite organizations such as INTELSAT.

TCOM 5163*
Telecommunications Practicum. Lab 3. Prerequisite(s): Graduate standing and consent of program director. Application of knowledge and skills developed in core courses in an organizational environment to solve telecommunications management problems. Integration of concepts and adaptation of theory to fit organizational reality.

TCOM 5173*
Global Telecommunications Regulation. Historical review of the classical "PTT (Post, Telephone and Telegraph) Model", and the development of new competitive environments. Overview of international telecommunications networks and how they are regulated nationally and internationally. Review of the World Trade Organization (WTO) and the telecommunications commitments made by members. Emphasis on the European Union as the largest single telecommunications market, along with analyses of regional emerging markets. Review of challenges for the future for both regulatory agencies and telecommunications operators and providers.

TCOM 5193*
Capstone: Telecommunications Systems Analysis and Design. Prerequisite(s): 5113, 5123, ECEN 5553, 23 hours of relevant graduate course work, and consent of program director. Application of knowledge gained throughout the curriculum to basic systems analysis tools and techniques to perform an analyses and designs in a telecommunications context. Knowledge of technology, management, international aspects, and regulatory environment to provide an overall view of impact that a given system may have on an organization. System documentation through use of classical and structured tools and techniques for describing flows, data flows, data structures, file designs, input and output designs, and program specifications may be used.

TCOM 5213*
Telecommunications Systems Analysis, Planning and Design II. Prerequisite(s): 5143, ECEN 5553, and consent of program director. The fundamentals behind systems analysis and design of telecommunication systems from an engineering perspective. Advanced mathematical modeling and queuing theory, graph theory, network design algorithms and other tools that are key to the design and analysis of telecommunication networks. An in-depth, technical and quantitative follow-up to TCOM 5143.

TCOM 5223*
Information Assurance Management. A broad investigation of the elements of information assurance and security with an emphasis on the management impact to corporations and businesses engaged in information services and electronic commerce. Students should come away from the course with the ability to advise management on the risks and mitigation for all types of threats to information and privacy.

TCOM 5233*
Applied Information Systems Security. Prerequisite(s): 5123. An investigation into the various technical aspects of attacking, and of guarding against attacks and failures in various types of information systems. Course content may vary but includes computer, network, and data protection technologies (e.g., firewalls, packet filters, proxy servers, user authentication and validation techniques, encryption, backup methodologies, system and component redundancies, etc.). Various threats and attack methods examined.

TCOM 5273*
Legal and Ethical Issues in Information Technology. This course reviews the current status of information systems law in regard to rights of privacy, freedom of information, confidentiality, work product protection, copyright, security, legal liability, ethical issues and a range of additional legal and information policy topics. We will investigate the legal difficulties that technological innovations are causing in all of these areas. Legal options for dealing with the conflicts caused by technological change and likely adaptations of the law over time in response to societal changes will be explored. *No credit for students having completed MSIS 4273.*

TCOM 5283*
Operating Systems for Information Assurance. Operating Systems (OS) concepts for security. Vulnerabilities and threats. Security models. User authentication. Smart cards: architectures, technologies, application environments, and case studies. System availability. Software and data integrity. Auditing. Sensitive data confidentiality. Access control. Secure OS development: design principles, design methodologies, security certification. Case studies: Unix/Linux, MS-Windows XP/2000.

TCOM 5310*
UNIX Administration Laboratory. 1-3 credits, max 9, Lab 16-48. Prerequisite(s): Must have taken or currently enrolled in 5223 or 5233 and have consent of program director. Common administration level tasks associated with managing systems that run Unix and Unix derivatives. Utilities and resources commonly deployed in support of network infrastructure.

TCOM 5320*
Infrastructure Security Lab. 1-3 credits, max 9, Lab 16-48. Prerequisite(s): Must have taken or currently enrolled in 5223 or 5233 and have consent of program director. Hands-on experience with various technical aspects of managing the perimeter of a connected network. Network hardware, such as routers, switches and firewalls. Course content variable, but includes computer, network, and data protection technologies.

TCOM 5330*
UNIX Security Lab. 1-3 credits, max 9, Lab 16-48. Prerequisite(s): Must have taken or currently enrolled in 5223 or 5233 and have consent of program director. Hands-on experience with various technical aspects of managing security, protecting information technology assets, and both attacking and guarding against attacks and failures in UNIX and Linux systems. Course content variable, but includes computer, network, and data protecting technologies.

TCOM 5340*
Security Lab. 1-3 credits, max 9, Lab 16-48. Prerequisite(s): Must have taken or currently enrolled in 5223 or 5233 and have consent of program director. Hands-on experience with various technical aspects of managing security, protecting information technology assets, attacking and of guarding against attacks and failures in information systems. Course content variable but includes computer, network, and data protection technologies (e.g. firewalls, packet filters, proxy servers, user authentication and validation techniques, data encryption, establishing virtual private networks, creating and using digital certificates for authentication, using encrypted e-mail technologies). Several threats and attack methods explored (e.g. sniffers, password crackers, network scanners, etc.).

TCOM 5343*
Information Technology Forensics. Prerequisite(s): 5123, consent of department head. Review of systems for vulnerabilities and analysis of systems that have been breached. This course will cover the many related issues and have a heavy hands-on component.

TCOM 5350*
Advanced Telecommunications Management Lab. 2-3 credits, max 3, Lab 2-3. Prerequisite(s): 5012 and consent of program director. Advanced state-of-the-art topics in voice, data and video. Hands-on network experiments beyond coverage in the required TCOM 5012 lab.

TCOM 5353*
Information Technology Risk Analysis, Planning and Mitigation. Prerequisite(s): Consent of department head. Examination of factors of risk analysis in information technology and how management can plan to achieve an acceptable level of risk in the face of corporation desiring to further open up their networks to partners, customers and mobile workers.

TCOM 5360*
Wireless Communications Laboratory. 1-3 credits, max 9, Lab 16-48 Prerequisite(s): ECEN 4523, ECEN 5553 and consent of program director. Conducting wireless-modem and wireless-networking experiments and analyzing the problems that result in improved designs for wireless systems and networking performance.

TCOM 5370*
Windows Security Lab. 1-3 credits, max 9, Lab 16-48. Prerequisite(s): Must have taken or currently enrolled in 5223 or 5233 and have consent of program director. Hands-on experience with various technical aspects of managing security, protecting information assets, and both attacking and guarding against attacks and failures in Windows systems. Course content variable, but includes computer, network, and data protection technologies.

TCOM 5380*
System Technologies for Information Assurance. 1-3 credits, max 3, Lab 1-3. Prerequisite(s): 5223, consent of director. The basic parts of an operating system, including memory handling, processing and I/O functions. Areas of the OS most often exploited in information assurance breaches, as well as those that serve as the building blocks for upper-layer attacks. OS structures, process management, memory management, storage management, protection and security, distributed systems, and special purpose systems. For non-computer science majors, and may not be taken for credit if another course in operating systems has already been completed.

TCOM 5410*
Advanced Topics in Telecommunications Management. 3 credits, max 3. Prerequisite(s): Graduate standing and consent of program director. Advanced topics in the interdisciplinary field of telecommunications management, such as legal and regulatory issues, electronic commerce, Internet and Intranet development.

TCOM 5990*
Directed Studies in Telecommunications Management. 1-6 credits, max 6. Prerequisite(s): Graduate standing and consent of program director. Special advanced topics, projects and independent study in telecommunications management.

THEATRE (TH)

TH 1322
Acting I. Lab 1. Ensemble techniques and creative improvisation; vocal and physical development for the actor; theories and techniques of acting; fundamental scene and character analysis; scene performance workshops.

TH 1332
Voice and Movement I. Lab 4. Techniques and exercises to build the actor's awareness and ability to use the vocal and physical instruments on stage. Alignment, breathing, centers essence, tempo-rhythm, and movement patterns. Freeing and natural voice, resonance and range, and articulation.

TH 1500
Theatre Practicum. 1 credit, max 6, Lab 2. Laboratory experience in theatre production, acting and crew assignments. *Graded on a pass-fail basis.*

TH 1664
Stage Technology. Lab 4. Elementary techniques of stagecraft for the stage. Basic stagecraft skills. Practical experience preparing departmental productions.

TH 1674
Costume Technology. Lab 4. Elementary techniques of costume craft for the stage. Basic costuming skills. Practical experience preparing departmental productions.

TH 2322
Acting II. Lab 4. Prerequisite(s): 1322. Continuation and refinement of 1322. Textual and character analyses, characterization and inner techniques. Audition techniques and realistic comedy through scene work with contemporary plays.

TH 2332
Voice and Movement II. Lab 1. Prerequisite(s): 1332. Continued development of strength of the vocal and physical instrument. Introduction to analysis and interpretation of heightened text. Study of the International Phonetic Alphabet, General American Speech, and the American Stage Speech dialect.

TH 2413
(H)Introduction to the Theatre. Character, plot, thematic, historical and production analyses of various types of play scripts; understanding the work of various theatre artists; developing appreciative audiences.

TH 2553
Introduction to Stage Design. Lab 2. Prerequisite(s): 1664, 1674 or consent of instructor. An integrated overview of the theory and practice of design for the stage.

TH 3373
Acting III. Lab 2. Prerequisite(s): 1322, 2322. Continuation and refinement of 2322. Performance techniques in classic to modern styles. Shakespeare to Miller.

TH 3383
BFA Acting Studio I. Lab 2. Prerequisite(s): 3373 and admission to Bachelor of Fine Arts program. In-depth acting study for BFA candidates. Special emphasis on performing classic and poetic realism.

TH 3400
Upper-division Projects. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Individual or group study of techniques, history, or literature of the theatre. Required written survey of the project and self-evaluation of its results, or a term paper.

TH 3412
Theatrical Dance: Jazz I. Lab 4. Jazz dance techniques for theatrical performance emphasizing body alignment, coordination, flexibility, rhythm and jazz dance vocabulary in simple dance combinations. Artistic development of dance performers. (Same course as 5400*)

TH 3422
Theatrical Dance: Jazz II. Lab 4. Prerequisites: 3412 or consent of instructor. Techniques for theatrical performance at the intermediate level emphasizing stamina, control, speed, and dynamics. Artistic development of dance performers.

TH 3432
Theatrical Dance: Tap I. Lab 4. Fundamentals of tap dance techniques for theatrical performance emphasizing coordination, rhythm, and dance vocabulary in simple tap combinations. Artistic development of dance performers.

TH 3442
Theatrical Dance: Tap II. Lab 4. Prerequisite(s): 3432 or consent of instructor. Tap dance techniques for theatrical performance at the intermediate level emphasizing stamina, control, speed, and dynamics. Artistic development of dance performers.

TH 3500
Theatre Practicum II. 1-2 credits, max 4. Prerequisite(s): 1322; 1332 or 1664; 1674. Advanced laboratory experience in theatre production, design, acting, and/or major crew assignments.

TH 3903
History of Costume and Decor for the Stage. Comprehensive history of theatrical costume and interior decor from ancient Egypt to the present.

TH 3913
Dramatic Literature and Analysis. Survey of critical approaches to dramatic literature focusing on the transfer of literature to live theatrical production and performance.

TH 3923
(H)Theatre History I. Aesthetic and social relationships of theatre and western civilization from Ancient Greece to the 18th century.

TH 3933
(H)Theatre History II. Aesthetic and social relationships of theatre and western civilization from the 19th century to the present.

TH 3971
Stage Makeup. Lab 2. Techniques of basic stage makeup. Application of makeup including a study of facial anatomy and character development. Laboratory work in preparation for departmental productions.

TH 4183*
Scene Design for Theatre and Television. The designer's approach to the script; execution of sketches, models, and working drawings.

TH 4223*
Sound Design and Technology. Prerequisite(s): 2553, 2663. Use and design of sound in theatrical productions, including voice reinforcement, scoring, script analysis, and effects.

TH 4363
BFA Acting Studio II. Lab 2. Prerequisite(s): 3383 and admission to Bachelor of Fine Arts program. In-depth acting study for BFA candidates. Special emphasis on performing physical comedy and related styles.

TH 4373
BFA Acting Studio III. Lab 2. Prerequisite(s): 4363 and admission to Bachelor of Fine Arts program. In-depth acting study for BFA candidates. Special emphasis on performing restoration, comedy of manners and other dramatic literature which requires heightened performance style.

TH 4383*
Stage Combat. Lab 2. Prerequisite(s): 2332, 3373. Safe and effective techniques for portraying theatrical representations of stage violence; melding technical aspects of stage, combat with developing use of the actor's craft.

TH 4393*
Stage Dialects. Prerequisite(s): 1332, 2332. Development of techniques for learning and speaking dialects commonly required in theatrical productions, as well as an application of these dialects.

TH 4403
Senior Honors Project. Prerequisite(s): Departmental invitation, senior standing, Honors Program participation. A guided reading and research program ending with an honors thesis or performance under the direction of a faculty member, with second faculty committee member. *Required for graduation with departmental honors in theatre.*

TH 4593*
Lighting for Theatre and Television. Lab 2. Stage lighting design, elementary electricity, design of lighting instruments. Practical experience in lighting in preparing and running departmental productions.

TH 4653
Advanced Stage Mechanics. Lab 2. Prerequisite(s): 1664. Advanced study in theatrical stage mechanics and production techniques, including special steel fabrication, automated scenery, and structural support systems.

TH 4663
Scenographic Techniques. Lab 2. Prerequisite(s): 1664, 1674, 2553. Development of computer and hand drafting techniques specific to the design, planning, and execution of stage scenery, lighting, and sound. Emphasis will be placed on USITT graphic standards.

TH 4673*
Seminar in Advanced Costume Construction. Lab 2. Prerequisite(s): 1674. Sewing and craft techniques for the construction of period costumes. Boned garments, fabric manipulation, and millinery.

TH 4683
Costume and Prop Crafts. Lab 2. Prerequisite(s): 1664 and 1674. Use of advanced materials and techniques in the fabrication of specialized stage and costume props.

TH 4753*
Stage Management. Prerequisite(s): Consent of instructor. Procedures and skills of effective stage management. Authoritative coordination of performers and technicians during rehearsal and performance periods. Maintenance and use of the production prompt book, notation of ground plan and blocking; scene shifts; cues for lighting, sound, special effects, and performers; opening and calling the show; post-show wrap-up. Practical experience in stage managing student directed scenes.

TH 4953*
Directing. Prerequisite(s): 2543. Play analysis for production, problems in staging, and the role of the director. Planning and direction of scenes in laboratory situations.

TH 4963*
Theatre Graphic Techniques. Fundamental theatre graphic techniques to communicate theatrical design ideas.

TH 4973*
Stage Costume Design. Lab 4. Approaches to basic costume design including research, conceptual analysis, figure drawing, and executions of sketches and renderings.

TH 4983*
Scene Painting. Lab 3. Elementary techniques of scene painting. Individual projects in large scale in representing marble, rock to landscape, interiors. Color theory, forced perspective, ability to paint different styles. Practical experience preparing for departmental productions.

TH 4990
BFA Jury. 1 credit, max 4. Prerequisite(s): Consent of the department. Business for the performing artist: professional portfolio/audition preparation; career development, internships and national/international organizations; graduate school preparation; resume, application and interviewing. *4 hours required for all BFA candidates.*

TH 5000*
Master's Thesis and Research. 1-6 credits, max 6. Prerequisite(s): Consent of department head. Master's level research in theatre for thesis option graduate students.

TH 5013*
Theatre Research Methods. Diverse methods of theatre research appropriate to performance, design and technology, and history and theory. Developing familiarity with standard references and journals of the field, and introduction to professional organizations.

TH 5063*
Scenography. Investigation of design styles and theories and the designers whose work advances the artform. Special emphasis will be placed on collaboration strategies for developing visual and directorial production concepts.

TH 5213*
Script Analysis. Analytical and interpretive techniques in studying play scripts for theatrical production. Emphasis on writing skills appropriate to script analysis.

TH 5223*
Seminar in Theatre History. Prerequisite(s): Undergraduate degree or instructor consent. Specific topics in theatre history with focus on theatre production in one historical or artistic era (e.g. Russian Silver Age, Post War French Absurdism, Imperial Roman), or the comparative study of theatre and drama in various nations.

TH 5243*
Problems in Advanced Acting. Lab 2. Experimentation in psychological realism. Concentration on analysis, technical skills, and contacting the emotions. Special preparations for professional interviews and auditions.

TH 5253*
Problems in Advanced Acting II. Prerequisite(s): 5243. In-depth exploration of three theatrical acting styles. Scene study, monologue study, lecture, discussion, reading and various in-class exercises. Utilizing language in these plays and creating a physical life reflective of the character's social customs and values.

TH 5400*
Seminar in Theatre. 1-3 credits, max 12. Prerequisite(s): Consent of instructor. Individual or group studies of techniques, history or literature of the theatre. A term paper or written report and self-evaluation of the study or project required. (Same course as 3400)

TH 5413*
Dramatic Theory. Concepts of play construction and audience effects: classic, neoclassic, romantic, realist, to post-modern.

TH 5500*
Individual Theatre Projects. 1-3 credits, max 6. Prerequisite(s): Consent of instructor. Individual projects in directing, acting, or design and technology for a specified theatre production, with concept, realization, and self-evaluation under faculty guidance.

TH 5953*
Problems in Advanced Directing. Prerequisite(s): 4953, consent of instructor. Problems in directing period styles, especially Shakespeare. Restoration comedy, absurdist drama, and avant garde drama. Preparation, rehearsal and staging of a complete production by each student.

UNIVERSITY (UNIV)

UNIV 0023
Concepts of Algebra. Previous study in algebra is not assumed. Linear equations, laws of exponents, factoring, factoring applications, story problems, and substituting data into formulas. A comprehensive review of arithmetic procedures incorporated throughout the course. Students must complete the COMPASS test and score 45 or less to enroll in this course. *Does not count for college credit. Graded on a satisfactory-unsatisfactory basis.*

UNIV 0113
Developmental Science Process Skills. Study and investigate the natural world. Emphasis on critical thinking processes. Observation, classification, metric measurement, data table construction, graph construction, and interpretation. May be used to fulfill the science remediation requirement as established by State Regents policy. *Graded on a satisfactory-unsatisfactory basis.*

UNIV 0123
Intermediate Algebra. Prerequisite(s): One year of high school algebra or equivalent. In-depth coverage of applications of factoring, arithmetic operations with polynomial and rational algebraic expressions, review of laws of exponents (integers, fractions), simplifying radical expressions, equations (linear, radical, quadratic, rational), and graphing linear equations in two variables. Students must complete the COMPASS test before enrolling in this course. *Does not count for college credit but satisfies high school curricular deficiency in mathematics. Graded on a satisfactory-unsatisfactory basis.*

UNIV 0133
Basic Composition. Intensive instruction in sentence and paragraph structure, punctuation, grammar and word usage. Does not count for college credit but will satisfy high school curricular deficiency in English composition. *Graded on satisfactory-unsatisfactory basis.*

UNIV 0143
Improving College Reading Skills. Instruction to improve reading comprehension, vocabulary building, study and reference skills, and critical thinking. Does not count for college credit but will satisfy high school curricular deficiency in reading. *Graded on satisfactory-unsatisfactory basis.*

UNIV 1111
University Academic Services Freshman Orientation. Prerequisite(s): Beginning freshman standing in University Academic Services. Designed to help students ease the transition from high school to college; become aware of campus resources and administrative structures; explore various majors and careers; increase awareness of current issues in education; and enhance study skills and attitudes which can contribute to academic success.

UNIV 2001
Academic Assessment and Evaluation. Required for students in University Academic Assessment Program and available campus wide to students on academic probation. Identification of reasons for experiencing academic difficulty; assessment of reading ability and individual learning styles; understanding university policies and procedures and current issues in American education; development of goals, attitudes, and study skills needed to achieve academic success; and exploration of careers, majors, and alternative educational experiences.

UNIV 2510
Innovative Studies. 1-3 credits, max 6, Lab 0-6. May be used for not more than two semesters for new or experimental topics or techniques.

UNIV 2511
Introduction to Health Careers. An introduction to medical professions related to all areas of human and animal health. *Graded on pass-fail basis.*

UNIV 2910
Niblack Research Scholars. 1 credit, max 4, Lab 2. Prerequisite(s): Current recipient of the Niblack Research Scholar Award. Scientific research in a laboratory environment at an early stage of an academic career.

UNIV 3110
Directed Study. 1-18 credits, max 18. Prerequisite(s): Written application approved by instructor, the department head, and the dean of the student's college. Independent study, research, field work or internship. *Some sections will be graded on a pass-fail basis.*

UNIV 3511
Health Profession School Preparation. Prerequisite(s): Junior/senior pre-health students. This seminar targets the junior/senior pre-health professional primarily pre-medical, pre-dental, and pre-optometry. The seminar will provide the student with the necessary tools needed for the following to apply to their professional program: the application process; interview process, including a mock interview; composition of a personal statement; MCAT, DAT & OAT preparation; shadowing/ volunteer experience. *Graded on a pass-fail basis.*

VETERINARY BIOMEDICAL SCIENCES (VBSC)

VBSC 5000*
Masters Research and Thesis. 1-6 credits, max 6. Prerequisite(s): Graduate standing. Research problem for meeting requirements of the Masters degree.

VBSC 5010*
Professional Skills for Biomedical Sciences. 1-3 credits, max 3. Prerequisite(s): Graduate student standing; consent of instructor. Acquiring skills that are usually not taught in other courses but are essential to be successful in the graduate program as well as in a career in science. Writing and publishing a scientific paper, writing a successful grant proposal, preparing effective oral and poster presentations, and understanding professional ethics in the conduct of scientific research.

VBSC 5102*
Biochemical Toxicology. Prerequisite(s): Consent of instructor. In-depth overview of biochemical and molecular mechanisms of interactions between exogenous chemicals and living systems. Transport, distribution, elimination and alteration of exogenous chemicals within the body and mechanisms whereby exogenous chemicals disrupt biochemical processes critical for cell/organ/organismal integrity and function.

VBSC 5110*
Special Problems. 1-6 credits, max 20. Prerequisite(s): Graduate standing and consent of instructor. Special research problems in the various fields of veterinary biomedical sciences.

VBSC 5120*
Current Topics in Veterinary and Biomedical Science. 1 credit, max 4. Prerequisite(s): A minimum of one undergraduate introductory course in microbiology. Development of oral presentation skills, critical thinking and deductive reasoning through the use of discussion of current literature from the field of veterinary and biomedical science as it pertains to the study of infectious disease in humans and animals.

VBSC 5202*
Evaluation of Biomedical Research Data. Prerequisite(s): STAT 5013 or consent of instructor. Statistical analysis of biomedical data with emphasis on selection of appropriate biometrical procedures and interpretation of results rather than on computational aspects of procedures. Exploration of experimental design, data collection, and analysis within the context of biomedical investigation methodologies.

VBSC 5404*
Techniques in Parasitology. Lab 1. Prerequisite(s): Graduate standing and general parasitology; helminthology or concurrent enrollment. Experimental application of basic research and teaching techniques in helminthology and protozoology. Individual participation and analysis of experimental situations and techniques applicable to all areas of zoology.

VBSC 5554*
Bacterial Pathogenesis. Prerequisite(s): Undergraduate course in microbiology and consent of instructor. Survey of pathogenic mechanisms of bacteria and host response covering historic prospective; genetic organization of virulence; regulation of virulence factors; attachment, adhesion, an invasion; capsules and outer membrane proteins; intracellular parasitism; endotoxin; exotoxins; iron acquisition and host sequestration; antibiotic resistance mechanisms; innate immunity; acquired immunity; and evasion of host immunity. Lecture and discussion of directed reading of classic and current literature.

VBSC 5613*
Biology of Parasites. Prerequisite(s): Graduate standing, general parasitology, or consent of instructor. A systematic and ecologic approach to the study of parasitology. Host-parasite relationships, physiology, ecology and behavioral aspects of parasitic organisms.

VBSC 5723*
Parasitic Protozoa. Lab 3. Prerequisite(s): Graduate standing in zoology or entomology or consent of instructor. Structure, life cycle, physiology, host-parasite relationships, and diagnosis concerned with protozoan parasites.

VBSC 6000*
PhD Research and Thesis. 1-15 credits, max 45. Prerequisite(s): Graduate standing. Research problem for meeting requirements of the PhD degree.

VBSC 6110*
Seminar. 1-6 credits, max 6. Prerequisite(s): Graduate standing. Literature and research problems pertaining to veterinary biomedical sciences.

VBSC 6120*
Advanced Physiology of Selected Systems. 3-15 credits, max 15. Prerequisite(s): Graduate standing or consent of instructor. Advanced studies in gastrointestinal, cardiovascular, respiratory, excretory and neuroendocrine physiology. Each part of this sequential course may be taken for two hours credit. Student should ascertain the topics before registering for this course a second time.

VBSC 6200*
Topics in Advanced Pharmacology and Toxicology. 1-4 credits, max 4. Prerequisite(s): Consent of instructor. Selected topics in advanced pharmacology, including xenobiotic kinetics and dynamics.

VBSC 6201*
Xenobiotic Disposition. Prerequisite(s): Graduate standing and consent of instructor. Discussion of xenobiotic absorption, distribution, metabolism, and excretion. Analysis of xenobiotic concentration-time data using pharmacokinetic software.

VBSC 6203*
Advanced Concepts in Veterinary Immunology. Prerequisite(s): 5113 or BIOC 3653 or MICR 3254. Induction of immune responses, host defense mechanisms, immunoregulation, antigen presentation and immune recognition by B and T lymphocytes, using contemporary research publications.

VBSC 6213*
Advanced Toxicology. Prerequisite(s): Graduate standing, consent of instructor. An integrated systems-based approach to toxicology from molecular, cellular, organ, organismal, and ecological perspectives.

VBSC 6220*
Advanced Topics in Cell Biology. 1-5 credits, max 12. Prerequisite(s): Consent of instructor. Selected topics in cell biology including membrane traffic, cell signaling, ion transport, cytoskeleton, cell cycle, cell junctions, and adhesion.

VBSC 6233*
Laboratory in Electron Microscopy. Lab 12. Prerequisite(s): Consent of instructor. Student learns to prepare specimens for, and to operate, the electron microscope, and techniques for printing and preparation of electron micrographs for publication.

VBSC 6550*
Problems in Functional Morphology. 1-3 credits, max 3, Lab 3-9. Prerequisite(s): Consent of instructor. Investigations in comparative, gross, developmental or histologic morphology for graduate students.

VBSC 6560*
Advanced Pathology Techniques and Special Problems. 1-6 credits, max 6. Prerequisite(s): Graduate standing in biological sciences and consent of instructor. Investigations of contemporary techniques and methods used in diagnosis, technical work and research in pathology.

VBSC 6650*
Current Topics in Bacterial Pathogenesis. 1-10 credits, max 10. Prerequisite(s): VBSC 5552 or equivalent and consent of instructor. Selected mechanisms in bacterial pathogenesis and host response using recent literature, such as genetic organization of virulence; regulation of virulence factors; attachment, adhesion, and invasion; capsules and outer membrane proteins; intracellular parasitism; endotoxin; exotoxins; iron acquisition and host sequestration; antibiotic resistance mechanisms; innate immunity; acquired immunity; and evasion of host immunity on a rotating basis. Lecture and discussion of directed reading of current literature.

VBSC 6710*
Seminar in Veterinary Clinical Sciences. 1-3 credits, max 3. Prerequisite(s): Graduate standing in the College of Veterinary Medicine, or internship or residency training program in the Department of Veterinary Clinical Sciences. Literature and research of problems pertaining to veterinary clinical sciences.

VBSC 6712*
Advances in Veterinary Medicine I. Prerequisite(s): Graduate standing in the College of Veterinary Medicine, or internship or residency training program in the Department of Veterinary Clinical Sciences. Special problems course emphasizing organ system physiology, selected diagnostic and therapeutic topics, and requiring a publication-quality paper on an approved subject.

VBSC 6722*
Advances in Veterinary Medicine II. Prerequisite(s): Graduate standing in the College of Veterinary Medicine, or internship or residency training program in the Department of Veterinary Clinical Sciences. Special problems course emphasizing organ system physiology, selected diagnostic and therapeutic topics, and requiring a publication-quality paper on an approved subject.

VBSC 6910*
Veterinary Pathology Slide Conference. 1-2 credits, max 6. Prerequisite(s): Medical degree. Guided weekly exercises based on veterinary diagnostic microscopy.

VBSC 6920*
Diagnostic Pathology. 1-4 credits, max 4, Lab 3-9. Prerequisite(s): Graduate standing in the College of Veterinary Medicine or written consent of department head. Weekly review of current cases submitted to the department and the methods employed in diagnosis. Examination of necropsy reports, specimens, and preparations. Students required to formulate diagnoses.

VBSC 6930*
Comparative Anesthesiology. 1-3 credits, max 3. Prerequisite(s): Graduate standing in the College of Veterinary Medicine or consent of the head of the department. Anesthesiology of animals.

VBSC 6950*
Advanced Systemic Pathology. 2-4 credits, MS max 6, PhD max 12. Prerequisite(s): VMED 5264, graduate standing, consent of instructor. Total credit not to exceed six for the MS degree and 12 for the PhD Re-enrollment permits the study of two to four different groups of organs and systems of the animal body. A consideration of the pathogenesis and the morphological, biochemical, and comparative aspects of lesions found in organs and tissues of the domesticated animals.

VBSC 6960*
Current Topics in Veterinary Clinical Pathology. 1-3 credits, max 9. Prerequisite(s): DVM or equivalent, graduate standing and consent of instructor. Obtaining current knowledge and developing critical thinking and reasoning skills through seminars and discussions of current literature from the field of veterinary clinical pathology and general pathology.

VBSC 6963*
Advanced Clinical Pathology. Prerequisite(s): VMED 5362 or equivalent, graduate standing and consent of instructor. Applied clinical biochemistry, organ function tests and related cytologic examination.

VBSC 6973*
Advanced Hematology. Prerequisite(s): VMED 5362 or equivalent, graduate standing and consent of instructor. The etiology and pathogenesis of the diseases of the blood and bone marrow.

VETERINARY CLINICAL SCIENCES (VCS)

VCS 6900*
Clinical Problems and Investigation. 1-6 credits, max 6. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Diseases of animals.

VCS 7003
Elective I. Lab 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Students required to choose four electives. *Two of those electives on-campus. Two electives may be off-campus.*

VCS 7013
Elective II. Lab 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Students required to choose four electives. *Two of those electives on-campus. Two electives may be off-campus.*

VCS 7023
Elective III. Lab 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Students required to choose four electives. *Two of those electives on-campus. Two electives may be off-campus.*

VCS 7033
Elective IV. Lab 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Students required to choose four electives. *Two of those electives on-campus. Two electives may be off-campus.*

VCS 7700
Preceptorship Clinic. 1-8 credits, max 8. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Diagnosis, prognosis, prevention and treatment of diseases of animals presented in the preceptorship program. *Graded on a pass-fail basis.*

VCS 7703
Intensive Care Clinic. Lab 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Clinical rotation in small animal intensive care/critical and emergency medicine. *Letter graded.*

VCS 7710
Non-OSU Clinic. 1-8 credits, max 8. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Approved clinical rotations off the OSU campus. *Graded on a pass-fail basis.*

VCS 7713
Radiology Clinic. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Diagnostic radiography, ultrasound, and other special imaging modalities.

VCS 7720
Special Clinics. 3 credits. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine or graduate veterinarian. Special assignments for introductory clinical studies in the following: selected species clinic; herd-health program; necropsy, clinic pathology and parasitology; diagnostic laboratory; and special aspects of the basic sciences. *Graded on a pass-fail basis.*

VCS 7723
Equine Medicine Clinic. Lab 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Diagnosis, prognosis, treatment and prevention of equine medical diseases.

VCS 7730
Anesthesiology Clinic. 3 credits, max 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Management of clinical anesthesia in various domestic species.

VCS 7733
Community Practice. Lab 9. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Receiving and managing emergency and general medical and surgical cases in companion animals.

VCS 7743
Small Animal Internal Medicine. Lab 9. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Diagnosis, prognosis, treatment and prevention of companion animal medical diseases.

VCS 7753
Small Animal Surgery Clinic. Lab 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Diagnosis, prognosis, treatment, and prevention of companion animal surgical diseases.

VCS 7763
Food Animal Medicine Clinic. Lab 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Diagnosis, prognosis, treatment and prevention of diseases of food animal medical and surgical diseases.

VCS 7770
Large Animal Theriogenology Elective. 3-6 credits, max 6, Lab 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Management of breeding cattle and horses at the Center for Veterinary Health Sciences Ranch, including artificial insemination, treatment of infertility, periparturient management, and pediatrics.

VCS 7780
Zoological Medicine Clinical Elective. 3 credits, max 6, Lab 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Health maintenance, diagnosis and treatment of medical or surgical conditions in zoo, exotic pet and wildlife species.

VCS 7790
Clinical Pathology and Parasitology Elective. 3-6 credits, max 6, Lab 10. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Students will work with clinical pathology residents and laboratory personnel. Emphasis is placed on cytology,hematology, and parasitology. Each student will spend one week in each area. *Graded on a pass-fail basis.*

VCS 7793
Equine Surgery Clinic. Lab 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Diagnosis, prognosis, treatment, and prevention of equine surgical diseases.

VCS 7803
Clinic Pool. Lab 3. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Semi-elective clinical assignment. *Graded on a pass-fail basis.*

VCS 7912
Clinical Conference. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Presentation and discussion of selected clinical topics by fourth-year students, departmental faculty, and invited experts. *Letter graded.*

VETERINARY MEDICINE (VMED)

VMED 7110*
Veterinary Physiology I. 3-6 credits, max 6, Lab 15. Prerequisite(s): First-year standing in the College of Veterinary Medicine or consent of instructor. Molecular, cellular and organ system physiology. Establishing a base of knowledge and understanding requisite to subsequent courses.

VMED 7120*
Veterinary Physiology II. 3-6 credits, max 6, Lab 15. Prerequisite(s): First-year standing in the College of Veterinary Medicine or consent of instructor. Molecular, cellular and organ system physiology. Establishing a base of knowledge and understanding requisite to subsequent courses.

VMED 7123*
Veterinary Histology. Lab 45. Prerequisite(s): First-year standing in the College of Veterinary Medicine or consent of instructor. Organization and structure of cells and tissues of domestic animals.

VMED 7144*
Gross and Developmental Anatomy. Prerequisite(s): First-year standing in the College of Veterinary Medicine or consent of instructor. Embryology and anatomy of domestic mammals using the dog as the primary model. Integrated lecture-dissection-laboratory format. The integration of developmental gross, radiographic and applied aspects of veterinary anatomy as they relate to a topographical appreciation of the living individual. An overview of domestic bird and laboratory animal anatomy.

VMED 7152
Zootechnology. Prerequisite(s): First-year admission to College of Veterinary Medicine fall semester. Animal breeds and identification, animal production and marketing systems and animal handling and restraint as it applies to production and marketing.

VMED 7162
Jurisprudence and Ethics. Prerequisite(s): First-year standing in College of Veterinary Medicine. Introduction to veterinary jurisprudence, ethics, licensing, government regulations, human-animal bond, and evolving issues in animal law and animal welfare.

VMED 7223*
Veterinary Parasitology I. Lab 2. Prerequisite(s): First-year standing in the College of Veterinary Medicine or consent of instructor. Introduction to the general principles of parasitism and parasites of veterinary medical importance including taxonomy morphology, biology of parasites, modes of transmission, host-parasite relationships, infectious processes and pathogenicity, diagnostic methods, treatment and control measures and public health importance.

VMED 7230*
Veterinary Physiology III. 3-6 credits, max 6. Prerequisite(s): First-year standing in the College of Veterinary Medicine or consent of instructor. Molecular, cellular and organ system physiology. Establishing a base of knowledge and understanding requisite to subsequent courses.

VMED 7243*
Comparative Anatomy. Prerequisite(s): First year standing in the College of Veterinary Medicine or consent of instructor. Comparative and functional gross anatomy and developmental anatomy of domestic mammals. The integration of developmental, gross, radiographic, and applied clinical aspects of veterinary anatomy as they relate to a topographical appreciation of the living individual. Integrated lecture-dissection-laboratory format.

VMED 7250*
Veterinary Immunology. 3-4 credits, max 4, Lab 2. Prerequisite(s): First-year standing in College of Veterinary Medicine or consent of instructor. Basic principles of immunology and their application to veterinary medicine. Variable credits hours distributed among Veterinary Immunology, Infectious Diseases I and II not to exceed a total of 11 credit hours.

VMED 7264
General Pathology. Prerequisite(s): First-year standing in the College of Veterinary Medicine or consent of instructor. Cellular and tissue pathology, pigments, inflammation, immunopathology, disturbances of growth and circulation, and neoplasia. Functional disturbances that accompany changes in structures as well as the causes and pathogenesis of diseases.

VMED 7311
Introduction to Clinics I. Lab 2. Prerequisite(s): Second-year standing in College of Veterinary Medicine. Clinical orientation including rotations in instruction and service units in the College. *Graded on a pass-fail basis.*

VMED 7323*
Veterinary Parasitology II. Lab 2. Prerequisite(s): Second-year standing in the College of Veterinary Medicine or consent of instructor. Principles of diagnostic, treatment, control and prevention of animal diseases produced by arthropod, protozoan, rickettsial, and helminth parasites. A problem-based approach to parasitic diseases affecting the integumentary, respiratory, hemic-lymphatic, reproductive, urinary, nervous/sensory, musculoskeletal, and alimentary systems with emphasis on diseases of domestic animals.

VMED 7333*
Pharmacology I. Prerequisite(s): Second-year standing in the College of Veterinary Medicine or consent of instructor. Introduction of the principles of pharmacodynamics, drug disposition and pharmacokinetics. pharmacological effects, mechanisms of actions, metabolism, disposition, clinical indications and toxic effects of drugs acting on the autonomic, central nervous, cardiovascular, respiratory, and renal systems.

VMED 7342*
Clinical Anatomy. Lab 6. Prerequisite(s): Second-year standing in the College of Veterinary Medicine. Aspects of gross anatomy as they relate to clinical applications.

VMED 7350*
Infectious Diseases I. 3-4 credits, max 4, Lab 2. Prerequisite(s): Second-year standing in College of Veterinary Medicine or consent of instructor. Important animal diseases caused by bacteria, fungi and viruses covered on a systems basis. Mechanisms of infectious disease processes and the relationship of such processes to disease development, diagnosis, treatment and control. The relationship of zoonotic diseases to community and environmental health as well as important zoonoses. Variable credit hours distributed among Veterinary Immunology, Infectious Diseases I and II not to exceed a total of 11 credit hours.

VMED 7363*
Clinical Pathology. Lab 30. Prerequisite(s): Second-year standing in the College of Veterinary Medicine or graduate standing with consent of instructor. Basic concepts pertinent to data interpretation and laboratory methods used in evaluation of disease.

VMED 7412*
Anesthesiology. Lab 6. Prerequisite(s): second-year standing in the College of Veterinary Medicine. Application of the principles of veterinary anesthesiology to incorporate fundamental aspects of physiology and pharmacology in the anesthetic management of important domestic species.

VMED 7413*
Epidemiology, Food Safety and Public Health. Prerequisite(s): Second-year standing in the College of Veterinary Medicine or consent of instructor. Principles and uses of epidemiology in veterinary medicine. Introduction to public health and diseases transmissible to humans. Potential human health hazards in foods of animal origin and principles of safe food production, processing, handling, and inspection, including pathogen reduction, HACCP regulations, and pre-harvest food safety.

VMED 7432*
Pharmacology II. Prerequisite(s): Second-year standing in the College of Veterinary Medicine or consent of instructor. Continuation of 7333 that includes the mechanisms of action, disposition, adverse effects, and indications for groups of pharmacological agents used in veterinary medicine.

VMED 7443*
Diagnostic Imaging. Lab 13. Prerequisite(s): Second-year standing in the College of Veterinary Medicine. Radiographic theory, techniques, and interpretation. Introduction to alternate methods, including ultrasonography.

VMED 7450*
Infectious Diseases II. 3-4 credits, max 4, Lab 2. Prerequisite(s): Second year standing in the College of Veterinary Medicine. Continuation of Infectious Diseases I (VMED 7350). Variable credit hours distributed among Veterinary Immunology, Infectious Diseases I and II not to exceed a total of 11 credit hours.

VMED 7482*
Hemolymphatic and Oncology. Prerequisite(s): Second-year standing in the College of Veterinary Medicine. Pathogenesis, diagnosis, pathology, medical and surgical treatment, and prevention of diseases related primarily to the blood and lymphatic system (six-week module).

VMED 7501*
Ophthalmology. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Pathogenesis, diagnosis, medical and surgical treatment, and prevention of ophthalmic disease in small animal and equine patients.

VMED 7510*
Research Elective. 1-4 credits, max 8, Lab 30-90. Prerequisite(s): Second-or-third-year standing in the College of Veterinary Medicine. Participation in faculty-directed projects to enhance career development in veterinary biomedical research. Students participate in a process mimicking investigator-initiated research by developing a research proposal, participating in a competitive peer-review process, and reporting on completed research project. *Letter grade to be assigned.*

VMED 7512*
Laboratory Animal Medicine. Introductory course focusing on the biology and major diseases of commonly used laboratory animals.

VMED 7521*
Veterinary Practice Management. Prerequisite(s): Second-or third-year standing in College of Veterinary Medicine. Skills and background for success as an employee in private veterinary practice. Successful practice is defined in terms of the perceived value received in the delivery of veterinary medical services, doctor-client communication skills, and aesthetic quality of the environment in which services are delivered. Business management of private practice, personal finances, and personnel management.

VMED 7522*
Signs and Symptoms of the Small Animal Medical Diagnosis. Prerequisite(s): Second-or-third-year standing in the College of Veterinary Medicine. Introduction to clinical problem solving through application of a problem-oriented approach to clinical diagnosis. Discussion of major problems (clinical signs and symptoms) affecting animals, and the pathophysiology of each clinical sign, its differential diagnosis and symptomatic management. Review of key anatomical, pathological and immunological concepts learned in basic science courses.

VMED 7523*
Surgery. Lab 48. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Introduction to fundamental principles of surgery. Didactic material followed by surgical laboratories.

VMED 7531*
Avian Biology for Veterinarians. Prerequisite(s): Second- or third-year standing in the College of Veterinary Medicine. Topics in avian biology of value to veterinary students who will be treating birds in their practice or those planning to be active in raptor rehabilitation. Feather anatomy and molt; bill and claw anatomy; characteristics of the avian skeleton; weight saving adaptations; recondition atrophied flight muscles in raptors; anatomy of the digestive system; how birds breathe; avian aerodynamics; taste and olfaction in birds; reproductive biology; raptor natural history; identification, rehabilitation.

VMED 7532*
Molecular Genetics. Prerequisite(s): Second-or third-year or higher in good standing in the College of Veterinary Medicine. The expression, purification, characterization, and application of biological macromolecules in therapeutics and diagnostics relevant to animal health.

VMED 7533*
Toxicology. Lab 3. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Diagnosis and management of intoxications involving plant, chemical and biological toxins.

VMED 7542*
Clinical Endocrinology I. Prerequisite(s): Second or third-year standing in the College of Veterinary Medicine. Advanced medical endocrinology addressing diagnostic endocrinology and therapeutic endocrinology. Diagnostic endocrinology shall examine the physiological and medical basis for selecting provocative or non-provocative testing procedures as an adjunct to completing a definitive diagnosis. Therapeutic endocrinology involves the use of diagnostic endocrinology to evaluate the efficacy of medical treatment of endocrinopathies and the medical use of hormonal preparations to control animal physiology or endocrinology and non-endocrine diseases.

VMED 7562*
Avian and Exotic Pet Medicine. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Clinical diagnosis, management and treatment, prognosis, and prevention of diseases in avian and exotic pets. Introductory material provided to familiarize students with the species discussed and where clinically important; however, student understanding of the basic sciences required and assumed.

VMED 7563*
Musculoskeletal System. Lab 9. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Pathogenesis, diagnosis, pathology, medical and surgical treatment, and prevention of diseases related primarily to the musculoskeletal system.

VMED 7564*
Alimentary System. Lab 12. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Pathogenesis, diagnosis, pathology, medical and surgical treatment, and prevention of diseases related primarily to the alimentary system.

VMED 7571*
Introduction to Behavioral Medicine. Prerequisite(s): Second-or third-year standing in College of Veterinary Medicine. Introduction to behavioral veterinary medicine. Normal behavior of the dog and cat, basic procedures and methods for diagnosing and treating behavioral problems.

VMED 7583*
Dermatology and Endocrinology. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Pathogenesis, diagnosis, pathology, medical and surgical treatment, and prevention of diseases related primarily to skin and the endocrine system (nine-week module).

VMED 7610*
Basic Science Elective. 1-8 credits, max 8. Prerequisite(s): Second-or-third-year standing in the College of Veterinary Medicine. Problems in the basic sciences taught as lecture or lab.

VMED 7611*
Applied Pharmacology. Lab 7. Prerequisite(s): Second-or third-year standing in College of Veterinary Medicine. Criteria applicable to the rational selection of pharmacological agents used in the therapy of animal diseases, adverse reactions and interactions that may complicate therapy, and issues relevant to the ethical use of drugs and avoidance of residues in food products.

VMED 7612*
Clinical Neurology. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Pathogenesis, diagnosis, pathology, medical and surgical treatment and prevention of nervous system diseases.

VMED 7614*
Cardiopulmonary System. Lab 24. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Pathogenesis, diagnosis, pathology, medical and surgical treatment, and prevention of diseases related primarily to the cardiovascular and respiratory systems.

VMED 7620*
Clinical Science Elective. 1-8 credits, max 8. Prerequisite(s): Second-or-third-year standing in the College of Veterinary Medicine. Problems in the clinical sciences taught as lecture or lab.

VMED 7621*
Zoonotic Diseases. Prerequisite(s): Second or third year standing in the College of Veterinary Medicine or consent of instructor. Overview of zoonotic aspects of infectious diseases, including the transmission to man, incidence and prevalence, prevention and control strategies, assessment of risk, and governmental and regulatory aspects of these public health threats. Diseases of all veterinary species will be balanced according to various aspects of importance, east of transmission, incidence, and other current concepts.

VMED 7622*
Problem Solving in Internal Medicine. Prerequisite(s): Second-or-third-year standing in the College of Veterinary Medicine. Clinic cases that provide a review of basic pathophysiology.

VMED 7631*
History of Veterinary Medicine. Prerequisite(s): Second-or third-year standing in the College of Veterinary Medicine. History of the veterinary medical profession, especially in North America.

VMED 7632*
Exercise Physiology. Prerequisite(s): Second-or-third-year standing in the College of Veterinary Medicine. Current knowledge base pertaining to the acute and chronic adaptations to exercise in domestic animals and current techniques for the evaluation and correction of poor performance.

VMED 7651*
Equine Theriogeneology Laboratory. Lab 3. Prerequisite(s): Third year standing in the College of Veterinary Medicine. Introduction to palpation, ultrasonographic examination and breeding preparation of the mare reproductive tract.

VMED 7652*
Introduction to Clinics II. Lab 2. Prerequisite(s): Third year standing in the College of Veterinary Medicine. Rotations through instructional and service areas, including the Veterinary Teaching Hospital of the College of Veterinary Medicine. *Graded on a pass-fail basis.*

VMED 7661*
Infectious and Parasitic Diseases of Wild Animals. Lab 11. Prerequisite(s): Second-or-third-year standing in the College of Veterinary Medicine. Systematic approach to infectious and parasitic diseases affecting wild animals. Capture, restraint, and disease recognition in wild species, population management implications of disease diagnosis.

VMED 7662*
Urinary System. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Pathogenesis, diagnosis, pathology, medical and surgical treatment, and prevention of diseases related primarily to the urinary system (2.5 week module).

VMED 7671*
Clinical Endocrinology II. Prerequisite(s): Second or third year standing in the College of Veterinary Medicine. Advanced medical endocrinology, focusing on endocrine diseases associated with (1) dysfunction of the endocrine pancreas, (2) selected endocrineopathies of the reproductive system, and (3) therapeutic use of hormones to control reproductive activity of animals.

VMED 7672*
Swine Production and Diseases. Prerequisite(s): Second or third-year standing in the College of Veterinary Medicine. Problem-based course related to swine diseases and production systems.

VMED 7674*
Theriogenology. Lab 2. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Pathogenesis, diagnosis, pathology, medical and surgical treatment, and prevention of diseases related primarily to the reproductive system.

VMED 7681*
Advanced Neurology. Prerequisite(s): Second or third year standing in the College of Veterinary Medicine. Case based, problem oriented clinical diagnosis, management, treatment and prevention of small animal neurological diseases.

VMED 7682*
Small Ruminant Production, Management, Medicine and Surgery. Prerequisite(s): Second or third-year standing in the College of Veterinary Medicine. Production, management, medical and surgical diseases of sheep, goats, and llamas used for production and companion animals.

VMED 7691*
A Focus on Zoonotic Diseases. Prerequisite(s): Second or third year standing in the College of Veterinary Medicine or consent of instructor. Overview of zoonotic aspects of infectious diseases, including the transmission to man, incidence and prevalence, prevention and control strategies, assessment of risk, and governmental and regulatory aspects of these public health threats. Diseases of all veterinary species will be balanced according to various aspects of importance, ease of transmission, incidence, and other current concepts.

VMED 7701*
Small Animal Diagnostic Ultrasound. Lab 10. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. An introduction to diagnostic ultrasonography, basic physics of ultrasound production, transmission in tissues, image formation and common artifacts. Recognition of normal organs, organ function, and common diseases that can be diagnosed sonographically in small animals.

VMED 7702*
Whales and Dolphins. Prerequisite(s): Second- or third-year standing in the College of Veterinary Medicine. Review of functional morphology of whales, dolphins and porpoises. Families and species, evolution, skeleton, feeding, diving, reproduction, echoimaging, brain and special senses, thermoregulation, life histories, veterinary perspectives and human impact. Functional and comparative structural adaptations of cetaceans to the marine environment. Discussion of comparisons with terrestrial mammals.

VMED 7711*
Problem and Case Based Learning in Advanced Ophthalmology. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Case-based, problem-oriented discussions of small animal and equine ophthalmology cases. Key points in the case history, the significance of signalment in the diagnosis, clinical diagnosis, supportive diagnostic tests, and treatment. General discussion of the specific disease following the case discussion.

VMED 7731*
Advanced Small Animal Medicine I: Problem-based Learning. Lab 3. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Case-based problem oriented clinical diagnosis, management, treatment, and prevention of internal medicine diseases common to small animals. Small group format will meet one hour per week at a time determined by the individual groups.

VMED 7732*
Advanced Medical and Surgical Oncology. Lab 7. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Investigates cancer as the leading cause of death among dogs and cats. Diagnosis, staging and treatment of common malignancies in veterinary medicine. A systematic approach to the cancer patient while dispelling common misconceptions about cancer treatment and prognosis. Emphasis on fundamental skills, such as diagnostic evaluation of the cancer patient, principles of oncologic surgery, and critical evaluation of journal articles. Safe chemotherapy drug handling and biopsy techniques will be learned in a laboratory setting.

VMED 7741*
Bovine Theriogenology Laboratory. Lab 27. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Palpation techniques in cows. An elective restricted to students entering food animal practice.

VMED 7751*
Poultry Medicine and Diseases. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Poultry medicine and common diseases of poultry. Disease diagnosis based in clinical signs and lesions. Disease prevention and treatment. Application of diagnostic techniques through problem oriented case studies.

VMED 7752*
Applied Bovine Nutrition. Lab 14. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Applied nutrition of beef and dairy cows. Restricted to students that wish to enter food animal practice.

VMED 7771*
Advanced Equine Medicine I. Lab 3. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. An in-depth study of topics pertinent to equine practice. Supplemental information presented in core sources and critical analysis of current literature, pathophysiological concepts and case management issues.

VMED 7781
Professional Veterinary Medicine. Prerequisite(s): Third year standing in the College of Veterinary Medicine. A capstone course preparing third-year veterinary students for clinical training. Topics include: non-technical skills, knowledge, aptitudes, and attitudes; veterinary career opportunities in public practice, and preparation for the North American Veterinary Licensing Examination (NAVLE).

VMED 7801*
Business Management for Veterinary Practice. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. VMED 7521 recommended. Business and financial management of private veterinary practice.

VMED 7811*
Advanced Equine Medicine II. Lab 3. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. A continuation of 7771 presenting in-depth study of topics pertinent to equine practice. Supplemental information presented in core sources and critical analysis of current literature, pathophysiological concepts and case management issues.

VMED 7821*
Equine Radiology. Lab 12. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Diagnostic imaging (radiology, nuclear scintigraphy and ultrasound) of horses.

VMED 7822*
Food Animal Production Medicine. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Production animal agriculture and the veterinarian's present and future role in these enterprises. Cattle production is emphasized. Cycles of production, economics and health programs will be discussed. For students intending to enter mixed animal or exclusive food animal practices.

VMED 7831*
Advanced Small Animal Medicine II: Problem-based Learning. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Case-based, problem oriented clinical diagnosis, management, treatment, and prevention of internal medicine diseases common to small animals. Small group format will meet one hour weekly at a time determined by the individual groups.

VMED 7841*
Food Animal Surgery. Lab 9. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Detailed examination and review of commonly utilized local anesthetic techniques, injectable anesthetic techniques, and surgical procedures in food animal practice. Major topics include digital, mammary, gastrointestinal, and urethral surgery as well as cesarean section.

VMED 7842*
Special Surgical Problems and Techniques, Advanced Wound Management and Introduction to Reconstructive Surgery. Lab 9. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Principles of wound management and reconstructive surgery. Lecture and laboratory format.

VMED 7851*
Advanced Small Animal Neurology. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Elective course with in-depth discussion of diseases affecting the neuromuscular system of dogs and cats. For students intending to enter predominately small animal practice or small animal internships. Lecture and case discussion formats.

VMED 7861*
Cytology. Lab 10. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Case discussion and diagnosis by cytologic methods. Cases predominately small animals.

VMED 7871*
Advanced Equine Reproduction. Lab 3. Prerequisite(s): Third-year student in the veterinary medicine curriculum. The practical application of recent research in the breeding management, estrous cycle manipulation, and reproductive disease diagnosis and treatment of the mare. The stallion will be studied with respect to semen quality, endocrine-associated infertility, and breeding accidents and injuries.

VMED 7872*
Special Surgical Problems and Techniques, Advanced Small Animal Orthopedics and Neurosurgery. Lab 12. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Diagnosis and surgical management of small animal orthopedic and neurological diseases. Lecture and laboratory format.

VMED 7891*
Equine Surgical Laboratory. Lab 12. Prerequisite(s): Third-year standing in the College of Veterinary Medicine. Surgical techniques directly supervised by the instructor. Fundamental enclosed surgical techniques. Abdominal procedures on live animals. Orthopedic procedures on cadavoric limbs.

VMED 7933
Diagnostics. Lab 9. Prerequisite(s): Fourth-year standing in the College of Veterinary Medicine. Participation in animal necropsy, clinical pathology, clinical parasitology, and other investigative methods to study diagnosis, prognosis, prevention, and treatment of animals.

ZOOLOGY (ZOOL)

ZOOL 1604
(N)Animal Biology. Lab 2. Prerequisite(s): BIOL 1114. Morphology, physiology, ecology, embryological development behavior, life histories and importance to man of representatives of major groups. Evolution of systems and mechanisms which have allowed animals to survive and adapt to diverse habitats.

ZOOL 2104
Human Anatomy. Lab 3. Prerequisite(s): 1604, 3204. Gross anatomy of the human body and its systems based on comparisons with nonhuman mammals dissected in the laboratory. Minor emphasis on embryology and histology.

ZOOL 3104*
Invertebrate Zoology. Lab 4. Prerequisite(s): 1604. Morphology, physiology, reproduction and ecology of major invertebrate groups.

ZOOL 3113
(N)Human Evolution. An evolutionary perspective on human biology.

ZOOL 3114*
Vertebrate Morphology. Lab 3. Prerequisite(s): 1604. Comparative morphology of representative vertebrates with emphasis on phylogeny and ontogeny and consideration of histology and function.

ZOOL 3123
(N)Human Heredity. The impact of genetics on human endeavor. *No credit for students with prior credit in BIOL 3023.*

ZOOL 3153
Animal Behavior. Prerequisite(s): Junior standing. Survey of theory and application in basic and applied animal behavior. Interdisciplinary analysis of animal behavior in the field, captive settings and laboratories.

ZOOL 3204
Physiology. Lab 2. Prerequisite(s): BIOL 1114; CHEM 1215 or 1314. Anatomy and function of the human body. Human and domestic animal physiology considered in laboratories. *No credit for students with prior credit in 4215.*

ZOOL 3513
Principles of Conservation Biology. Prerequisite(s): 60 credit hours including BIOL 3034. Application of ecological principles to the maintenance and restoration of biological diversity at genetic, population, and community levels. (Same course as NREM 3513)

ZOOL 3700
Readings and Special Studies in Zoology. 1-3 credits, max 6. Prerequisite(s): ZOOL 1604 and consent of instructor. Discussion of selected readings.

ZOOL 4103*
General Parasitology. Lab 2. Prerequisite(s): ZOOL 1604; ZOOL 3104 recommended. Fundamentals of parasitism with emphasis on: life cycles, disease conditions, epidemiology, diagnosis, treatment, historical significance, terminology, taxonomy, and parasitological techniques.

ZOOL 4113
Conservation Genetics. Prerequisite(s): BIOL 3023 or equivalent, MATH 1513. Principles of population genetics as they pertain to issues in conservation biology. Evolutionary relationships, hybridization, natural selection, factors affecting small populations, gene flow, captive populations, and META populations. *No credit for students with credit in 5113.* (Same course as 5113*)

ZOOL 4115*
Biology of Fishes, Amphibians and Reptiles. Lab 5. Prerequisite(s): ZOOL 1604. Systematics, evolution, and natural history of fishes, amphibians and reptiles; laboratory emphasis on Oklahoma species. Offered spring semester of even-numbered years. *Weekend field trips required.*

ZOOL 4133*
Evolution. Prerequisite(s): BIOL 3023. Development of the evolutionary concept; speciation evolutionary mechanisms and phylogenetic concepts.

ZOOL 4134*
Embryology. Lab 2. Prerequisite(s): 3114, MICR 3033. Biochemical basis of development with emphasis on gene regulation. Comparative development of sea urchin, frog, chick and pig. Experiments using frog and mouse, including the molecular level.

ZOOL 4174*
Mammalogy. Lab 3. Prerequisite(s): 1604. Taxonomy, identification, evolution, zoogeography, life history traits, and techniques of study of wild mammals. *Weekend field trips required.*

ZOOL 4215*
Mammalian Physiology. Prerequisite(s): ZOOL 3204 and CHEM 3015 or CHEM 3053. Descriptive and functional analysis of the mammalian nervous, cardiovascular, musculoskeletal, respiratory, renal, endocrine, and digestive organ systems. *For majors in biological, agricultural, or human environmental (including pre-medical, pre-dental and pre-veterinary) sciences.*

ZOOL 4223*
Mammalian Physiology Laboratory. Lab 4. Prerequisite(s): 4215. Co-requisite: 4231. Laboratory experiments that illustrate function of organs, organ systems or mechanisms of whole body physiological control.

ZOOL 4231*
Seminar in Physiology. Prerequisite(s): 4215. Co-requisite: 4223. Oral and written communication in the physiological sciences; critical review of physiological literature.

ZOOL 4273
Environmental Physiology. Prerequisite(s): 3204 or 4215. Environmental, comparative and ecological physiology of nonhuman animals, with emphasis on vertebrates. Thermoregulation, osmoregulation, comparative aspects of respiratory, circulatory, digestive, muscle, and sensory physiology, and adaptations to extreme environments. *No credit for students with credit in 5273.* (Same course as 5273*)

ZOOL 4283
Endocrinology. Prerequisite(s): 3204 or 4215 and CHEM 3015 or consent of instructor. Examination of the hormonal control and regulation of physiological processes in vertebrates. Function of the hypothalamus, pituitary, adrenal, thyroid, pancreas, ovary and testes; comparative endocrinology. *No credit for students with credit in 5283.* (Same course as 5283*)

ZOOL 4293
Behavioral Neuroendocrinology. Prerequisite(s): 3204 or 4215. Examination of the influences of nervous and endocrine systems on behavior, and vice-versa, in vertebrates, including humans. Historical roots and current techniques relating to topics, including male and female reproductive behavior patterns, sex differences in behavior and neuroendocrine causation. No credit for students with credit in ZOOL 5293. (Same course as 5293*)

ZOOL 4303
Organismal Ecotoxicology. Prerequisite(s): BIOL 1114 or equivalent and CHEM 1215 or 1314 and junior standing. Comparative study of the major groups of environmental contaminants (e.g. heavy metals, PCB's, insecticides) and an introduction to the basic theories, principles and techniques associated with the study of contaminant fate and effects on organisms. (Same course as 5303)

ZOOL 4434*
Limnology. Lab 3. Prerequisite(s): BIOL 3034. Physical, chemical, and biological factors in lakes and streams.

ZOOL 4464*
Ornithology. Lab 3. Prerequisite(s): 1604. Classification, evolution, distribution, identification, life histories, and morphological, ecological, and behavioral adaptations of birds. *Two weekend field trips required.* (Same course as NREM 4464)

ZOOL 4483
Aquatic Entomology. Prerequisite(s): ENTO 2993 or ZOOL 1604. Biology, taxonomy and ecology of insects and other invertebrates inhabiting freshwater environments. Emphasis is placed on identification and biology of individual taxa. Roles of insects in aquatic ecology, as a forage base, and as indicators of biotic integrity of aquatic systems. Linkages between aquatic systems and terrestrial systems are also examined. No credit for students with credit in 5483 or ENTO 5483. (Same course as ENTO 4483)

ZOOL 4503
Genetics Laboratory Investigations. Lab 6. Prerequisite(s): Completion of BIOL 3023 with a minimum grade of "C" or consent of instructor. Laboratory course to complement BIOL 3023 General Genetics. Experiments on Mendelian, microbial, Drosophila, molecular and population genetics. Techniques including, Drosophila manipulations, DNA isolation, electrophoresis, PRC, DNA sequencing and analyses, cloning and biotechnology.

ZOOL 4533*
Zoo Biology and Management. Prerequisite(s): Four hours of zoology or biology. Conservation and propagation of endangered species, animal acquisition and transport, restraint, sanitation and animal health, exhibit planning and design, public relations, administration and research. Lectures by professional zoo staff members. Extension course taught at the Oklahoma City and Tulsa zoos.

ZOOL 4700
Undergraduate Research Problems. 1-4 credits, max 4. Prerequisite(s): Consent of instructor. Participation in faculty research or execution of a problem formulated by the student.

ZOOL 4710
Internships in Zoology. 1-3 credits, max 3. Prerequisite(s): Consent of instructor. Student participation in a research project during an intership in a Zoology-related professional work setting. *Graded on a pass-fail basis.*

ZOOL 4750
Honors Study in Zoology. 1-5 credits, max 5. Prerequisite(s): Honors Program participation. Individual study in the development of zoological concepts. Extensive reading, literature search and special experimentation. An individual problems course for the gifted student.

ZOOL 5000*
Research for Master's Thesis. 1-6 credits, max 6. Independent research for the MS thesis under the supervision of graduate faculty member.

ZOOL 5010*
Graduate Seminar. 1-3 credits, max 10. Discussion of selected topics.

ZOOL 5020*
Special Problems. 1-4 credits, max 10. Prerequisite(s): Graduate standing and consent of instructor. A report of results obtained is to be placed in department files.

ZOOL 5033*
Teaching Zoology. Prerequisite(s): Consent of instructor. Supervised teaching in the department. Attendance at seminar on problems involved in teaching zoology in college.

ZOOL 5112*
Advanced Herpetology. Selected advanced aspects of evolution, systematics, biogeography, natural history, physiology, husbandry, nutrition, ecology, behavior, and population biology of reptiles and amphibians as drawn from the primary literature.

ZOOL 5113*
Conservation Genetics. Prerequisite(s): Course in genetics strongly recommended. Theory and principles of population genetics as they pertain to issues in conservation biology. Evolutionary relationships, hybridization, natural selection, factors affecting small populations, gene flow, captive populations, META populations, and data analysis. *No credit for students with credit in 4113.* (Same course as 4113)

ZOOL 5123
Behavioral Ecology. Prerequisite(s): Course in ecology strongly recommended. Analysis and description of the behavior of animals in their natural environment, especially in terms of natural selection and adaptation. A synthesis of ethology, population genetics, sociobiology, and evolutionary theory. Largely descriptive and generalized with limited emphasis on mathematical theory.

ZOOL 5133*
Evolutionary Ecology. Lab 2. Prerequisite(s): Course in ecology strongly recommended. Ecological concepts dealing with contemporary evolutionary processes, not phylogeny. Life history traits, sociality, kin and group selection, speciation, competition, predation, plant-animal coevolution, niche theory, species diversity and biogeography. General models and mechanisms, with examples drawn from all kingdoms.

ZOOL 5173*
Advanced Mammalogy. Prerequisite(s): Course in mammalogy or vertebrate natural history recommended. Advanced aspects of mammalian biology including systematic, evolution, biogeography, ecology, and paleontology; with emphases on the primary literature. *A spring break field trip is required.*

ZOOL 5243*
Ecological Immunology. The causes and consequences of variation in immunity studies within the context of evolution and ecology. Introduction to grant writing. A combination of lectures and student-led presentations intended for graduate students and advanced undergraduates.

ZOOL 5273*
Environmental Physiology. Prerequisite(s): 3204 or 4215 or equivalent. Environmental, comparative and ecological physiology of nonhuman animals with emphasis on vertebrates. Thermoregulation, osmoregulation, comparative aspects of respiratory, circulatory, digestive, muscle, and sensory physiology, and adaptations to extreme environments. *No credit for students with credit in 4273.* (Same course as 4273)

ZOOL 5283*
Endocrinology. Prerequisite(s): 3204 or 4215 and CHEM 3015 or consent of instructor. Examination of the hormonal control and regulation of physiological processes in vertebrates. Function of the hypothalamus, pituitary, adrenal, thyroid, pancreas, ovary and testes; comparative endocrinology. *No credit for students with credit in 4283.* (Same course as 4283)

ZOOL 5293*
Behavioral Neuroendocrinology. Prerequisite(s): 3204 or 4215. Examination of the influences of nervous and endocrine systems on behavior and vice-versa, in vertebrates including humans. Historical roots and current techniques relating to topics, including male and female reproductive behavior patterns, sex differences in behavior and neuroendocrine causation. *No credit for students with credit in 4293.* (Same course as 4293)

ZOOL 5303*
Organismal Ecotoxicology. Comparative study of the major groups of environmental contaminants (e.g. heavy metals, PCB's, insecticides) and an introduction to the basic theories, principles and techniques associated with the study of contaminant fate and effects on organisms. (Same course as 4303)

ZOOL 5343*
Population and Community Ecotoxicology. Prerequisite(s): Course in ecology strongly recommended. Examines the exposure of animals to environmental contaminants and resulting effects at the individual through community level. The dynamic nature of exposure to contaminants will be of particular interest in this course. For example, how do the natural history traits of a species either protect it from exposure, or enhance its potential for exposure to contaminants? Topics will range from the historical perspectives to ecotoxicology to study design and risk assessment.

ZOOL 5423*
Techniques in Environmental Toxicology. Lab 4. Prerequisite(s): Organic chemistry or instructor consent. Practical understanding of modern techniques used to quantify exposure and effects of environmental toxicants. Laboratory topics include gas chromatography, HPLC, atomic absorption spectroscopy, immunoassay, and toxicity testing.

ZOOL 5483*
Aquatic Entomology. Prerequisite(s): ENTO 2993 or ZOOL 1604. Biology, taxonomy and ecology of insects and other invertebrates inhabiting freshwater environments. Emphasis is placed on identification and biology of individual taxa. Roles of insects in aquatic ecology, as a forage base, and as indicators of biotic integrity of aquatic systems. Linkages between aquatic systems and terrestrial systems are also examined. No credit for students with credit in 4483 or ENTO 4483. (Same course as ENTO 5483)

ZOOL 5523*
Population Ecology. Lab 2.5. Prerequisite(s): BIOL 3034, MATH 1513. Theory and principles of predicting and analyzing population abundance and dynamics. Life history theory, foraging theory, habitat selection, population genetics, and species interactions. (Same course as NREM 5523)

ZOOL 5603*
Elements in Integrative Biology. Prerequisite(s): Courses in biology and chemistry. Explores eco-evolutionary processes using the most fundamental currency-atoms of various biogenic elements. Such elemental thought enables integration of several key eco-evolutionary processes operating at various levels of organization (e.g. gene expression, cellular metabolism, foraging behavior, life-history) without any phylogenetic boundaries. This view of biology helps build theory that can describe the functioning and evolution of biological systems.

ZOOL 5623*
Ecological Data and Alternative Hypotheses. Prerequisite(s): Course in statistics strongly recommended. Emphasizes statistical analyses that start with a set of plausible alternative hypotheses and use likelihoods to quantify the relative support the hypotheses receive from empirical data. Instruction will be done with lectures, computer lab exercises, and in-class presentations.

ZOOL 6000*
Research for PhD Dissertation. 1-15 credits, max 60. Independent research for the PhD dissertation under the supervision of a graduate faculty member.

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