Graduate Credit for Undergraduate Courses

400-level courses in nuclear engineering may be used for graduate credit. However, at least two-thirds of the minimum required hours in the MS must be taken in courses numbered 500 or above.

MASTER OF SCIENCE
NUCLEAR ENGINEERING MAJOR

A graduate program leading to the Master of Science degree is available to graduates of recognized undergraduate curricula as described above. Each applicant will be advised as to the necessary prerequisite courses before he/she enters the program.

Requirements

The minimum requirements for the MS in nuclear engineering are:

- A major consisting of 12 hours of graduate courses in nuclear engineering which must include at least one of the following sequences – 511, 512; 521, 522; 551, 552; 571, 572; 581, 582.
- A minor consisting of 6 hours of elective courses in mathematics, statistics, or another field related to nuclear engineering.
- 6 hours in either nuclear engineering or a related field.
- One of the following four options for a culminating experience.
  - Option 1 – a thesis project (6 hours of 500).
  - Option 2 – two to four engineering practice projects (6 hours of 598).
  - Option 3 – one engineering practice project (3 hours of 598) plus 6 hours of additional nuclear engineering coursework.
  - Option 4 – nine hours of additional nuclear engineering coursework and a comprehensive written exam on all coursework prepared by the student’s graduate committee (i.e., no thesis or engineering practice project).

Options 1 and 2 result in a minimum total of 30 hours and Options 3 and 4 result in a minimum total of 33 hours. The determination of which option a student may undertake is made by the student’s graduate committee and is based on the student’s personal interests, academic background, and work experience, as well as the nature of projects currently available in the department.

A thesis project requires the student to conduct independent, in-depth research. An engineering practice project is similar to a thesis project but smaller in scope and can be research, design, product development, special operations, or a critical review of published literature in a specific technical area. The student must submit a brief written proposal for each project undertaken, either thesis or engineering practice, which must be approved by the student’s graduate committee. The final report for an engineering practice project is normally prepared in thesis format (i.e., according to the Graduate School, Guide to the Preparation of Theses and Dissertations); however, another formal report format may be used if approved by the student’s graduate committee.

The student must also register for the appropriate number of hours of either 500 or 598, as specified by the student’s major professor, during each semester that work is performed on a thesis or engineering practice project. Finally, the student must pass an oral examination on all work presented for the degree (all coursework and all projects).

The MS with a major in nuclear engineering is also available to distance students via selected courses that are delivered synchronously over the Web to the student’s computer. More detailed information about this distance program is located at http://www.anywhere.tennessee.edu/ne/default.htm.

DUAL MS-MBA

The College of Business Administration and the College of Engineering offer an integrated program in product development and manufacturing leading to the conferral of the Master of Business Administration degree and the Master of Science degree with a major in nuclear engineering. The establishment of the dual program addresses the critical need for personnel trained in both engineering and management who can integrate an increasingly complex body of knowledge for rapid introduction of new products to the marketplace. The objective of the dual degree program is to prepare graduates to take a leading management role in companies that must react quickly to a dynamic market where forces of competition require rapid changes in design and manufacturing and a short product development cycle.

Admission

Applications are accepted for fall semester only. Applicants for the MS-MBA program must make separate application to, and be competitively and independently accepted by the Office of Graduate and International Admissions for the Master of Business Administration program and the Master of Science program with a major in nuclear engineering, and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on their application the intent to pursue the dual MS-MBA program and the appropriate engineering major (refer to the MBA program for separate instructions). Students accepted for both the MBA and the MS with a major in nuclear engineering will be assigned to a Dual Program Committee advisor (a faculty member in nuclear engineering) who will be responsible for course approval and overall supervision of the students’ progress through the dual program.

Applications by United States citizens and permanent residents received after the MBA application deadline (March 1) will be considered as space allows. Additional information is required and different application dates are established by the Office of Graduate and International Admissions for international students.

Requirements

All engineering students enrolled in the product development and manufacturing program must complete common coursework designed to provide them with an integrated, multidisciplinary teamwork experience. The MBA curriculum in product development and manufacturing consists of 33 hours of common coursework in the College of Business Administration and 15 hours of common coursework in the College of Engineering. Engineering common coursework includes a culminating 3-hour integrated project course requiring a comprehensive report, and a final examination as required by the Dual Program Committee, to be taken during the first session of summer following the second year.

During the second year, dual degree candidates will also take courses in their engineering major. The coursework is designed to provide students with a concentration in their major and advanced skills to accomplish their teamwork assignments. Dual degree candidates enrolled in nuclear engineering are required to take 18 hours of graduate-level nuclear engineering courses during the second year of the program, which must be approved by the student’s Dual Program Committee Advisor. In addition, a dual degree candidate who majors in nuclear engineering must successfully defend, in an oral examination administered by at least three nuclear engineering faculty members, including the student’s Dual Program Committee Advisor, all work presented for the MS degree (all coursework and the culminating integrated project).
Nuclear Engineering Major

August – First Year
Business Administration 511 MBA Core I ................................. .3

Fall – First Year
Business Administration 512 MBA Core II ............................... 15
Mechanical Engineering 504 Product Development Process .............. 1

Spring
Business Administration 513 MBA Core III ............................... 9
Mechanical Engineering 506 Product Selection and Evaluation ........... 2

Summer
– Internship ............................................................................. –
Nuclear Engineering 509 Project Management ....................... 1

Fall – Second Year
Nuclear Engineering 509 Project Management ....................... 1
– Nuclear Engineering Courses .............................................. 9

Spring
– MBA Hub Course Elective .................................................. 3
Nuclear Engineering 509 Project Management ....................... 1
– Nuclear Engineering Courses .............................................. 9

Summer (first session)
Nuclear Engineering 594 Culminating Integrated Project Report ....... 3

Total 60

The dual degree candidate must satisfy the curriculum and graduation requirements of the engineering major being pursued and the College of Business Administration. Students withdrawing from the dual degree program before completing both degrees will not receive credit toward graduation in either degree program for courses taken in the other degree program, except as such courses qualify for credit without regard to the dual degree program. The MS and the MBA will be awarded upon successful completion of the requirements of the dual program.

DOCTOR OF PHILOSOPHY

NUCLEAR ENGINEERING MAJOR

Students in the field of nuclear engineering desiring to study for the Doctor of Philosophy degree must have a Bachelor of Science or Master of Science from a recognized university with a major in engineering, physics, chemistry, or mathematics. All candidates will be required to demonstrate general competence in a comprehensive examination in the areas of engineering science, mathematics, chemistry, physics, and nuclear engineering.

Requirements

Specific requirements for the PhD with a major in nuclear engineering include the following:

• A minimum of 48 hours beyond the bachelor’s degree, exclusive of credit for the MS thesis or nuclear engineering practice.
• A minimum of 24 hours in doctoral research, Nuclear Engineering 600.
• A minimum of 30 hours in nuclear engineering courses numbered 500 and above (or the equivalent), with at least 9 hours of 600-level courses. These are exclusive of thesis or dissertation credit. Three of the 9 hours of 600-level courses can be from a department other than nuclear engineering, provided the selection supports the student’s research area.
• A minimum of 12 hours in mathematics, statistics or other courses related to nuclear engineering beyond nuclear engineering undergraduate requirements numbered 400 or above.
• A minimum of 6 hours in courses numbered 500 or above from a department other than nuclear engineering. The choice depends on the student’s overall program and should expand his/her knowledge in a given field.

The first part of the comprehensive examination is prepared by the nuclear engineering faculty and consists of 6 hours of written examination that is administered over a two-day period. All past written examinations are filed in the library and students are encouraged to review them. Students are invited to take the written examination after completing approximately 30 hours of graduate coursework. A student who fails the written examination must take and pass the examination the next time it is offered to remain in the PhD program. Registration for 600 is not permitted until the written examination is passed. The second part of the comprehensive examination is completed with the successful oral defense of a written dissertation proposal.

A candidate must successfully defend, in an oral examination, all work presented for the degree (all coursework and the dissertation).

GRADUATE CERTIFICATE IN NUCLEAR CRITICALITY SAFETY

The Department of Nuclear Engineering offers a graduate certificate in nuclear criticality safety. The program is designed primarily for part-time students. All of the courses are available through distance education (see http://www.anywhere.tennessee.edu/ne/default.htm).

The 12-hour certificate is earned by completing 421, 543, and 582 plus one of the following three courses: 470, 571, or 581.

The selection of one of the latter three courses is determined through an advising conference with each individual student and is based on the student’s personal interests, academic background, and work experience. Applicants must meet the minimum criteria established by the Graduate Council. Students without a nuclear engineering background must take Nuclear Engineering 301 prior to beginning the graduate coursework described above.
College of Law

John Sobieski, Jr., Interim Dean
Douglas A. Blaze, Interim Associate Dean for Academic Affairs

http://www.law.utk.edu/

Professors

Best, R., MLS .................................................. Florida
Blaze, D.A., JD ........................................... Georgetown
Blitt, R.C., LLM ........................................... University of Toronto
Cook, J.G., LLM ............................................ Yale
Davies, T.Y., JD ............................................. Northwestern
Hess, A.M., JD ............................................. Virginia
King, J.H., JD ............................................... Pennsylvania
Leatherman, D.A., LLM .................. New York
Lloyd, R.M., JD ............................................ Michigan
Picquet, C., MSLS ..................................... Tennessee
Pierce, C.A., JD ............................................. Yale
Plank, T.E., JD ............................................. Maryland
Reynolds, G.H., JD ..................................... Yale
Rivkin, D.H., JD ......................................... Vanderbilt
Sobieski, Jr., J.L., JD ............................. Michigan
Stein, G.M., JD ........................................... Columbia
Stephens, O.H., JD ................................. Tennessee

Associate Professors

Aarons, D., JD ............................................... UCLA
Anderson, G.L., LLM .................. Harvard
Barton, B.H., JD .......................................... Michigan
Beintema, W.J., JD .......................... Miami
Black, Jr., J.P., JD ................................. Vanderbilt
Cornett, J.M., JD ......................................... Tennessee
Goodwin, I.J., JD .......................................... New York
Heminway, J.M., JD ......................... New York
Hendricks, J.S., JD ............................... Harvard
Hirsch, J.M., JD .......................................... New York
Jacobs, B.L., JD .......................................... Georgia
Kennedy, Deserenee A., LLM ........... Temple
Kuney, G.W., JD ......................................... California (Hastings)
Parker, C.M., JD .......................................... Illinois
Price, L., MLSLS ........................................ Tennessee
Pulsinelli, G.A., JD............................. California (Boalt Hall)
Quinn, M.C., LLM ..................... Georgetown
White, P.J., LLM ....................................... Georgetown
Williams, P.J., JD ................................. New York

Assistant Professors

Cochran, C.R., MS .................................... Tennessee
Collins, C.M., MS ................................. Tennessee
Marshall, S.D., JD ................................. Loyola

MAJOR

DEGREES

Law JD

JD-MBA, JD-MPA

Advocacy and dispute resolution concentration
Business transactions concentrations

The University of Tennessee College of Law commenced operation in 1890 and has continuously sought to provide high-quality legal education in a university community.

The principal objective of the college is to prepare students for the practice of law. The college teaches the analytical skills needed to interpret cases and statutes, the ability to communicate effectively, an awareness of the historical growth of the law, a knowledgeable appreciation of the interrelationship of law and society, and the ability to use law as an implement of social change and development. Students are thus equipped to serve their communities not only as advocates and counselors, but as policy makers and active, responsible citizens.

The program of the college has three dimensions -- teaching and learning, research into and appraisal of our legal systems and institutions, and service to the community. Each plays a significant role in the college as a modern law center.

The teaching and learning element of legal education at the college involves a co-operative classroom interaction between faculty and students in the analytical study of a host of questions and problems found in today's legal profession. These involve decisional law, statutory interpretation, administrative regulation, techniques of trial and appellate advocacy, and the roles and responsibilities of the lawyer in advising and representing clients.

The college is also directly involved in providing service to the community. A major element of public service is centered in the Legal Clinic where students, under the guidance of skilled and experienced licensed practitioners, provide legal services to clients. Additionally, through research, consultation, and other services to legal institutions and groups within the state, the college seeks to participate in the development and improvement of the society in which its students may eventually practice law.

In combination, the direction and objectives of the college lead to the development not of a narrow technician, but of a student of the law with the perspective, breadth, and understanding necessary to accomplish the many tasks assigned by society to the legal profession.
Graduate Programs
The College of Law offers the Doctor of Jurisprudence degree program; a dual degree program with the College of Business Administration leading to the JD and the Master of Business Administration degree; and a dual degree program with the Department of Political Science, College of Arts and Sciences, leading to the JD and Master of Public Administration. In addition, graduate students may be eligible to take a limited number of law courses to count toward a graduate degree.

Current information regarding admission, financial aid, course requirements, academic policies, extracurricular activities, and student services is available from the Admissions Office, The University of Tennessee College of Law, 1505 West Cumberland Avenue, Knoxville, Tennessee 37996-1810 and at the college’s Web page www.law.utk.edu. Completed application should be received before February 1 of the year of requested admission.

DOCTOR OF JURISPRUDENCE
The Doctor of Jurisprudence degree will be conferred upon candidates who complete, with the required average, six semesters of resident law study and who have 89 hours of credit, excluding all required courses. Of the required 89 hours of credit, no more than 18 hours of credit may be earned in any combination of the following courses – 947, 993, 994, 995, 996, or 997. The required average is 2.00 and that average must be maintained on the work of all six semesters and also for the combined work of the grading periods in which the last 28 hours taken in residence were earned. Averages are computed on weighted grades. Grades are awarded on a numerical scale (in increments of 0.10) from 0.00 to 4.30. No credit toward the JD degree is awarded for grades of 0.00 to 0.70.

Eligible law students may receive up to 6 hours of credit toward the JD for acceptable performance (a grade of B or higher) in upper-level courses that materially contribute to the study of law and which are taken in other departments at the University of Tennessee, Knoxville. Course selection and registration are subject to guidelines approved by the law faculty which include the requirement that any such course be acceptable for credit toward a graduate degree in the department offering the course.

Refer to the Law Catalog and Student Handbook for current degree requirements.

CONCENTRATION IN ADVOCACY AND DISPUTE RESOLUTION
Students interested in a concentration in advocacy and dispute resolution must complete the following courses
Second Year Fall Semester – 813, 920.
Third Year (one of the following) – 905, 908 and 914 or 947.
During the second and third year, any combination totaling 12 hours from the following courses – 821, 855, 877, 915, 918, 919, 921, 922, 923, 927, 990*, 991*, (Only if approved by the Dean or Dean’s designee as satisfying the requirements of the concentration.)

Students electing a concentration in advocacy and dispute resolution may not take any of the above courses on an S/NC basis.

CONCENTRATION IN BUSINESS TRANSACTIONS
Students interested in a concentration in business transactions must complete all of the following law courses.
818 Fundamental Concepts of Income Taxation
826 Introduction to Business Transactions*
827 Business Associations
972 Income Taxation of Business Organizations
940 Land Finance Law
840 Commercial Law
842 Contract Drafting Seminar

Students electing a concentration in business transactions may not take any of the above courses on an S/NC basis except 826.

*This course is not required for students who have an undergraduate major in accounting, finance, or business administration, who hold the MBA, or who are enrolled in the dual JD-MBA program. Waivers may also be granted to students who have acquired the requisite business knowledge through other coursework or through practical experience.

DUAL JD-MBA PROGRAM
The College of Business Administration and the College of Law offer a coordinated dual program leading to the conferral of both the Doctor of Jurisprudence and the Master of Business Administration.

The establishment of the dual program recognizes the increasingly complex body of knowledge necessary to the creative conduct of business and business-related law practice, the complementary nature of many aspects of the graduate programs of the College of Law and the College of Business Administration, and the intellectual benefits inherent in the concurrent study of both business and business-related law. The program is designed to accommodate the interests of students who (a) contemplate a career in public service and want to acquire the skills and perspective of the lawyer and the business-oriented manager; (b) contemplate a career in business management and want to acquire the skills and perspective of a lawyer; or (c) contemplate a career as a lawyer specializing in business-related law and want to acquire the skills and perspective of the business-oriented manager.

Admission
Applicants for the JD-MBA program must make separate application to, and be competitively and independently accepted by, the College of Law for the JD, the Office of Graduate and International Admissions and College of Business Administration for the MBA degree, and by the Dual Program Committee.

Students who have been accepted by both colleges may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both colleges. Such approval will be granted, provided that dual program studies are started prior to entry into the last 28 hours of JD coursework and prior to the third semester of the MBA program. Students interested in entering the dual degree program should submit a letter of application to the Dual Program Committee. Upon receipt of the application, the Dual Program Committee will determine eligibility and assign students to advisors who will be responsible for course approval and supervision of the student’s progress through the dual program.

Requirements
A dual program candidate must satisfy the graduation requirements of each college. Students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses qualify for credit without regard to the dual program.

The College of Law will award up to 9 hours of credit toward the JD for acceptable performance in approved graduate-level courses offered by the College of Business Administration. The College of Business Administration will award up to 6 hours of credit toward the MBA for acceptable performance in approved courses offered in the College of Law. The approval of courses is the responsibility of the Dual Program Committee and the student’s assigned advisor.

Students may begin their studies in either the JD or the MBA program, but may not enroll in MBA coursework while completing
the first year of the law curriculum and may not enroll in JD coursework while completing the first year of the business curriculum. During the first year in the JD program, students register through the College of Law. During the first year in the MBA program, students register as graduate students. After the first two years, any term in which students take law courses or a mixture of law and graduate courses, they are classified and registered as law students. If taking only graduate courses, they are classified and registered as graduate students.

Approved Dual Credit
MBA courses in which the student has earned a B grade or higher and are to be counted toward the JD program must include 9 hours approved by the College of Law. The 6 hours of law courses in which the student has earned a 2.30 or C+ grade or higher and are to be counted toward the MBA must be selected from those approved by the Assistant Dean of the MBA Program.

DUAL JD-MPA PROGRAM
The College of Law and the Department of Political Science in the College of Arts and Sciences offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and Master of Public Administration degrees. In this program, a student may earn the MPA and JD in about four years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to be enrolled in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission
Applicants for the JD-MPA program must make separate application to, and be independently accepted by, the College of Law for the JD and the Department of Political Science and the Office of Graduate and International Admissions for the MPA. Applicants must also be accepted by the Dual Degree Committee. All applicants must submit a Law School Admission Test (LSAT) score. An applicant's LSAT score may be substituted for the Graduate Record Examination (GRE) score, which is normally required for admission to the MPA program. Application may be made prior to or after matriculation in either the JD or the MPA program, but application to the dual program must be made prior to entry into the last 29 hours required for the JD and prior to entry into the last 15 hours required for the MPA.

Requirements
A dual degree candidate must satisfy the requirements for both the JD and the MPA, as well as the requirements for the dual program. The College of Law will award a maximum of 9 hours of credit toward the JD for successful completion of approved graduate level courses (500 or 600 level) offered in the Department of Political Science. The MPA program will award a maximum of 9 hours of credit toward the MPA for successful completion of approved courses offered in the College of Law. All courses for which such cross-credit is awarded must be approved by the JD-MPA coordinators in the College of Law and the Department of Political Science. All candidates for the dual degree must successfully complete Administrative Law (Law 821). An internship is strongly recommended for students in the dual degree program, as it is for all MPA candidates, but an internship is not required.

During the first two years in the dual program, students will spend one academic year completing the required first year of the College of Law curriculum and one academic year taking courses solely in the MPA program. During those first two years, students may not take courses in the opposite area without the approval of the JD-MPA coordinators in both academic units. In the third and fourth years, students are strongly encouraged to take both law and political science courses each semester.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward either the JD or the MPA for courses taken in the other program except as such courses qualify for credit without regard to the dual program.

Awarding of Grades
For grade recording purposes in the College of Law and the Department of Political Science, grades awarded in courses in the other unit will be converted to either Satisfactory/No Credit and will not be computed in determining a student's GPA or class standing. The College of Law will award a grade of Satisfactory for an approved MPA course in which the student earns a grade of B or higher and a grade of No Credit for any lower grade. The Political Science Department will award a grade of Satisfactory for an approved law course in which the student earns a grade of C+ or higher and a grade of No Credit for any lower grade. The official academic record of the student maintained by the Office of the University Registrar shall show the actual grade assigned by the instructor without conversion.

Policy for Graduate Students Taking Law Courses
Students pursuing a graduate degree in another college may, upon approval of the College of Law and the major chairperson, take up to 6 hours of law courses and receive credit toward the graduate degree. The graduate student must register for the law course during regular registration at the College of Law requesting an S/NC grade only. If a C or above is earned in a law course, an S will be recorded on the transcript. If a student earns below a C, an NC will be recorded, and the course cannot be used toward meeting degree requirements. Grades for law courses will not be reflected in the cumulative average. Law courses may be taken for credit only by students enrolled in a graduate degree program.

Different rules apply to the student enrolled in the Dual JD-MBA or JD-MPA Programs. Grades must be earned according to the grading system of the respective college, e.g. numerical grades for law courses, letter grades for graduate courses. Refer to section on Grades for the grading scale acceptable toward meeting degree requirements. Cumulative GPA for law courses only will be carried until graduation, at which time both the graduate and the law cumulatives will be shown on the permanent record.
College of Nursing
Joan Creasia, Dean
Jan L. Lee, Associate Dean for Academic Affairs
Kenneth Phillips, Associate Dean for Research
Sandra McGuire, Chair of Master’s Program
Sandra P. Thomas, Chair of Doctoral Program

http://nightingale.con.utk.edu

The College of Nursing was established in July 1971. The master’s program was initiated in 1976 and approval for the doctoral program was granted in 1988. For more information, contact the Director of MSN or PhD Program, The University of Tennessee, College of Nursing, 1200 Volunteer Boulevard, Knoxville, Tennessee 37996-4180; (865) 974-4151.

Facilities for research and service include the Center for Nursing Practice and the Center for Nursing Research.

MASTER OF SCIENCE IN NURSING

NURSING MAJOR

The College of Nursing program is accredited by the Collegiate Commission on Nursing Education that may be contacted at One Dupont Circle NW, Ste 530, Washington, DC 20036-1120, 1-202-887-6791, and is unconditionally approved by the Tennessee Board of Nursing.

The purpose of the master’s program in nursing is to prepare leaders, managers, and practitioners who facilitate achievement of optimal health in the dynamic health care system. The program prepares advanced practice nurses for a career in adult health nursing, nursing of women and children, mental health nursing, and nurse anesthesia as well as role preparation as nurse practitioners, clinical nurse specialists or nursing administrators. Advanced practice nursing involves the delivery of care, management of resources, interdisciplinary collaboration, and application of technology, information systems, knowledge, and critical thinking.

MAJOR

Nursing

Adult health nursing concentration
Family nurse practitioner concentration
Homeland security nursing concentration
Mental health nursing concentration
Nurse anesthesia concentration
Nursing administration concentration
Nursing of women and children concentration

DEGREES

MSN

Graduate Certificate Programs
Adult Health Nursing
Family Nurse Practitioner
Homeland Security Nursing
Homeland Security Studies
Mental Health Nursing
Nurse Anesthesia
Nursing Administration
Nursing Education
Nursing of Women and Children

http://nightingale.con.utk.edu
Graduates of the program are expected to
• Provide advanced nursing care in a variety of health care settings.
• Utilize theoretical knowledge to guide advanced practice nursing.
• Collaborate in research activities and utilize knowledge gained from research in advanced practice nursing.
• Evaluate health policies and economics related to delivery of health care.
• Assume roles as leaders and collaborators with other professionals and communities in planning, providing, and evaluating health care.

Admission
• Meet requirements for admission to graduate study.
• Achieve a competitive score on the combined verbal and quantitative portions of the Graduate Record Exam.
• Achieve a TOEFL score of at least 550 on the paper test, 213 on the computer-based test, or 80 on the Internet-based Test if native language is not English.
• Applicants for nurse anesthesia require an interview.
• Hold a bachelor’s degree in nursing (Bachelor of Science in Nursing) from an accredited program.
  a. Hold or be eligible for licensure to practice nursing in Tennessee.
  b. Have an undergraduate GPA of 3.00 or higher on a 4-point scale, or a GPA of 3.30 for courses in the undergraduate major.
  c. Have completed a health assessment course.
  d. Have completed 3 hours of graduate-level statistics.

OR
• Hold a bachelor’s degree in a discipline other than nursing (master’s entry student or RN) from an accredited college or university.
  a. Have a cumulative undergraduate GPA of at least 3.00 on a 4-point scale.
  b. Have satisfactorily completed the following prerequisite courses: chemistry (8 hours); microbiology (including lab); anatomy and physiology (6 to 8 hours); nutrition (covering lifespan in health and illness); social sciences (9 hours) and a general psychology course (3 hours); undergraduate research course or equivalent; 3 hours of graduate-level statistics prior to enrollment in graduate research course.
  c. Nurse anesthesia option not available to master’s entry students.
• New students normally are admitted to the program only at the beginning of fall semester. However, under special circumstances and on a space available basis, a BSN graduate may be admitted at the beginning of spring or summer terms in a temporary non-degree status. Applications from full-time BSN and master’s entry students for fall admission must be received by February 1. Part-time and post-master’s applications must be received by October 1. Nurse anesthesia applications must be received by March 1 for spring admission in the following academic year.

Non-Degree Status
Only 505 and 511 are open to students in Non-Degree Status. Students not yet accepted into the master’s program must be advised by the Chair of the Master of Science in Nursing program prior to enrollment.

Special Requirements
• Before enrollment in the master’s program, each student must successfully complete a criminal background check.
• Each student must hold personal professional liability insurance and health insurance.
• Registered nurses must be eligible to practice nursing in Tennessee, i.e., licensed in Tennessee or one of the interstate compact states.
• Each student must present proof of hepatitis B vaccination and rubella and rubeola immunization or sufficient titer for immunity; TB status.
• Each student must present evidence of current two-person CPR certification.
• Non-registered nurse students must have completed courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 hours of behavioral science courses.
• For more detailed information about the application process, contact Master of Science in Nursing Program, The University of Tennessee College of Nursing, 1200 Volunteer Boulevard, Knoxville, Tennessee 37996-4180; (865) 974-0591.

Thesis and Non-Thesis Options
The thesis option is available for interested students and is especially encouraged for those who are considering pursuit of doctoral degrees sometime in the future. Students who choose the non-thesis option must register for Nursing 582.

Program Requirements

<table>
<thead>
<tr>
<th>Core (7 hours)</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>507 Concepts for Advanced Practice Nursing: Health Promotion and Health Policy</td>
<td>4</td>
</tr>
<tr>
<td>510 Theoretical Foundations of Nursing</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advanced Practice Core (9 hours) *</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>504 Advanced Health/Physical Assessment</td>
<td>3</td>
</tr>
<tr>
<td>505 Advanced Clinical Pharmacology</td>
<td>3</td>
</tr>
<tr>
<td>515 Advanced Pathophysiology for Nursing Practice (not required for nurse anesthesia students or neonatal students)</td>
<td>3</td>
</tr>
</tbody>
</table>

* Not required for nursing administration concentration or homeland security (Management Track).

Required for nurse anesthesia students

| 506 Advanced Anesthesia Pharmacology | 3           |
| 516 Advanced Pathophysiology: Neurological/Cardiovascular with Anesthesia Implications | 2           |
| 517 Advanced Pathophysiology: Respiratory/Renal with Anesthesia Implications | 2           |
| 518 Advanced Pathophysiology: Obstetrics/Regional Anesthesia | 2           |
| 523 Advanced Principles of Nurse Anesthesia Practice | 2           |
| 524 Basic Principles of Anesthesia I | 3           |
| 525 Basic Principles of Anesthesia II | 3           |
| 526 Professional Issues in Nurse Anesthesia | 2           |

Research (6-9 hours)

| 501 Nursing Research: Methods, Design and Analysis | 3           |
| 500 Thesis | 6           |
| 582 Scholarly Inquiry for Advanced Practice Nursing | 3           |

Concentration (choose one)

| 529, 530, 531 Adult Health | 13          |
| 529, 530-539 Adult Health: Gerontology | 13          |
| 544-545-546-547-548-549 Clinical Nurse Anesthesia Practicum | 40          |
| 532, 533, 534, 535, 536, 537 Homeland Security: Advanced Practice | 31          |
| 532, 533, 534, 537 Homeland Security: Management | 16          |
| 550-551-553-554-555-556 Nursing of Women and Children: Women’s Health | 20          |
| 550-551-527-528-562-563 Nursing of Women and Children: Child Health | 20          |
550-551-552-564-568-569 Nursing of Women and Children: 
Neonatal Health ............................................. 20
560-561-519 Mental Health Nursing I, II .................. 16
570-571-572-573 Family Nurse Practitioner I, II, III .... 19
590-591 Nursing Administration: Macro/Micro Analysis ... 12

Additional Course Requirements
Electives for nursing administration concentration ........... 9
Electives for homeland security nursing: management track ... 3
Epidemiology for homeland security nursing: management and 
advanced practice tracks ................................ 3

Students who enter the program as non-RNs must complete 
the following undergraduate nursing courses in addition to meet- 
ing the requirements listed above.

<table>
<thead>
<tr>
<th>Hours</th>
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</tr>
</thead>
<tbody>
<tr>
<td>311</td>
<td>Foundations of Professional Nursing Practice</td>
</tr>
<tr>
<td>319</td>
<td>Pathophysiology of Health Deviations</td>
</tr>
<tr>
<td>333</td>
<td>Health Assessment</td>
</tr>
<tr>
<td>341</td>
<td>Transcultural Nursing</td>
</tr>
<tr>
<td>351</td>
<td>Pharmacology I</td>
</tr>
<tr>
<td>361</td>
<td>Health Maintenance and Restoration: Adult</td>
</tr>
<tr>
<td>406</td>
<td>Pharmacology II</td>
</tr>
<tr>
<td>415</td>
<td>Nursing the Childbearing Family</td>
</tr>
<tr>
<td>421</td>
<td>Health Maintenance and Restoration in Mental Health</td>
</tr>
<tr>
<td>432</td>
<td>Health Promotion, Maintenance, Restoration in the Community</td>
</tr>
<tr>
<td>444</td>
<td>Care of Children, Adolescents, and Their Families</td>
</tr>
<tr>
<td>454</td>
<td>Professional Leadership Issues</td>
</tr>
</tbody>
</table>

Registered nurses whose bachelor’s degrees are not in nurs- 
ing must have completed courses in chemistry, nutrition, microbi- 
ology, anatomy, and physiology plus 12 hours of behavioral sci- 
ence courses. They must also complete 305, 382, and 454 and 
complete or successfully challenge the following.

<table>
<thead>
<tr>
<th>Hours</th>
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<tr>
<td>311</td>
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<td>351</td>
<td>Pharmacology I</td>
</tr>
<tr>
<td>361</td>
<td>Health Maintenance and Restoration: Adult</td>
</tr>
<tr>
<td>403</td>
<td>Health Promotion, Maintenance, Restoration in Childbearing Families</td>
</tr>
</tbody>
</table>
| 404   | Health Promotion, Maintenance, and Restoration in Children, 
Adolescents, and their Families | 5 |
| 406   | Pharmacology II | 2 |
| 421   | Health Maintenance and Restoration in Mental Health | 5 |
| 461   | Health Promotion, Maintenance, and Restoration in Mental Health | 4 |
| 494   | Alternative Preceptorship | 4 |

A total of 24 hours can be obtained by successful completion of 
the NLN ACE Examination. See undergraduate catalog for other 
challenge options. RNs who are in the process of completing a 
BSN at the University of Knoxville, with the intent of enrolling in the 
MSN program, follow the same plan with the addition of 471.

Final Examination Requirements
All students must successfully complete a final examination as 
required by the Graduate Council. For thesis students, the examina- 
tion will consist of an oral defense of the thesis as well as other writ- 
ten or oral questions designed to measure student mastery of the 
entire program of study. For non-thesis students, the written exami- 
nation will cover the entire program of study and may, at the discre- 
tion of the student’s committee, be followed by an oral examination.

Special Policies
- If the clinical performance of any student for any course is 
found to be unsatisfactory, the student will receive a grade of F for the course.
- If a student achieves a final grade of D or F for any re- 
quired undergraduate or graduate nursing course, he or 
she will not be permitted to repeat the course and will be 
required to withdraw from the program.
- If the clinical performance of any student is characterized by 
euther, unprofessional or unsafe behavior, or behav- 
or that places the client in jeopardy, the student will be re- 
quited to withdraw from the program.

Students are expected to maintain a 3.00 cumulative GPA; 
however, students must maintain a grade of B or better in 
clinical concentration courses and/or directed clinical practice. Graduate students are not permitted to repeat a 
course, repeat an exam or do additional work for the pur- 
purpose of raising a grade already received. A student who 
receives a final grade below a B in a clinical concentration 
course will be dismissed from the program. A student 
whose cumulative GPA drops below a 3.00 as a result of 
earning grades of C in other courses will be placed on ac- 
ademic probation. A student will be allowed to continue in 
graduate study while on academic probation as long as 
each semester’s grade point average is 3.00 or better and 
the grade for clinical concentration work is at least 3.00.

RN-MSN Track
The RN-MSN track provides an opportunity for qualified associ- 
deate degree and diploma-prepared nurses to obtain the MSN.

Admission
- Associate degree or diploma in nursing.
- Minimum grade point average 3.00 (on 4 point scale) for 
all pre-professional course requirements.
- Eligible to practice as a registered nurse in Tennessee (li- 
censed as an RN in Tennessee or one of the interstate 
compact states).
- Have satisfactorily completed the following prerequisite 
courses – chemistry (8 hours); microbiology (including 
lab); anatomy and physiology (6 to 8 hours) nutrition (cov- 
ering lifespan in health and illness); social sciences (9 
hours) and a general psychology course (3 hours).
- Three professional letters of reference.
- Personal statement of goals and objectives.

Prior to Admission to Graduate Program
- Complete the BSN with at least a 3.00 GPA.
- Achieve a competitive score on the combined verbal and 
the quantitative portions of the Graduate Record Exami- 
nation.

Bachelor of Science in Nursing Courses
- RN’s are exempt from sophomore level Nursing 201 (In- 
troduction to Nursing) and will be given proficiency credit 
based on RN status.
- RN students will take the NLN Acceleration Challenge Exams prior to starting upper division coursework. If a de- 
cision score of 100 is achieved (per section), the student 
will receive proficiency credit for Nursing 361, 403, 404, 
421, and 461.
- Proficiency credit can be obtained in courses marked with an asterisk (*)

Bachelor of Science in Nursing Degree
- A baccalaureate degree in nursing will be awarded upon 
completion of all required level 300 and 400 courses.
- A total of 123 undergraduate hours are required for the 
baccalaureate degree with the last 30 hours completed in 
residence at the University of Tennessee, Knoxville.

RN-MSN students will complete (or challenge*) the following 
courses, prior to beginning MSN courses.
DOCTOR OF PHILOSOPHY
NURSING MAJOR

The College of Nursing offers a doctoral program leading to the Doctor of Philosophy degree with a major in nursing. This is a unified program offered jointly with the University of Tennessee, Memphis, College of Nursing. Students may complete all or part of the program at either site. The dissertation must be completed in its entirety at one site.

The doctoral program prepares nursing scholars capable of integrating research, theory, and practice into their roles as researchers, educators, and/or administrators. Specifically, the graduate of this program should be able to

- Analyze, test, refine, and expand the theoretical basis of nursing.
- Conduct research that generates knowledge and advances nursing as a discipline.
- Provide leadership as nurse scientists who can function in a variety of roles and settings.
- Collaborate with members of other disciplines in health-related research.
- Develop, implement, evaluate, and recommend health care policy.
- Demonstrate professionalism, advocacy, ethical principles and scientific integrity.

Admission

- Meet requirements for admission to graduate study.
- Hold a master’s degree in nursing from a program accredited by the National League for Nursing Accrediting Commission or the Commission on Collegiate Nursing Education. Some outstanding applicants who are prepared at the bachelor’s level in nursing may be considered. In such cases, graduate level courses in nursing theory, concentration specialty, and/or research will be integrated into the formal program of doctoral degree requirements.
- Have a minimum cumulative grade point average of 3.30 on a 4.00 scale for previous college work.
- Achieve a competitive score on the combined verbal and quantitative portions of the Graduate Record Exam.
- Have successfully completed a basic statistics course and graduate nursing theory and research courses prior to enrollment in nursing doctoral level courses.
- Have TOEFL score of at least 550 on the paper test, 213 on the computer-based test, or 80 on the Internet-based Test if native language is not English.
- Complete Graduate Program Data Form, College of Nursing.
- Submit Graduate Rating Forms from three college level instructors and/or nurses and administrators who have supervised applicant’s professional work.
- Submit a sample of scholarly writing (e.g., thesis, published paper).
- Submit an essay describing personal and professional aspirations.
- Submit Graduate Application for Admission, academic transcript(s), Graduate Record Examination scores, and, if required, TOEFL scores to the Office of Graduate and International Admissions. Submit three Graduate Rating Forms, sample of scholarly writing, and Graduate Program Data Form with essay to the Director of the PhD program prior to November 1 of the year prior to fall admission.
- Schedule a personal interview with the College of Nursing PhD Student Admissions Committee prior to March 15 of the year preceding fall admission. International applicants may be interviewed by telephone or teleconferencing at the discretion of the admissions committee.

Requirements

The following courses are required for all students.

<table>
<thead>
<tr>
<th>Hours Credit</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>601</td>
<td>Philosophy and Theory for Nursing Science</td>
</tr>
<tr>
<td>603</td>
<td>Nursing Research and Inquiry</td>
</tr>
<tr>
<td>605</td>
<td>Middle-Range Theoretical Formulations for Nursing Science Development</td>
</tr>
<tr>
<td>606</td>
<td>Nursing Research Seminar</td>
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<tr>
<td>607</td>
<td>Qualitative Nursing Research</td>
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<tr>
<td>608</td>
<td>Quantitative Nursing Research</td>
</tr>
<tr>
<td>609</td>
<td>Research Practicum*</td>
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<tr>
<td>610</td>
<td>Nursing Science Seminar</td>
</tr>
<tr>
<td>612</td>
<td>Health and Nursing Policy/Planning</td>
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<tr>
<td>613</td>
<td>Nursing Leadership in Complex Systems</td>
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<tr>
<td></td>
<td>Inferential Statistics</td>
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<td></td>
<td>Multivariate Statistics</td>
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<tr>
<td></td>
<td>Cognates**</td>
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<td></td>
<td>Elective</td>
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<tr>
<td>600</td>
<td>Dissertation</td>
</tr>
</tbody>
</table>

Total 67

*Note: One hour per semester, must be taken for two semesters.
**Possible cognate areas include, but are not limited to, anthropology, child and family studies, psychology, education, management, public health, social work, philosophy, and statistics.

Doctoral Committee

Early in the student’s program, a nursing faculty advisor will be selected by the student in consultation with the program director. The student’s comprehensive examination committee consists of the faculty teaching core courses and one representative from the cognate area. The student then selects the dissertation committee. Four faculty, holding the rank of assistant professor or above, comprise the committee, three of whom (including the chair) must be approved by the Graduate Council to direct doctoral dissertations. At least one member of the committee must be from an academic unit other than nursing.

Special Policies

- A maximum of 6 graduate hours taken before acceptance into the doctoral program may be applied toward the degree.
- Prior to enrollment in the PhD program, each student must successfully complete a criminal background check.
- A minimum grade of B in all nursing doctoral courses and a 3.00 cumulative GPA are required for continuation in the program.

Intercollegiate/Interdisciplinary Gerontology Minor

Graduate students in the College of Nursing may pursue an intercollegiate/interdisciplinary minor in gerontology. The gerontology minor gives the student an opportunity for combining knowledge about aging in American society with his/her major concentration.

Core courses and a practicum are offered by the College of Social Work and selected departments within the Colleges of Education, Health, and Human Sciences and Arts and Sciences. A cross-listed seminar between contributing programs is designed to integrate experiences from different sources and to demonstrate the multi-faceted nature of working within an aging socie-
Please refer to the College of Education, Health, and Human Sciences for specific requirements.

**Nursing Education Minor**

Graduate students in the College of Nursing may pursue a nursing education minor. The minor consists of 12 hours – 6 hours in nursing and 6 in education. Required courses in the College of Nursing are 566 and 565. In consultation with the Nursing Education Minor Coordinator, students select 6 hours of coursework from the College of Education, Health, and Human Sciences.

**GRADUATE CERTIFICATES**

The College of Nursing offers certificates for nurses who need additional training. A master’s degree in nursing is required for admission.

The total hours will vary depending on the student’s academic record, clinical experience, and objectives. Students must complete a minimum of 12 hours. Most students complete 16-20 hours of course credit with the exception of those pursuing the homeland security nursing certificate or the nurse anesthesia certificate. The nurse anesthesia certificate program requires students who have completed the master’s degree in nursing within the preceding five years to complete 60-70 hours of course credit. Contact the MSN chair for more information.

- **ADULT HEALTH NURSING**
  
  Course requirements are 530 and 531 plus additional hours as determined by the college.

- **FAMILY NURSE PRACTITIONER**
  
  Course requirements are 570, 571, 572, and 573 plus additional hours as determined by the college.

- **HOMELAND SECURITY NURSING**
  
  Course requirements are 532, 533, 534, 535, 536, plus additional hours as determined by the college.

- **HOMELAND SECURITY STUDIES**
  
  The graduate certificate in homeland security studies is available to graduate students who seek to gain specialized knowledge and skills related to the prevention and management of catastrophic incidents which result in mass casualties, whether the cause is naturally-occurring, accidental, or terrorism. Admission to the certificate program is selective and requires admission to a degree-seeking program and relevant professional work experience. A degree in nursing is not required. The certificate program is composed of 13 credits: Nursing 532: Homeland Security Threats (3 cr.), Nursing 533: Homeland Security I (5 cr.), and Nursing 534: Homeland Security II (5 cr.).

- **MENTAL HEALTH NURSING**
  
  Course requirements are 560 and 561, plus additional hours as determined by the college.

- **NURSE ANESTHESIA**
  
  In addition to the general requirements for admission to graduate study and the College of Nursing, the following are required of all nurse anesthesia certificate applicants.
  
  - One year of critical care experience with adult clients.
  - Certification in Advanced Cardiac Life Support (ACLS) and Pediatric Advanced Life Support (PALS).
  - A personal interview.

  Course requirements are 506, 516, 517, 518, 522, 523, 524, 525, 526 of nurse anesthesia didactic content, plus additional hours as determined by the college and 54 hours of nurse anesthesia clinical practice courses, 544, 545, 546, 547, 548, 549, 583.

- **NURSING ADMINISTRATION**
  
  Course requirements are 590 and 591, plus additional hours as determined by the college.

- **NURSING EDUCATION**
  
  The post-master’s certificate in Nursing Education consists of 12 hours – 6 hours in nursing and 6 in education. Required courses in the College of Nursing are 566 and 565. In consultation with the Nursing Education Minor Coordinator, students select 6 hours of coursework from the College of Education, Health, and Human Sciences.

- **NURSING OF WOMEN AND CHILDREN**
  
  Course requirements are 550 and 551, plus additional hours as determined by the college.
College of Social Work

Karen Sowers, Dean
Sherry Cummings, Acting Associate Dean, Nashville
Geraldine Faria, Associate Dean, Knoxville
Theora Evans, Acting Associate Dean, Memphis
Paul M. Campbell, Director, Office of Social Work Research and Public Service
Charles Glisson, Director, Children’s Mental Health Services Research Center

http://www.csw.utk.edu/

Professors
Cetingok, M., PhD .............................................. Washington (St. Louis)
Combs-Orme, T., PhD ............................................. Washington (St. Louis)
Glisson, C., PhD .................................................. Washington (St. Louis)
Nugent, W., PhD .................................................. Florida State
Orme, J., PhD ....................................................... Washington (St. Louis)
Sowers, K., PhD .................................................... Florida State
Wodarski, J., PhD ................................................... Washington (St. Louis)

Associate Professors
Bolen, R., PhD ...................................................... Texas (Arlington)
Bowie, S., PhD ...................................................... Barry
Cummings, S., PhD ............................................... Georgia
Dupper, D., PhD ..................................................... Florida State
Egan, M., PhD ....................................................... Maryland
Ellis, R., PhD ........................................................ Florida International
Evans, T., PhD ....................................................... Minnesota
Faria, G., PhD ....................................................... Denver
Patterson, D., PhD .................................................. Utah
Rocha, C., PhD ....................................................... Washington (St. Louis)
Rogge, M., PhD ..................................................... Washington (St. Louis)
Spicuzza, F., MSSW ............................................... Tennessee
Staudt, M., PhD ..................................................... Washington (St. Louis)

Assistant Professors
Brown, E., PhD ..................................................... Michigan
Cho, S., MSW ........................................................ Ewha (Korea)
Craun, S., PhD ...................................................... UCLA
Davis, C., PhD ...................................................... UCLA
Hall, C., PhD ......................................................... Smith
MacMaster, S., PhD ............................................. Case Western Reserve
Neely-Barnes, S., PhD ......................................... Washington
Strand, E., PhD ...................................................... Georgia
Theriot, M., PhD ................................................... California (Berkeley)
Washington, G., PhD ........................................ Clark

Research Faculty
Black, B., MSSW .................................................. Tennessee
Campbell, P., DSW ................................................. Alabama
Green, P., PhD ..................................................... Tennessee
Hemmelgarn, A., PhD ......................................... Tennessee

Field Coordinators
Enochs, P., EdD (Nashville) .................................... Tennessee State
Jackson, R., MSSW (Knoxville) ................................ Tennessee
Lodato, G., MSW .................................................. Marywood
Thompson, B., MSSW (Memphis) ................................ Tennessee

MAJOR DEGREES

Social Work
Evidenced-based Practice Across Systems
Social Work PhD

The College of Social Work began as the Nashville School of Social Work, founded in 1942 under the auspices of Vanderbilt University, Scarritt College, and George Peabody College. It joined the University of Tennessee in 1951. By 1974 the three branches, located in Nashville, Memphis and Knoxville, offered the two-year master’s program. The doctoral program was inaugurated in 1983. In 1985 the Bachelor of Science in Social Work program was added, and the School achieved college status.

The University of Tennessee College of Social Work is the only graduate professional social work education program in Tennessee and offers the full continuum of social work education degrees at the baccalaureate, master’s and doctoral levels.

Social work is a helping profession that focuses on providing skilled intervention in the prevention and amelioration of individual and societal problems. It is the purpose of the college to provide an education that fosters growth in both individual and career development.

Graduate Programs

The two-year program (thesis or non-thesis option) leading to the Master of Science in Social Work is fully accredited by the Council on Social Work Education and is offered on all three campuses. The foundation curriculum of the PhD program is available only in Knoxville. The interdisciplinary graduate certificate in gerontology at the University of Tennessee, offered on all three campuses, prepares graduate students to work with and on behalf of the rapidly growing older population. The graduate certificate in gerontology consists of 21 credit hours – 3 required classes (9 hours), 2 elective classes (6 hours) and 6 hours of an aging-related internship. Courses may be used to count towards both the MSSW and the gerontology certificate if they fulfill requirements of both programs. With proper planning, one can complete both programs of study in a two-year period. For more information/application materials go to the Web at http://web.utk.edu/~sals/gerontology/. The Tennessee State School Social Work Licensure Program at the University of Tennessee College of Social Work is available to currently enrolled
bachelor's level and master's level students as well as persons who already hold a bachelor's and/or master's degree in Social Work from an accredited social work program. Information and application materials are available from the College of Social Work, Henson Hall, Knoxville, Tennessee 37996-3333.

Financial Aid
Students may apply directly to the university's Office of Financial Aid and Scholarships for assistance such as the National Direct Student Loan or the Work-Study Program.

Information regarding scholarships administered by the college is made available after admission. Financial aid is available to qualified students in the form of fellowships, scholarships, and teaching and research assistantships. Graduate assistantships and other forms of assistance are awarded on the basis of merit and interest to applicants who are accepted into the PhD program.

MASTER OF SCIENCE IN SOCIAL WORK
SOCIAL WORK MAJOR

The college offers a new MSSW curriculum that is informed by state-of-the-art, cutting-edge knowledge and grounded upon core social work values and ethics. The concepts of critical thinking and evidenced-based practice, complexity, culturally affirming practice, social and economic justice, and at-risk populations permeate the new MSSW curriculum. The MSSW program seeks to prepare MSSW graduates to make demonstrable improvements in the quality of life of at-risk and vulnerable populations across individuals, families, groups, organizations, communities, and the state of Tennessee, the nation and society.

Admission
Admission to the master’s program is based on the following.

• A bachelor’s degree from an accredited college or university with appropriate preparation in the social sciences. At least three-fourths of the applicant’s undergraduate work should be in the social sciences, humanities, physical sciences, and other arts and sciences subjects. Applicants must have a course in human biology and demonstrate a liberal arts perspective through coursework in at least four of the following five areas – economics or mathematics; government, political science or history; sociology or anthropology; psychology; philosophy, literature, or the arts. Applicants with other academic backgrounds may request consultation to discuss ways that they can meet the requirements.

• A grade point of 2.70 or higher on a 4.00 scale. Applicants falling below this average may be considered for probationary admission on the basis of supplemental evidence of the ability to perform at a satisfactory level. The university requires a minimum GPA of 2.70 for admission to graduate study.

• Personal qualifications acceptable for entrance into the professional practice of social work.

• All applicants must submit up-to-date scores from the Graduate Record Examination (general).

Preference is given to applicants with a GPA of 3.00 or above in their undergraduate work with substantial preparation in the social sciences. Applicants who have a prior conviction, other than a minor traffic violation, may not necessarily be denied admission to the MSSW program. However, such convictions may prevent placement in certain field practice agencies and/or licensure in certain states.

Advanced Standing

The University of Tennessee College of Social Work has an advanced standing program. Admission to advanced standing requires a BSW from an accredited program; an overall undergraduate GPA of 3.00 or higher; and personal qualifications acceptable for entrance into the professional practice of social work. These students will follow the curriculum plan and meet all requirements of the concentration during three semesters of study in the program.

Application for admission to the advanced standing program is through the regular admission process.

Extended Study

Planned part-time programs are available in all three locations of the college. Admission requirements are the same as for full-time study. Coursework can be completed over a three- or four-year period.

Transfer Credits

Coursework equivalent to the first year of the master’s program, completed in another accredited graduate social work program, is usually accepted toward degree requirements. Applicants must meet the admission requirements of the Graduate Council and the College of Social Work. Transfer courses must be approved as equivalent to required and/or elective courses taken for graduate credit and passed with a grade of B or better. An S (Satisfactory/No Credit system) for the field practicum is also accepted. In addition, transfer courses must be part of an otherwise satisfactory graduate program (B average) and be approved by the dean. This coursework must be completed within the six-year period prior to the receipt of the degree.

A maximum of 6 hours from work earned in disciplines other than social work may be transferred as elective credits. The student’s academic committee must approve the request and the transfer credit must meet Graduate Council requirements.

Proficiency Examination

Students in the master’s program may earn a maximum of 9 hours by proficiency examination. Students interested in proficiency examinations are referred to the College of Social Work Student Handbook statement describing the procedure for applying for examination and the applicable courses.

Requirements

• The program requires successful completion of a minimum total of 60 semester hours.

• Students may select a thesis or non-thesis option. Students pursuing the thesis option receive 6 hours for successful completion.

• Students must successfully complete a comprehensive exam or thesis defense.

• Students must have an overall GPA of 3.00 or better on all graded courses and satisfactory performance in field.

Professional Foundation Curriculum

MSSW foundation content (first year – fall and first half of spring semester) includes fundamental, evidence-based knowledge and skills that will prepare students to practice across client systems within a culturally affirming generalist social work context. MSSW foundation curriculum includes content in the following areas – social work practice, research, human behavior in the social environment, social policy, populations at risk and social and economic justice, values and ethics, diversity, critical thinking/evidenced-based practice, and field.
Field Practice

The application of knowledge and skills is a critical aspect of a competency-based, practice-oriented MSSW curriculum. The opportunity for students to practice and learn in experiential settings is provided through collaboration between the college and a wide range of social service organizations. This effort between the partners produces effective experiences that enhance the students' professional development in their individual areas of focus. Opportunities designed to meet the field practice requirement are available within Tennessee, in certain other parts of the country, and in selected international locations. Field practica are offered either concurrently with class instruction or in block format.

Foundation placements are selected through a joint process involving the student, the field coordinator, and personnel from potential internship sites. These first placements are designed to provide students with supervised generalist practice experience, which is consistent with the generalist knowledge and skill development education they receive in the classroom. Accordingly, students' experiences are planned and designed to meet specific foundation educational objectives. Concentration internships build on the generalist foundation. The concentration practicum provides supervision in a practice setting selected with attention to a student's area of focus, individual career interests, and educational needs. As with the foundation placement, students actively participate with the field coordinator and potential agency. Field Instructors to select their concentration placement site. The concentration field placement experience focuses on the integration of social work knowledge and values while emphasizing the acquisition and development of advanced practice skills built on, but distinct from generalist, foundation skills.

Students receiving a grade of NC in field practice may not repeat the field practice.

Advanced Content

All MSSW students begin to take advanced required courses in the second session of spring semester during their first year of study. These advanced required courses include content in leadership, supervision, management, psychopathology, and advanced empirical knowledge for practice and evidence-based interventions. These courses are embedded in an understanding of the complex ways that risk and resilience interact across the lifespan and systems to enhance well being.

Areas of Focus

MSSW students complete the concentration portion of their MSSW program of study (second year – fall and spring semesters) by taking four required core courses and then choosing from a series of required electives/selectives within a specific area of focus. These courses enable students to become competent in knowledge and skills necessary for advanced social work practice with complex situations and problems.

Integrative Seminar

The integrative seminar is the MSSW capstone experience. The seminar allows students to integrate and synthesize knowledge learned across the curriculum and to critically apply it within each student's specified area of focus.

DOCTOR OF PHILOSOPHY
SOCIAL WORK MAJOR

The College of Social Work offers the Doctor of Philosophy with a major in social work.

The focus of social work education at the doctoral level is to foster the development of an attitude of scientific inquiry, knowledge of the scientific method, ability to extend the knowledge base of social work practice, and effective participation in leadership roles in social work education, research, and practice.

The emphasis of the doctoral program is upon:

- The analysis of direct intervention and social administration and of the interrelationships among each of them and their social policy, organizational, and community contexts.
- Research-based knowledge to inform and guide social work practice, social policy, and social welfare program development.

The program consists of foundation courses, elective courses, and dissertation research. The courses are available only in Knoxville. Students and their committees can develop a plan for completing their research in Nashville and Memphis based on the availability of dissertation resources.

Students have the opportunity to work in the Children's Mental Health Services Research Center as part of their training. The center focuses on services to children who have experienced mental health problems associated with abuse, neglect, violence and a variety of psychosocial problems.

Admission

The PhD program is designed for students who have completed a master's degree in an accredited school of social work and have post-master's social work/social welfare experience. Applicants who do not meet these requirements, but believe they have equivalent credentials should contact the chair of PhD program for further information regarding admissions criteria.

Applications may be downloaded at www.csw.utk.edu/phd.

Requirements

A minimum of 66 hours beyond the master's degree including the following:

- Completion of 27 hours of required coursework.
- Completion of 15 hours of advanced electives, at least 12 of which are taken outside the department, and 9 of those 12 related to the dissertation.
- Completion of at least 24 hours of dissertation research.
- Successful completion of qualifying and comprehensive examinations.
- Completion and defense of the dissertation.

The curriculum of the PhD program consists of foundation coursework, electives, and dissertation research. The foundation curriculum consists of 27 hours of coursework in the history and philosophy of social work, issues in direct service and administration and planning, areas of practice, and research methodology and statistics. Upon this foundation, students and their academic committees develop a plan of study consisting of coursework in social work and other departments of the university.

Typically, the 24 hours of foundation curriculum are completed and elective coursework begun during the first year of study Social Work 670 and the elective requirement are completed and dissertation research begun in the second year of study. Dissertation research is continued in the third year of study. While it is generally expected that the coursework will be completed on a full-time basis, dissertation research can be completed on a planned part-time basis.

Specific courses required are 601, 602, 612, 613, 640, 650, 670, and Statistics 531 and 532 or any two graduate level statistics courses approved by the doctoral program chair.

Examinations

All doctoral students are required to pass a qualifying examination and a comprehensive examination. The qualifying examination covers the foundation curriculum. The comprehensive examination is administered by members of the comprehensive exam committee and is designed for the student to demonstrate comprehensive knowledge of the major and cognate areas and the dissertation topic. In case of failure of either examination, the
student may request a retake. The result of the second examination is final.

**Intercollegiate/Interdisciplinary Gerontology Minor**

Graduate students in the College of Social Work, at the Knoxville location, may pursue an intercollegiate/interdisciplinary minor in gerontology. The gerontology minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration.

Core courses and a practicum are offered by the College of Social Work and selected departments within the Colleges of Education, Health, and Human Sciences and Arts and Sciences. A cross-listed seminar between contributing programs is designed to integrate experiences from different sources and to demonstrate the multi-faceted nature of working within an aging society. Please refer to the College of Education, Health, and Human Sciences for specific requirements.
College of Veterinary Medicine

Michael J. Blackwell, Dean
James J. Brace, Associate Dean, Academic Programs
Robert N. Moore, Associate Dean, Research and Graduate Programs
Leon N.D. Potgieter, Associate Dean, Hospital Operations
Dennis R. Geiser, Assistant Dean, Outreach and Organizational Development

http://www.vet.utk.edu/

MAJOR
Veterinary Medicine

The College of Veterinary Medicine, established in 1974, offers a professional curriculum leading to the Doctor of Veterinary Medicine (DVM) degree. Residency training programs in the various clinical specialties are also offered.

The primary objective of the college is to enable students to attain essential information, skills, attitudes and behaviors to meet the varied needs of society and the veterinary profession. The professional curriculum provides an excellent basic science education in addition to training in diagnosis, disease prevention, medical treatment, and surgery. Graduates are qualified to pursue careers in the many facets of veterinary medicine and related health professions.

About two-thirds of the veterinarians in the United States are engaged exclusively in pet or companion animal practice. A growing number are concerned with the health problems of zoo animals, laboratory animals, wildlife, and aquatic species. A number of veterinarians are involved in the health care of food and fiber animals ensuring the supply of safe and healthy food.

Veterinarians also find rewarding careers in the U.S. Public Health Service, the Armed Forces, and in state, county, or local health agencies. A large number of veterinarians are employed by the U.S. Department of Agriculture and by state departments of agriculture for important work in livestock disease control, meat and poultry inspection, serum and vaccine production, and the protection of our country against the importation of foreign animal diseases. With the events of September 11, 2001, veterinarians are making significant contributions to biosecurity and homeland defense.

Excellent research opportunities exist for veterinarians – research directly benefiting animals and research conducted with animals that benefits humans. Such opportunities are available at colleges and universities and with governmental agencies, private research institutions and biological and pharmaceutical companies.

The college jointly administers a graduate program leading to the Master of Science and the Doctor of Philosophy degrees with a major in comparative and experimental medicine. This program provides a wide spectrum of interdisciplinary training that prepares graduates for teaching and/or research careers in the health sciences. The majority of the graduate students and graduate faculty of the College of Veterinary Medicine are involved in the comparative and experimental medicine program. (See Comparative and Experimental Medicine in the Intercollegiate section of this catalog.)

Because of the interdisciplinary departmental administration of the college, the faculty also have opportunities in the graduate programs of other instructional units, including Animal Science (nutrition, physiology, genetics and animal management), Microbiology (bacteriology, virology and immunology), Ecology and Evolutionary Biology (environmental toxicology), and Public Health. (Refer to other sections of this catalog for a full description of these programs.)

DOCTOR OF VETERINARY MEDICINE

Admission

To qualify for admission to the professional program of the College of Veterinary Medicine, a candidate must have completed at least the minimum pre-veterinary course requirements listed below. These may be completed at any accredited college or university that offers courses equivalent to those at the University of Tennessee, Knoxville. Pre-veterinary course requirements must be completed by the end of spring term of the year in which the applicant intends to enroll. Biochemistry requirements must have been satisfactorily completed within five years of the time the applicant wishes to enter the program.

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Semester Hours</th>
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</thead>
<tbody>
<tr>
<td>English</td>
<td>6</td>
</tr>
<tr>
<td>1Humanities and Social Sciences</td>
<td>18</td>
</tr>
<tr>
<td>Physics</td>
<td>8</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>8</td>
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<td>Organic Chemistry</td>
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<td>2Biochemistry</td>
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<td>General Biology</td>
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<td>Genetics</td>
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<tr>
<td>3Cellular Biology</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>66</strong></td>
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</tbody>
</table>

http://www.vet.utk.edu/
May include, for example, courses in English literature, speech, music, art, philosophy, religion, language, history, economics, anthropology, political science, psychology, sociology, and geography.

Exclusive of laboratory.

It is expected that this requirement will be fulfilled by a course in cellular or molecular biology.

Admission Procedures

Admission of new students is for the fall semester, with first priority given to residents of Tennessee.

The College of Veterinary Medicine utilizes the Veterinary Medical College Application Service (VMCAS) for all applicants. Instructions for making application for admission may be obtained from the Office of the Associate Dean, The University of Tennessee, College of Veterinary Medicine, 2407 River Drive, Room A102, Knoxville, Tennessee 37996-4550, or on-line at VMCAS (<www.aavmc.org>).

The deadline for receipt of the completed application materials is October 1. Non-Tennessee applicants must have a minimum cumulative grade point average of 3.20 on a 4.00 scale for applications to be considered.

Applications are accepted only from U.S. citizens or permanent residents of the U.S.

Requirements

The curriculum of the College of Veterinary Medicine is a nine-semester, four-year program. Each class begins in August and graduates four years later in May. The first three years generally follow the traditional fall and spring semesters with the summer break following years one and two. The final year of the professional curriculum begins immediately following semester six and is a continuous clinical rotation experience extending over 54 weeks.

Development of a strong basic science foundation is emphasized in the first year. Courses consist mostly of pre-clinical subjects of anatomy (gross and microscopic), physiology, immunology, bacteriology, virology and parasitology. Also included in the first year are clinical subjects of physical diagnosis and epidemiology. Considerable integration of subject matter is incorporated during this year.

The second and third years include the study of diseases, their causes, diagnosis, treatment and prevention, and courses are team-taught on an organ system basis.

The final year (three semesters) is devoted to intensive education in solving animal disease problems involving extensive clinical experience in the Veterinary Teaching Hospital. Each student will participate exclusively in clinical rotations in the Veterinary Teaching Hospital and in required externships (preferably off-campus).

Innovative features of this curriculum include six weeks of student centered, small group, applied learning exercises in semesters one through five; three weeks of dedicated clinical experiences in the Veterinary Teaching Hospital in semesters three through five; and elective course opportunities in semesters four through nine which allow students to focus on individual educational/career goals. Students enrolled in the DVM program may register for up to 10 hours of graduate courses and these hours will be credited toward the DVM. Elective study offers a unique educational alternative for students in the College of Veterinary Medicine and is intended to enhance professional growth, concentration in an area of interest, and career opportunities.

In addition to education in the science and art of veterinary medicine, students receive instruction in paramedical subjects such as animal behavior, medical communication, professional ethics, jurisprudence, economics, and practice management.

The curriculum requires successful completion of 164 credit hours.

VETERINARY PUBLIC HEALTH CONCENTRATION

A veterinary public health concentration is available for students enrolled in the DVM curriculum and graduate veterinarians. This concentration is part of the Master of Public Health degree in the College of Education, Health, and Human Sciences. For more information, see Public Health in this catalog. The College of Veterinary Medicine shares governance of the concentration through the Public Health Academic Program Committee and student advisors within this concentration are faculty in the College of Veterinary Medicine. This concentration requires a separate application to the MPH Program.
AVIATION SYSTEMS
(UT Space Institute)
http://www.utsi.edu/Academic/AvSys/index.html

Stephen Corda, Chair and Liaison

Associate Professors
Corda, S. (Liaison), PhD  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Maryland
Soltes, U.P., PhD  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Tennessee

Research Assistant Professor
Allison, R., MS  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Tennessee
Ranaudo, R.J., MS  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Ohio

Emeriti Faculty
Collins, F.G., PhD  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . California
Paludan, C.T., PhD  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Denver

Adjunct Faculty
Cavagnaro, Catherine  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Illinois
Palumbo, Nathan  . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Purdue

MAJOR DEGREE
Aviation Systems  MS

The University of Tennessee Space Institute offers a program leading to the Master of Science degree with a major in aviation systems. Aviation systems is a unique blend of aerospace engineering, aviation technology, flight science, and flight test engineering and research. The aviation systems program is designed for those who possess a bachelor’s degree in engineering or science and wish to study under a system philosophy toward careers in research and development or administration in areas pertinent to aviation and aerospace. Current emphases include flight testing, aircraft performance and flying qualities, aircraft design, atmospheric and earth/ocean science, airborne sensing, and human factors.

Admission
To qualify for admission to this program, the applicant must possess a bachelor’s degree in engineering or science from an accredited institution, show evidence of ability to pursue and benefit from the program, and fulfill the University of Tennessee, Knoxville, graduate admission procedures and grade point standards. It is expected that the student will have completed coursework in calculus and physics, and preferably aerodynamics, aircraft performance, or other aerospace-related subjects.

MASTER OF SCIENCE
AVIATION SYSTEMS MAJOR

Both thesis and non-thesis programs are available. The thesis program involves a minimum of 30 hours credit while the non-thesis program involves a minimum of 33 hours. Both options are fully supported off-campus utilizing electronic media for videotaping and interactive distance teaching methods.

Requirements

Thesis Option
The thesis program involves satisfactory completion of the following requirements.

Research and Development Specialization
• 12 hours of 500-level courses in the major field of aviation systems.
• 6 hours in industrial engineering (engineering management).
• 6 hours of electives from the major field, mathematics or engineering.
• 6 hours of Aviation Systems 500 demonstrating the ability to conduct and report on an independent investigation.
• Defense of thesis and completion of final exam.

Administration Specialization
• 12 hours of 500-level courses in the major field of aviation systems.
• 3 hours in industrial engineering (engineering management).
• 3 hours in economics or finance.
• 6 hours of electives selected from the major field, mathematics or engineering.
• 6 hours of Aviation Systems 500 demonstrating the ability to conduct and report on an independent investigation.
• Defense of thesis and completion of final exam.
Non-Thesis Option
The non-thesis program will be permitted in special circumstances and involves satisfactory completion of the following requirements.

Research and Development Specialization
- 12 hours of 500-level courses in the major field of aviation systems.
- 6 hours in industrial engineering (engineering management).
- 12 hours of electives in the major field, mathematics, or engineering.
- 3 hours of an assigned project under Aviation Systems 550.
- A comprehensive final written examination on all coursework submitted for the degree and defense of the project course paper.

Administration Specialization
- 12 hours of 500-level courses in the major field of aviation systems.
- 3 hours in industrial engineering (engineering management).
- 3 hours in economics or finance.
- 12 hours of electives in the major field, mathematics, or engineering.
- 3 hours of an assigned project under Aviation Systems 550.
- A comprehensive final written examination on all coursework submitted for the degree and defense of the project course paper.

COMPARATIVE AND EXPERIMENTAL MEDICINE

http://www.vet.utk.edu/graduate
Robert N. Moore, Director and Graduate Liaison
Joint Graduate Coordinating Committee
Bartges, J.W., DVM, PhD, Veterinary Teaching Hospital
Lawler, J.E., PhD, Psychology
Matteson, K.J., PhD, Medical Genetics
Moore, R.N., PhD, Veterinary Teaching Hospital

MAJOR DEGREES

Comparative and Experimental Medicine

MS, PhD

Comparative and Experimental Medicine (MS and PhD) is a jointly-administered graduate program intended to prepare students for teaching and/or research careers in the health sciences. This program emphasizes the comparative approach to the study of biomedical science. The PhD program is open to approved graduate students seeking training in this area and is especially useful for individuals with professional degrees. For the student with undergraduate biological science background, the comparative and experimental medicine program provides an unusual opportunity to study disease processes common in humans and animals from a multidisciplinary perspective. The scope of this intercollegiate program, which pools faculty resources from both veterinary and human medicine, is broadened by faculty members representing animal science and numerous areas of the life sciences. The interdisciplinary training environment includes such diverse support as facilities and personnel at the Veterinary Teaching Hospital, the University of Tennessee Medical Center at Knoxville, life sciences departments, College of Agricultural Sciences and Natural Resources, College of Engineering, and The Department of Nutrition.

For additional information, write to the Office of Research and Graduate Programs, or access the Web site.

MASTER OF SCIENCE
COMPARATIVE AND EXPERIMENTAL MEDICINE MAJOR

Admission
Applicants must have a baccalaureate degree with coursework in chemistry through organic, mathematics through calculus, physics, and basic biology. More advanced study in biology such as biochemistry, mammalian anatomy, histology, cell biology, or other appropriate biomedical courses from an accredited university is recommended.

Applicants for admission to the Master of Science degree program whose backgrounds include no formal training in the biomedical field beyond the baccalaureate degree will be required to score at least 1,000 on the quantitative and verbal portions of the Graduate Record Examination.

Requirements
Students must complete a minimum of 24 hours of coursework and 6 hours of Thesis 500. Comparative and Experimental Medicine 504 and 541 are required, as are 4 hours of 600-level graduate journal clubs. In addition, students must take at least 3 hours of 500- or 600-level statistics and a minimum of 8 hours of coursework in a specified discipline. Areas of emphasis may include hematology, oncology, pathology, pharmacology, toxicology, immunology, genetics, infectious disease, epidemiology, metabolism, or other areas of medicine. Exceptions to accommodate students with specific interests must be approved by the Joint Graduate Coordinating Committee after application, in writing, to the director.

The graduate committee (at least three members) is chosen before the end of the second term and must include at least one member from the College of Veterinary Medicine and at least one member from the Graduate School of Medicine. If a minor is declared, one member must be from the minor discipline. A final oral examination must be passed at the completion of the program.

DOCTOR OF PHILOSOPHY
COMPARATIVE AND EXPERIMENTAL MEDICINE MAJOR

Admission
Applicants must have a baccalaureate degree with coursework in chemistry through organic, mathematics through calculus, physics, and basic biology. More advanced study in biology such as biochemistry, mammalian anatomy, histology, cell biology, or other appropriate biomedical courses from an accredited university is recommended.

Applicants for admission to the Master of Science degree program whose backgrounds include no formal training in the biomedical field beyond the baccalaureate degree will be required to score at least 1,000 on the quantitative and verbal portions of the Graduate Record Examination.

Requirements
Students must complete a minimum of 24 hours of coursework and 6 hours of Thesis 500. Comparative and Experimental Medicine 504 and 541 are required, as are 4 hours of 600-level graduate journal clubs. In addition, students must take at least 3 hours of 500- or 600-level statistics and a minimum of 8 hours of coursework in a specified discipline. Areas of emphasis may include hematology, oncology, pathology, pharmacology, toxicology, immunology, genetics, infectious disease, epidemiology, metabolism, or other areas of medicine. Exceptions to accommodate students with specific interests must be approved by the Joint Graduate Coordinating Committee after application, in writing, to the director.

The graduate committee (at least three members) is chosen before the end of the second term and must include at least one member from the College of Veterinary Medicine and at least one member from the Graduate School of Medicine. If a minor is declared, one member must be from the minor discipline. A final oral examination must be passed at the completion of the program.

For additional information, write to the Office of Research and Graduate Programs, or access the Web site.
Requirements

Students with professional degrees (e.g., MD, DDS, DVM) or master’s degrees in a program-related biomedical science must complete at least 24 hours of coursework and 24 hours of Dissertation 600. Others must complete a minimum of 48 hours of coursework and 24 hours of Dissertation 600.

Comparative and Experimental Medicine 504 and 541 are required, as are 6 hours of 600-level graduate journal clubs. In addition, students must take at least 3 hours of 500- or 600-level statistics and a minimum of 8 hours of coursework in a specified discipline. Areas of emphasis may include hematology, oncology, pathology, pharmacology, toxicology, immunology, genetics, infectious disease, epidemiology, metabolism, or other areas of medicine. Exceptions to accommodate students with specific interests must be approved by the Joint Graduate Coordinating Committee after application, in writing, to the director. The doctoral committee is chosen during the first year. At least one member must be from the College of Veterinary Medicine and at least one member from the Graduate School of Medicine.

A comprehensive examination must be passed before the end of the third year of the program. In addition, students must prepare and defend a prospectus outlining their proposed research projects before the end of their third year in the program. Exceptions to these requirements are provided for medical residents pursuing doctoral degrees who must successfully complete the comprehensive examination and research prospectus before the end of their fourth year in the program.
Facilities for Research and Service

Center for Business and Economic Research (College of Business Administration)

William Fox, Director

The Center for Business and Economic Research (CBER) is well known within Tennessee for its extensive record of high quality public policy research related to a broad range of issues of importance to the life of Tennesseans, their economy, and their government. The research spans such diverse issues as welfare, taxation, Internet, health care, economic development, education and environmental policy. CBER is also the source of data that is used by both the public and private sectors for a wide range of purposes.

The quality and breadth of CBER’s work is also recognized across the U.S. and around the world. The public policy and academic communities from many states and countries call upon CBER researchers to analyze key policy issues.

CBER was established in 1937 as an auxiliary of the College of Business Administration at the University of Tennessee, Knoxville. It is located on the first floor of Temple Court. CBER currently has four research faculty, three faculty fellows in accounting, economics, and law, six graduate students, and an extensive support staff in the areas of research, data analysis, project management, modeling and forecasting, administration, and publications. CBER is designated as a State Data Center, allowing direct and timely access to Census and other data. Additionally, CBER staffs the college’s Technology Information Services, which provides technological support to the entire College of Business Administration.

Center for Executive Education (College of Business Administration)

http://TheCenter.utk.edu

Alex Miller, Associate Dean

The College of Business Administration’s executive/management education efforts are facilitated through the Center for Executive Education, 702 Stokely Management Center. The center is a major outreach activity of the University of Tennessee, Knoxville, and a key link between the business community and the College of Business Administration.

The center offers four executive track Master of Business Administration degrees for working managers. Non-degree programs for the business community include programs in lean enterprise, supply chain management, process improvement and general management.

Much of the center’s work is customized to the needs of individual companies and provided at their sites in the U.S. or abroad.

A prominent feature of all programs is their applied nature. Through projects, assignments and workshops, participants use the courses to analyze their organizations and implement immediate changes.

Additional information about the Center for Executive Education can be found at http://TheCenter.utk.edu.

Center for Information Studies (College of Communication and Information)

www.sis.utk.edu/cis/

The Center for Information Studies (CIS) was established in June 1989 to be a focal point for research related to information systems and services. The center, located at 420 Communications Building, has performed research for the federal government, state and local governments, and business and industry. Projects have ranged from strategic planning efforts to information system and service evaluations, to modeling of scientific and technical communication. Staff of the center have been actively involved in proposal development and project performance with faculty and staff in other centers and departments at the university.

Areas of interest to the center include information systems design, information organization and retrieval in very large databases, directories and locator tools in a networked environment, design of regional library and information system networks, new technology applications, information system support for educational reform, modeling of information processes, development of measures and methods for evaluating information system performance and effectiveness.
Center for Literacy Studies
(College of Education, Health, and Human Sciences)

The Center for Literacy Studies, founded in 1988, links theory and practice in the field of adult learning and literacy. The center collaborates with practitioners, policy makers, and other research organizations in Tennessee and across the nation in providing research, professional development initiatives, partnership development, innovative technology applications, and new approaches and knowledge in the field.

Center for Physical Activity and Health
(College of Education, Health, and Human Sciences)

The mission of the Center for Physical Activity and Health is to integrate scientific research, education, and practical applications of exercise and health science in a manner that enhances health, fitness, performance, and quality of life. The center is a research and service oriented organization designed to educate the University of Tennessee, Knoxville, and Knoxville communities about the benefits of regular physical activity as well as warn about the serious potential health outcomes of a sedentary existence.

A number of research projects are currently being conducted through the center. Many of these projects involve the role that physical activity plays in the prevention and treatment of obesity. In addition to supporting research, the center trains future leaders in exercise promotion, provides exercise opportunities for members of the university community, promotes exercise with the University of Tennessee and Knoxville communities, and provides exercise testing and assessment.

The center focuses its efforts in four main areas: training future leaders in exercise promotion, provides exercise opportunities for members of the university community, promotes exercise within the University of Tennessee and Knoxville communities, and provides exercise testing and assessment.

For additional information about services, contact Dr. Dixie L. Thompson at (865) 974-6040 or via e-mail at dixielee@utk.edu.

Center for Transportation Research
(Office of Research)

Stephen H. Richards, Executive Director

The Center for Transportation Research, formerly the Transportation Center, was created in 1970 to foster and facilitate interdisciplinary research, public service, and outreach in the field of transportation at the University of Tennessee, Knoxville. It began operating full-time in 1972 and since then has contributed greatly to the overall research program of the university.

The center, 600 Henley Street, Suite 309, is a university-level organization administratively positioned within the College of Engineering at the University of Tennessee, Knoxville. The center's multidisciplinary staff includes approximately 100 full-time researchers and technicians augmented with numerous faculty and students. The center is presently organized into five major divisions – Logistics and Systems Analysis, Infrastructure and Environment, Safety and Traffic Operations, Mobility Services and Policy, and Information Technology.

The center has three goals. The first is to conduct a program of research in transportation that is recognized for its excellence, comprehensiveness, innovation, productivity, and national leadership. The second is to develop and sustain the technical expertise for high quality transportation research by the faculty and students within the various departments and colleges of the University of Tennessee, Knoxville. The third goal is to serve the transportation research, service, and training needs of state and local government, business, and industry in Tennessee, the southeast region, and the nation.

Centers and Chairs of Excellence

The Centers of Excellence grew out of Tennessee's Better Schools Program, an initiative to upgrade state-aided education at all levels. State officials and legislators wanted to give a few outstanding academic programs in state-aided universities a special push toward prominence, well beyond regular annual increases for all programs.

In 1984, the General Assembly appropriated and the governor approved $10 million for the first Centers of Excellence throughout the state. The public colleges and universities submitted their proposals for Centers of Excellence to the Tennessee Higher Education Commission, which made the final determinations. Now four of the university’s ten Centers of Excellence are sponsored by the UT Knoxville or located in Knoxville.

Concurrently, the university has received state funding, which it must match dollar for dollar, for Chairs of Excellence. These Chairs are $1 million endowed professorships in areas of significance to the university and to the individual, foundation, or corporation providing the matching gift money. Chairholders are noted within their respective academic units. The Chairs of Excellence are as follows.

KNOXVILLE

Benard Blasingame Chair of Excellence in Agricultural Policy
Chair of Excellence in Science, Technology and Medical Writing
Clayton Homes Chair of Excellence in Finance
College of Business Administration Chair of Excellence of Policy Studies
Condra Chair of Excellence in Computer Integrated Engineering and Manufacturing
Condra Chair of Excellence in Power Electronics Applications
Goodrich Chair of Excellence in Transportation
Hodges Chair of Excellence of English
J. Fred Holly Chair of Excellence in Political Economy
Nancy Gore Hunger Chair of Excellence in Environmental Studies
The University of Tennessee Willis Lincoln Chair of Excellence in Physics
Pilot Chair of Excellence in Leadership
Ivan Racheff Chair of Excellence in Materials Science and Engineering
Ivan Racheff Chair of Excellence of Plant Molecular Genetics
Forrest and Patsy Shumway Chair of Excellence in Romance Languages
Bernadotte E. Schmitt Chair of Excellence of History

MEMPHIS

Maury W. Bronstein Chair of Excellence in Cardiovascular Physiology
Crippled Children's Hospital Foundation
William and Dorothy Dunavant Chair of Excellence in Pediatrics
Federal Express Chair of Excellence in Pediatrics
First Tennessee Chair of Excellence in Clinical Pharmacy
Thomas A. Gerwin Chair of Excellence in Physiology
Goodman Chair of Excellence in Medicine
J. R. Hyde Chair of Excellence in Rehabilitation Engineering
Le Bonheur Chair of Excellence in Pediatrics
E. Erick Muirhead Chair in Pathology
Plough Foundation Chair of Excellence in Pediatrics
Second Le Bonheur Chair of Excellence in Pediatrics
Semmes-Murphey Chair of Excellence in Neurology
Mark S. Soloway Chair of Excellence in Urology
Harriet S. Van Fleet Chair of Excellence in Biochemistry
Harriet S. Van Vleet Chair of Excellence in Microbiology and Immunology
Harriet S. Van Vleet Chair of Excellence in Pharmacology
Harriet S. Van Vleet Chair of Excellence in Virology
The University of Tennessee Medical Group Chair in Obstetrics and Gynecology

UTSI
H. H. Arnold Chair of Excellence in Computational Mechanics
Boling Chair of Excellence in Space Propulsion

The combination of the Centers of Excellence and Chairs of Excellence adds a dimension to the University of Tennessee that is not easily equaled by other institutions. UT’s reputation as the premiere university in the state and as a regional and national leader in instruction, research, and public service is enhanced as a result of the infusion of these special funds.

For information concerning the individual centers sponsored by the University of Tennessee, contact

Center for Laser Applications
Dr. William H. Hofmeister, Director
Space Institute
B. H. Goethert Pkwy.
Tullahoma, Tennessee 37388-8897
(931) 393-7485
(jlewis@utsi.edu)

Center of Excellence for Computer Applications (CECA)
Dr. Clinton Smullen, Director
UT Chattanooga
124 Grote Hall
Chattanooga, Tennessee 37403
(423) 755-4787
(csmullen@cecasun.utc.edu)

Center of Excellence for Livestock Diseases and Human Health
Dr. Robert N. Moore, Director
The University of Tennessee College of Veterinary Medicine
Veterinary Teaching Hospital
Knoxville, Tennessee 37996
(865) 974-5570
(rmoore1@utk.edu)

Center of Excellence for Materials Processing
Dr. Carl McHargue, Director
The University of Tennessee, Knoxville
514 East Stadium Hall
Knoxville, Tennessee 37996-2351
(865) 974-7680
(crl@utk.edu)

Center of Excellence for Neuroscience
Dr. David V. Smith, Director
The University of Tennessee Health Science Center
855 Monroe Avenue, Suite 515
Memphis, Tennessee 38163
(901) 448-5957
(dvsmith@utmem.edu)

Center of Excellence for Pediatric Pharmacokinetics and Therapeutics
Dr. Richard A. Helms, Director
The University of Tennessee Health Science Center
62 S. Dunlap Street, Suite 210
Memphis, Tennessee 38163
(901) 448-6034
(rhelms@tennessee.edu)

Molecular Resource Center of Excellence
Terry Mark-Major, Manager
The University of Tennessee Health Science Center
956 Court Avenue, Room A130
Memphis, Tennessee 38163
(901) 448-2656
(mrc@utmem.edu)

The Science Alliance
Dr. Jesse Poore, Director
University of Tennessee
101 South College
Knoxville, Tennessee 37996
(865) 974-6765
(jpoore@utk.edu)

Waste Management Research and Education Institute
Dr. Gary Sayler, Director
The University of Tennessee, Knoxville
The University of Tennessee Conference Center, Suite 311
Knoxville, Tennessee 37996
(865) 974-8080
(sayler@utk.edu)

Early Learning Center for Research and Practice
(College of Education, Health & Human Sciences)
http://elc.utk.edu

Rena Hallam, Executive Director
The Early Learning Center for Research and Practice, operated by the Department of Child and Family studies since 1927, currently offers an early education program for young children ages six weeks to five years, including children with disabilities. Through its high-quality model program for children and for university students, the Early Learning Center serves three purposes – to promote the research and scholarship activities of the department and other university faculty and students through observation and study of young children, their families and teachers; to prepare undergraduate and graduate child development and early education professionals to work effectively with young children and families; and to provide a model early education program for children, families, and early childhood professionals. Housed in three locations, the ELC sites are all equipped with videotaping capabilities, small group research rooms, and observation booths that facilitate observation and research. A variety of research projects (such as the development of creativity in young children, early childhood assessment, teachers as collaborative researchers, and nutritional preferences of toddlers) are ongoing. The Early Learning Center is accredited by the National Academy of Early Childhood Programs, a division of the National Association for the Education of Young Children and is a Tennessee Three-Star rated child care facility.

For more information, check the website at http://elc.utk.edu.
Institute for a Secure and Sustainable Environment
(Office of Research)

The University of Tennessee’s Institute for a Secure and Sustainable Environment (ISSE), pronounced ICE, promotes development of policies, technologies, and educational programs that cut across multiple disciplines, engage the university’s research faculty and staff, and grow in response to pressing environmental issues facing the state, the nation, and the globe. ISSE, which is located in Suite 311 in the UT Conference Center Building, 600 Henley St., became operational on July 1, 2006.

The institute represents a restructuring and expansion of the Waste Management Research and Education Institute—a state Center of Excellence established in 1985—to focus more broadly on environmental challenges. The institute includes programs previously found in two other long-standing organizations housed at the university and devoted to environmental research: the Joint Institute for Energy and Environment and the Energy, Environment, and Resources Center. This consolidation of environmental research activities enhances collaboration, facilitates more efficient administration, and builds on existing strengths and on-going research efforts.

Though the institute pursues an interdisciplinary research agenda, its efforts fall into the following program areas: water resources, environmental security, energy economics and policy, environmental sustainability, and environmental education and social perspectives.

Each program area develops research programs and projects specific to the focus topic and, when appropriate, draws on the expertise of specialists from other disciplines at the university as well as from the larger public and private research community.

Visit the ISSE Web site at: isse.utk.edu.

Institute of Agriculture
Buddy Mitchell, Interim Vice President for Agriculture

The Institute of Agriculture dates to 1869 when the university was designated as Tennessee’s Federal Land-Grant Institution. Since the enabling federal legislation, agriculture education programs expanded to include mission-oriented basic and applied research in agricultural sciences and natural resources, and extending this knowledge to the citizens of the state. The Institute of Agriculture is composed of four units—the Tennessee Agricultural Experiment Station, UT Extension, the College of Agricultural Sciences and Natural Resources, and the College of Veterinary Medicine.

Agricultural Experiment Station
Thomas H. Klindt, Interim Dean

The university’s Board of Trustees established the Agricultural Experiment Station on June 8, 1882, five years before the passage of the Hatch Experiment Station Act by the U.S. Congress. The university was one of the first five institutions in the U.S. to establish an Agricultural Experiment Station. Since its creation, the Station’s priority has been research to improve agricultural production, products, and marketing in Tennessee. Over time, programs have expanded to include natural resources and environmental stewardship.

The mission-oriented research initiatives of the Tennessee Agricultural Experiment Station, which are also reflected in thematic areas of the academic programs, are

- Molecular agriculture—applying the tools of biotechnology to agricultural and natural resources problems.
- Agro-environmental systems—systems approach to production and natural resources problems.
- Innovative technologies—engineering and processing technologies in agriculture and food systems.
- Agribusiness policies and practices—developing policies and practices that have economic, environmental and societal benefits.

The seven academic departments located in Knoxville are part of the Tennessee Agricultural Experiment Station. The faculty members, with joint appointments in the Experiment Station and the College of Agricultural Sciences and Natural Resources, are the graduate faculty participating in the eleven Master of Science and five doctoral programs. Research is conducted on campus and at ten Research and Education Centers located across Tennessee and operated by the Experiment Station. The Experiment Station also supports graduate student assistantships.

University of Tennessee Extension
Charles Goan, Interim Dean

The University of Tennessee Extension was established in 1914. Its purpose is to extend through various educational means agricultural, natural resources, and family and consumer sciences information to the citizens in the state.

The program is carried on through offices in each of the 95 counties of the state. Educational emphasis includes work in four major program areas: agriculture and natural resources, resource development, family and consumer sciences, and youth education through 4-H Clubs. County Extension staff members working directly with local people are supported in various disciplines by faculty who are stationed either in Knoxville, Nashville, or Jackson. The University of Tennessee Extension works cooperatively with faculty and staff at Tennessee State University in administering programs.

Faculty members, who are State Specialists, and area agents collaborate with other faculty members of the Institute of Agriculture to conduct ongoing and timely, issue-based applied research to meet the needs of agricultural producers, foresters, and others involved with the food and fiber system. Many of the Extension faculty members are involved with the departmental graduate programs.

UT Extension operates as one of the four units in the Institute of Agriculture. The state is divided into three regions with directors located in their respective regions. Regional headquarters are maintained in Knoxville, Nashville, and Jackson. Extension operates in a three-way partnership among county, state and federal governments. The University of Tennessee represents the state and federal government, and a County Agricultural Extension Committee represents county government in this partnership.

University Libraries
Barbara I. Dewey, Dean
Jill Keally, Interim Associate Dean
Pauline Bayne, Interim Assistant Dean
http://www.lib.utk.edu/

Professors
Baker, G., MLS ................................................. Alabama
Bayne, P., MSLS .................................................. North Carolina
Britten, W., MSLS ............................................. Clarion
Crowther, K., MLn. ............................................. Emory
Dewey, B., MLS ................................................. Minnesota
Felder-Hoehne, F., MSLS ................................. Atlanta
Leach, S., MLn ...................................................... Emory
Phillips, L., MLS .................................................. Rutgers
Smith, R., MSLS ............................................... Illinois

Associate Professors
Atkins, D., MLS ................................................. Wisconsin
Berry, T., MLS .................................................. Tennessee
Bridges, A., MLS ................................................. Rhode Island
Deeken, J., MSLS .............................................. North Texas State
Dixon, L., MSLS ................................................. Tennessee
Garrett, M., MLS .................................................. Vanderbilt
Keally, J., MSLS .................................................. Tennessee
Manoff, M., MLIS ................................................. South Carolina
Prescod, J., MSLS ................................................. Western Michigan
Purcell, A., MLS .................................................. Maryland
FACILITIES FOR RESEARCH AND SERVICE

from The Studio. The Center for Children’s and Young Adult Literature on the third floor provides a study collection of children’s books.

The Agriculture and Veterinary Medicine Library (Room A-113, Veterinary Teaching Hospital) has a strong collection in agriculture; veterinary, comparative and human medicine; environmental studies and biodiversity; and related biological sciences.

The Map Library (Room 15, basement of the Hoskins Library, 1401 Cumberland Ave.) houses a large collection of sheet maps, atlases, journals, and digital resources related to cartography and GIS. Materials in print, film, and digital formats are gathered from commercial sources as well as the Government Depository program.

The Music Library (301 Music Bldg.) has a comprehensive collection of music and music literature, including books, scores, audio and video recordings, current periodicals, and microfilm. Most materials in the Library of Congress "M" classification are located here. Special Collections (2nd floor, west wing, of the Hoskins Library) is dedicated to building collections of manuscripts, rare books, and other unique research materials. Collection strengths include Tennessee authors, Tennessee history and politics, Oak Ridge, and TVA. The Great Smoky Mountains Regional Collection is an ongoing effort to collect and preserve materials on the region. Students are welcome to use Special Collections. Materials from Special Collections cannot be checked out, but they can be used in the Special Collections Reading Room. The University Archives are also housed in the Hoskins Library. The Archives contain official records of the university; items published by its units, departments, and agencies; and materials that document University of Tennessee life.

The Social Work Library (Room 292, 193-E Polk Ave., Nashville) serves College of Social Work students in field practice across the state. The library has a working collection of materials in social work and related disciplines.

The Law Library on the Knoxville campus and the libraries located on the campuses in Chattanooga, Martin, Memphis, and Tullahoma are separately administered. The students and faculty of the university can use all of the libraries affiliated with The University of Tennessee.

The University of Tennessee Libraries own approximately 2.4 million volumes and subscribe to more than 32,000 periodicals and serial titles.* The UT Libraries are committed to providing access to information in all formats. A strong collection of electronic resources are available through the Libraries’ Web page at www.lib.utk.edu. UT’s Digital Library Center hosts a growing number of digital collections. The Libraries’ membership in the Association of Research Libraries reflects the university’s support of large collections of library materials to meet the needs of a comprehensive university curriculum.

Experts at the reference desk in each library offer help and assistance in using the library for research. AskUs.Now (www.lib.utk.edu/ref/askusnow/) provides chat, e-mail, IM (instant message), and telephone connections to librarians. Students will find a wide variety of materials and services in the main library (John C. Hodges Library), four branches on the Knoxville campus (Agriculture and Veterinary Medicine Library, Map Library, Music Library, and Special Collections), and the Social Work Library in Nashville.

Students can search the library catalog and hundreds of databases at any library location – and through the UT Libraries’ Web site. Interlibrary Services is available to help students find and retrieve materials that are not available in the UT Libraries. Workshops and classes are offered throughout the semester to help students learn how to get the most out of the Libraries’ services. The services and facilities of the UT Libraries are accessible to persons with disabilities.

The John C. Hodges Main Library (1015 Volunteer Blvd.) is a 350,000 square-foot building housing collections in all subject areas. Reference assistance and research consultation are available in Reference Services (Room 135) and The Commons (Rooms 220 and 235). The Commons, which is jointly staffed by the University Libraries and the Office of Information Technology, offers a computer help desk, a wide range of software applications and computer equipment, spaces for individual and group study, and loaner laptops configured to access the wireless network. The Commons is open continuously from noon on Sunday to midnight on Friday, MLIS Fall and Spring Semesters. The Tennessee CyberCafe, with reading tables and a coffee shop, also is open for late night study. The Studio (Room 245) offers students a state-of-the-art lab for graphics, video and web production. Still and video cameras are available for checkout.

* Data describe the Knoxville campus, excluding the Law Library.

Maintenance and Reliability Center (College of Engineering)
Thomas V. Byerley, Director

The Maintenance and Reliability Center (MRC), located at East Stadium Hall, was created in 1996 to provide an international center for research, development and application of advanced maintenance and reliability engineering. Over 30 industrial firms and a network of universities and national laboratories have joined with the University of Tennessee, Knoxville, in this endeavor. The four-fold mission of the MRC consists of education, research and technology assessment, information sharing, and business support and alliances. The mission has established maintenance and reliability engineering as an interdisciplinary activity with application across a broad spectrum of industrial activities. In addition to the technology, the MRC stresses the development of management techniques that will provide industry with the means to assess the availability, costs and benefits of advanced maintenance and reliability engineering practices.

For information on the educational opportunities offered by the center, check the Web site at http://www.engr.utk.edu/mrc/.
Nutrition Institute
(College of Education, Health, and Human Sciences)

Michael B. Zemel, Director

The Nutrition Institute is a system wide, multidisciplinary consortium of faculty who are engaged in clinical and experimental nutrition research, teaching, and service. Its expertise and resources are multifaceted including tools and techniques used in cell biology, epidemiology, metabolism, and clinical training.

The multidisciplinary nature of nutrition has created a situation where nutrition research and teaching is dispersed among a number of academic units, including the Department of Nutrition in the College of Education, Health, and Human Sciences as well as in several departments in the colleges of Agricultural Sciences and Natural Resources, Arts and Sciences, Medicine, and Veterinary Medicine. The institute fosters collaboration among all efforts in nutrition sciences, coordinates collaborative research programs in nutrition and provides a unified forum for exchange and interactions with the national and international nutrition community. In addition, by creating formal ties among the units within the university that are involved in undergraduate, graduate and professional education in nutrition, teaching resources are pooled to strengthen nutrition-related instruction in these units.

Office of Information Technology

http://oit.utk.edu

The Office of Information Technology (OIT) provides computing and telecommunications resources and services for students, faculty, and staff. Information about OIT is available on the OIT Web site http://oit.utk.edu.

OIT provides the core information technology equipment and services for The University of Tennessee, Knoxville. OIT provides public-access computer labs, central computing, administrative information systems, and network services, as well as information security for UT Knoxville.

Individual computer accounts are provided at no charge for all UT Knoxville students. The student’s UT email account is the official way the university communicates with students. These accounts may be used for e-mail, course work, research, and personal Web pages. Information and on-line registration for computer accounts are available at http://oit.utk.edu/accounts/. Students are also encouraged to download http://antivirus.utk.edu and use AntiVirus software supplied by OIT at no cost to the student.

Students on the Knoxville campus may access the Internet through wireless, direct Ethernet, or dial-up connections. UT Knoxville’s wireless infrastructure is available in most of the academic and administrative buildings on the Knoxville campus.

To provide access to computing facilities on campus, OIT staffs several computing labs including the new Commons located on the second floor of Hodges Library. The computing labs are equipped with Windows XP and Mac OS X computers along with black and white and color laser printers, scanners, and DVD/CD writers. A variety of industry standard software applications are available for use on the machines in the computing laboratories. Refer to http://oit.utk.edu/labs for more information.

OIT Help Desk

OIT provides the telephone Help Desk as a centralized source of information and service for the computer and network resources managed by OIT. Help Desk Services are available to all University of Tennessee students. To contact the Help Desk, dial 974-9900. The Help Desk may be contacted online by filling out the Help Desk request form which can be found at http://oit.utk.edu/contact.html. For more information, visit the Help Desk Web site at http://oit.utk.edu/helpdesk.

OIT Customer Service Center

OIT maintains a Customer Service Center that centrally locates all contact points for walk-in support on related OIT services. Students can receive assistance and/or training on a wide variety of topics at the center. These services include installing academic software free of charge on personally owned computers and helping students diagnose problems with their computers. The center also cleans up virus and spyware infected machines and reloads/upgrades operating systems. The Customer Service Center is located in the Commons, 2nd Floor Hodges Library and is open M-Th 9-9, F 9-4, Sun 4-9

Technology Training

Several courses are offered aimed at improving skills with the technology available at UT. Life Preserver: An Introduction to UT Computing is offered several times each semester on supported application software and operating systems. Other courses include those about MS Office products, Dreamweaver, JavaScript, using the Internet and search engines, and Web Page Essentials (four levels of HTML training). There is also a series of courses on Adobe Photoshop. Please refer to http://web.utk.edu/~training for more information.

Computer-Based Training

Computer-Based Training (CBT) is a self-paced series of interactive, Web delivered, learn-as-you-go courses offered on many computing topics. CBT offers courses for Microsoft products (Word, Excel, etc.), Internet topics (Internet basics, How to create a Web page, etc.), and more advanced topics, such as JavaScript, Visual Basic, object-oriented techniques, and open systems. There are over 800 courses available. This training is free to students. For registration and access to the CBT courses on the Web go to http://oit.utk.edu/cbt/.

Statistical Consulting Center

The center’s mission is to help UT students, faculty, and staff enhance the quality of their research by working together to effectively apply analytical methods, especially statistics. The software we support includes SPSS, SAS, Maple, MATLAB, LabVIEW, QDA Miner, WordStat, Enterprise Miner and Text Miner. The SCC can help you with determining sample sizes, designing surveys and deploying them on web pages, scanning and scoring Scan Forms, acquiring and managing data, analyzing or mining data or text, visualizing data through interactive or presentation graphs, and interpreting the results. Assistance is available by appointment via the Help Desk at 974-9900, by walk-in at 200 SMC, and by e-mail at StatHelp@utk.edu. For details, see http://oit.utk.edu/scc/.

Innovative Technology Center

The Innovative Technology Center (http://itc.utk.edu) provides the leadership, support, resources, and training necessary to help University of Tennessee faculty, graduate teaching assistants, and academic teaching staff make effective use of technology in their teaching, both online and in the classroom. The ITC supports the university’s academic community by providing free production services for the design and development of web-based course materials, implementing faculty grants for instructional technology projects, and administering Online@UT, the university’s Blackboard-powered integrated online academic community. Students can get help with Online@UT/Blackboard by calling the OIT Help Desk at 974-9900.

Psychological Clinic

(College of Arts and Sciences)

Lance Laurence, Director

The Psychological Clinic supports graduate research and training in clinical psychology. Psychological assessment and psychotherapy are offered on an outpatient basis to the general public as well as to university students and staff.
Research Consortiums

The University of Tennessee, Knoxville, is a member of three not-for-profit research consortiums – Oak Ridge Associated Universities (ORAU); Southeastern Universities Research Association (SURA); and Universities Research Association, Inc. (URA).

Oak Ridge Associated Universities (ORAU). Since 1946, students and faculty of the University of Tennessee, Knoxville, have benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of 91 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 research 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 manages, 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, geological sciences, physics, 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 numbers of under-represented 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 http://www.orau.gov/orise/educ.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 Lillian T. Mashburn; Director, Office of Federal Relations; ORAU Councilor for the University of Tennessee or Monnie E. Champion, ORAU Corporate Secretary at (865) 576-3306; or visit the ORAU home page: http://www.orau.org.

Southeastern Universities Research Association (SURA). SURA is a nonprofit consortium of forty-one universities in thirteen Southeastern states and the District of Columbia. SURA’s goals are to foster excellence in scientific research, to strengthen the scientific and technical capabilities of the nation and the Southeast, and to provide outstanding training opportunities for the next generation of scientists and engineers. The SURA-Oak Ridge National Laboratory (ORNL) Summer Cooperative Research Program in Materials Science and Engineering was established in 1989 to promote collaborations between individual university investigators and ORNL researchers. The SURA Continuous Electron Beam Accelerator Facility (CEBAF) Graduate Fellowship Program offers awards to promising graduate students enrolled or enrolling in master’s or doctoral programs at SURA member institutions and whose research interests correspond to research activities to be conducted at CEBAF (i.e., nuclear and related particle physics, accelerator physics, and associated scientific and engineering fields).

Universities Research Association, Inc. (URA). URA, Inc. is a management operating contractor for the U.S. Department of Energy (DOE) for the design, construction, and operation of the Fermi National Accelerator Laboratory (Fermilab) located near Batavia, Illinois. URA provides funds to support courses for graduate students at Fermilab. Member institutions have graduate study programs in science and are active in particle physics and astrophysics.

Tennessee Water Resources Research Center

(Office of Research)

http://eerc.uta.edu/divisions/WRRC.html

Timothy R. Gangaware, Associate Director
Dr. Bruce A. Tischantz, Senior Research Associate
Ruth Anne Hanahan, Senior Research Associate

The Tennessee Water Resources Research Center, 600 Henley Street, Suite B060, is a federally designated institute for sponsoring and coordinating water research for the state. The mission of the center is: (1) to assist and support all the academic institutions of the state, public and private, in pursuing water resources research which addresses a wide range of problems; (2) to provide for information dissemination and technology transfer services to state and local government bodies, academic institutions, professional groups, environmental organizations, and others, including the general public, who have an interest in water resources matters; and (3) to promote education and training in fields relating to water resources and to encourage the entry of promising students into careers in these fields. The center maintains a technical library that includes numerous water resources-related databases on CD-ROM and other references in support of its broad-based program involving watershed management, water quality education, urban stormwater management, erosion prevention, and sediment control. The center sponsors and conducts training workshops on stormwater management and erosion prevention and sediment control for the state.

Textiles and Nonwovens Development Center

(Office of Research)

Linda R. Painter, Director
G Allan Stahl, Project Director
Jack L. Wyrick, Operations Supervisor

The Textiles and Nonwovens Development Center (TANDEC) is a research and application development facility for melt processed nonwoven fabrics. These are materials used in a variety of products such as disposable diapers, wipes, hospital gowns and drapes, and protective clothing and masks. Officially dedicated in 1990, TANDEC was established through a grant from ExxonMobil Chemical Company. The Center brings together academics and industry to provide leadership in research, education, and industry services, by developing innovative materials, studying basic engineering and scientific aspects of products and processes, building cross-disciplinary research groups, and providing a range of laboratory and pilot scale equipment. Opportunities exist for faculty and students to work with pilot scale processing lines and interact with industrial engineers and scientists.

Tourism Institute

(Official of Research)

Stephen C. Morse, Director

Through education, research, and public service the Tourism Institute at the University of Tennessee seeks to add value to Tennessee’s largest sector of the economy – hospitality and tourism. Centered in the department of Retail, Hospitality, and Tourism Management in the College of Education, Health and Human Sciences, many research projects involve maintaining databases of tourism trends, econom-
Students who enroll at USTI are admitted to graduate study at the University of Tennessee, Knoxville. Graduate Research Assistantships are available for qualified students. Further information may be obtained from the Dean for Academic Affairs, the University of Tennessee Space Institute, Tullahoma, Tennessee 37388.

**University Outreach and Continuing Education**

Norvel Burket, Assistant Vice Chancellor

The University of Tennessee, Knoxville, is committed to its land-grant mission of public service. The institution meets that mission by extending its continuing education services and programming resources through outreach initiatives. University Outreach and Continuing Education works with academic departments to offer courses, educational services and programs. The division offers programs using a variety of modes, helping people of all ages achieve degrees and certificates, accomplish professional development goals, and pursue intellectual and self-improvement interests.

Programs and courses are based upon student needs and desires, whether for self-motivated learning; for leisure and recreational programs; or for professional promotion, certification, licensure, re-licensure, or mid-career changes. The division provides these opportunities through program coordination and development of the four departments – Department of Conferences, Department of Distance Education and Independent Study, English Language Institute, and Professional and Personal Development.

For more information, contact

University Outreach and Continuing Education
The University of Tennessee
313 Conference Center Building
Knoxville, Tennessee 37996-4137
Phone (865) 974-3181, fax (865) 974-6629
E-mail outreach@tennessee.edu
Web site www.outreach.tennessee.edu

**Department of Conferences**

Robert Gibbs, Director

The Department of Conferences, housed in the Conference Center Building in downtown Knoxville, provides management services to university departments and faculty or outside groups that desire to hold an educational meeting anywhere in Tennessee or across the United States.

The department assists organizations in designing and managing programs to meet the needs of attendees. The staff provides professional guidance and management for small group meetings as well as for major conventions of several thousand delegates. Consulting and support services can include planning and budgeting, registration, lodging, food services, promotional materials, meeting-site management and all details to ensure a successful event. Some programs qualify for Continuing Education Units (CEUs), which become a permanent record maintained by the University Outreach and Continuing Education.

Additional information may be obtained from

University of Tennessee Conferences
University Outreach and Continuing Education
The University of Tennessee
P.O. Box 2648
Knoxville, Tennessee 37901
Phone (865) 974-0250, fax (865) 974-0264
E-mail conferences@tennessee.edu
Web site www.outreach.tennessee.edu/conferences

The University of Tennessee Space Institute

Donald C. Daniel, Associate Vice President and Chief Operating Officer

The Space Institute is a graduate education and research institution located on a 365-acre lakeshore campus in Middle Tennessee. Established in 1964, UTSI has evolved into an internationally recognized engineering and science graduate school and a premier research center. The Institutes graduates include award-winning scientists, leaders in the aerospace industry, heads of large engineering companies and space pioneers, including astronauts. The accredited academic programs and educational policies of the Space Institute have their origins in appropriate departments of the University of Tennessee, Knoxville.

The faculty members at the institute carry out the academic programs through classroom teaching, informal seminars, active research, and directing the research of their students in an environment of creative work and advanced study. Programs are available to students devoting full-time or part-time effort toward M.S. and Ph.D. degrees and those who wish to pursue post-doctoral research. Off-campus offerings are made available through the use of distance learning technologies in some academic disciplines.

The Space Institute extends its scope well beyond space-specific disciplines, and offers graduate degree programs in mechanical and aerospace engineering/engineering science (MAES), aviation systems, industrial and information engineering/engineering management, electrical engineering, physics and mathematics.

The Institute’s faculty, staff and students are making a difference for our community, state and nation. Within several diverse research areas, faculty-student teams of aerospace engineers, mathematicians, mechanical engineers, physicists, electrical engineers, and materials scientists/engineers perform multidisciplinary research. In addition to the fundamental studies characteristic of each discipline, research opportunities are available in many areas including applied fluid dynamics, biomedical physics, carbon based materials, computational mechanics, laser applications, engineering management and flight systems.

The Center of Excellence in Laser Applications offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, pico-second processes, and coherent and non-linear optic and biological applications.

The institute was established in part to increase the research and engineering resources of Tennessee in relevant scientific and technical areas and in part to interface university faculty and student research with the Air Force Arnold Engineering Development Center. The faculty, research activities, and facilities of the Institute, and those available at Arnold Center through appropriate contractual arrangements, provide students an unusual opportunity for significant research in these areas.
University Conference Center
Robert Gibbs, Director

The University Conference Center, managed by the Department of Conferences, offers quality meeting facilities and service to university units, business and industry groups, professional organizations, and government agencies. Professional groups and interested individuals can request interactive videoconferencing to locations worldwide. The University Conference Center is located at 600 Henley Street in downtown Knoxville.

Additional information may be obtained from
UT Conference Center
The University of Tennessee
Suite 212
Knoxville, Tennessee 37996
Phone (865) 974-0250, fax (865) 974-0264
E-mail conferences@tennessee.edu
Web site www.outreach.tennessee.edu/conferences

English Language Institute
Jim Hamrick, Director

The English Language Institute (ELI) offers a non-credit language-study program. It is designed to assist students in their pursuit of career goals or educational objectives in the United States. The courses emphasize development of communicative ability in listening, speaking, reading, and writing. Faculty members are trained in teaching English to speakers of other languages and different national backgrounds.

The curriculum consists of eight proficiency levels: 101-108, Introductory through Pre-Academic.

Classes meet each day with emphasis on English Structure (Grammar); Listening Comprehension, Writing/Composition (Rhetoric), Conversation Practice for Communicative Purposes, Reading and Vocabulary.

Classes also assist students in pronunciation, test-taking strategies, U.S. culture orientation, and university study skills.

ELI offers on and off-campus classes for professional and academic audiences. ELI also offers seminars for international graduate students who need to improve their spoken English or pedagogical skills for the purpose of serving as graduate teaching assistants.

Additional information may be obtained from
English Language Institute
University Outreach and Continuing Education
The University of Tennessee
907 Mountcastle Street
Knoxville, Tennessee 37996-3505
Phone (865) 974-3404
Fax (865) 974-6383
E-mail eli@tennessee.edu
Web site www.outreach.tennessee.edu/eli

Department of Distance Education and Independent Study
George H. Hoemann, Assistant Dean

The Department of Distance Education and Independent Study, in concert with academic departments, offers Internet-based, Web-delivered classes, and programs leading to certificates and degrees. The College of Communication and Information and the College of Engineering offer Master’s degree programs through Web-based courses, while the Departments of Nuclear Engineering and Statistics offer courses leading to degree and certificate programs. Other undergraduate and graduate classes and programs are available, as well as a variety of individual courses in many disciplines. Current course availability can be found on the Web at anywhere.tennessee.edu.

The department provides services and support for faculty, students, and industry interested in flexibly-delivered education.

The Internet eLearning Institute provides certificate programs, professional development courses and training.

For information and registration forms, contact the Distance Education Program at
Distance Education and Independent Study
University Outreach and Continuing Education
The University of Tennessee
600 Henley Street, Suite 208
Knoxville, Tennessee 37996-4126
Phone (865) 974-1534 or (800) 670-8657
TDD (865) 974-5078
Fax (865) 974-4684
E-mail DistEducation@tennessee.edu
Web site www.outreach.tennessee.edu

That meet requirements of the state or other agencies for certification in real estate and financial planning.

Special programming also includes Kids U which provides summer hands-on workshops for elementary and secondary education students; Seniors for Creative Learning, a membership-based program focusing on issues and courses for senior adults; and the Smoky Mountain Field School, a program sponsored with Great Smoky Mountains National Park.

For further information or to register, contact
Department of Professional and Personal Development
University Outreach and Continuing Education
The University of Tennessee
313 Conference Center Building
Knoxville, Tennessee 37996-4137
Phone (865) 974-0150
Fax (865) 974-0154
E-mail ProfessionalPgms@utk.edu
Web site www.outreach.utk.edu/ppd

University Conference Center
Robert Gibbs, Director

The University Conference Center, managed by the Department of Conferences, offers quality meeting facilities and service to university units, business and industry groups, professional organizations, and government agencies. Professional groups and interested individuals can request interactive videoconferencing to locations worldwide. The University Conference Center is located at 600 Henley Street in downtown Knoxville.

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E-mail eli@tennessee.edu
Web site www.outreach.tennessee.edu/eli

Department of Distance Education and Independent Study
George H. Hoemann, Assistant Dean

The Department of Distance Education and Independent Study, in concert with academic departments, offers Internet-based, Web-delivered classes, and programs leading to certificates and degrees. The College of Communication and Information and the College of Engineering offer Master’s degree programs through Web-based courses, while the Departments of Nuclear Engineering and Statistics offer courses leading to degree and certificate programs. Other undergraduate and graduate classes and programs are available, as well as a variety of individual courses in many disciplines. Current course availability can be found on the Web at anywhere.tennessee.edu.

The department provides services and support for faculty, students, and industry interested in flexibly-delivered education.

The Internet eLearning Institute provides certificate programs, professional development courses and training.

For information and registration forms, contact the Distance Education Program at
Distance Education and Independent Study
University Outreach and Continuing Education
The University of Tennessee
600 Henley Street, Suite 208
Knoxville, Tennessee 37996-4126
Phone (865) 974-1534 or (800) 670-8657
TDD (865) 974-5078
Fax (865) 974-4684
E-mail DistEducation@tennessee.edu
Web site www.outreach.tennessee.edu
Courses of Instruction

REGISTRATION NOTES
(RE) Prerequisite(s) and Corequisite(s) will be enforced by the Registration System in the future. They are currently enforced by the department.
(DE) Prerequisite(s) and Corequisite(s) are enforced by the department.
Registration Restrictions are enforced by the Registration System.

Accounting (009)

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

507 Financial Reporting Research and Contemporary Issues (3)
Theory and practice of contemporary financial reporting issues are covered with an emphasis on researching the authoritative accounting literature. Specific contemporary issues covered vary each semester.
Comment(s): Master of Accountancy admission or consent of instructor required.

518 Professional Standards (3) Basic standards and contemporary issues relevant to assurance providers. Actual practice cases are used to illustrate application.
Comment(s): Master of Accountancy admission or consent of instructor required.

519 Seminar in Business Risk and Assurance Methodology (3) Business risk and emerging methodology used by assurance providers.
Comment(s): Admission to a graduate program or consent of instructor required.

521 Governmental, Not for Profit, and Management Accounting (3)
Accounting principles and reporting models for governmental and not for profit organizations. Uses of management accounting information in decision making and performance evaluation.
Comment(s): Admission to a graduate program or consent of instructor required.

530 Tax Research, Accounting Practice, and Procedures (3) Methods of researching tax issues within the federal tax system with emphasis on Internet-based research tools. Tax accounting periods and methods. Tax procedures for dealing with the Internal Revenue Service. Tax practice standards and ethical concerns.
Comment(s): Master of Accountancy admission or consent of instructor required.

531 Tax Strategy and Entity Taxation (3) Introduction to tax research. Current issues in tax strategy and planning including investment models, implicit taxes, organizational form, and other selected topics. Income taxation of business entity operations including financial statement implications of income taxes.
Comment(s): Master of Accountancy admission or consent of instructor required.

532 Corporate Taxation and Reorganizations (3) Current issues in corporate taxation including organization and capital structure, distributions, liquidations, acquisitions, and reorganizations. Course emphasizes group projects and presentations. Web-based research tools used extensively.
(DE) Prerequisite or (DE) Corequisite: 531.
Comment(s): Master of Accountancy admission or consent of instructor required.

533 Taxation of Partnerships and S Corporations (3) Current issues in partnership and S corporation taxation including partnership formation, operations, allocations, and distributions; LLCs; S corporation election and operations; and comparisons of different flow-through entities. Course emphasizes group projects and presentations. Web-based research tools used extensively.
(DE) Prerequisite or (DE) Corequisite: 531.
Comment(s): Master of Accountancy admission or consent of instructor required.

539 Multi-Jurisdictional Tax Planning and Policy (3) International and state tax law as it pertains to business transactions. Particular emphasis is placed on identifying tax planning opportunities and designing tax strategies to meet planning objectives.
(DE) Prerequisite: 531.
Comment(s): Master of Accountancy admission or consent of instructor required.

592 Graduate Internship in Accounting (3) Full-time resident professional employment for one academic semester involving qualified job experience, written report of responsibilities, and evaluation of student performance.
Comment(s): Master of Accountancy admission or consent of Master of Accountancy advisor required.

593 Individual Research in Accounting (3) Directed research in topic of mutual interest.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Master of Accountancy admission or consent of Master of Accountancy advisor required.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

611 Doctoral Seminar in Accounting (3) Analysis of issues reflected in accounting literature.
Registration Permission: Consent of PhD program advisor.

612 Doctoral Seminar in Accounting (3) Analysis of issues reflected in accounting literature.
Registration Permission: Consent of PhD program advisor.

619 Doctoral Research in Accounting (3) Study of research methodology and application of various research methods in accounting literature.
Registration Permission: Consent of PhD program advisor.

621 Accounting Colloquium (1) Research and discussion of contemporary issues in practice of accountancy.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 4 hours.
Registration Permission: Consent of PhD program advisor.

622 Accounting Colloquium (1) Research and discussion of contemporary issues in practice of accountancy.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 4 hours.
Registration Permission: Consent of PhD program advisor.
693 Independent Study (3) Directed research in topic of mutual interest. Repeatability: May be repeated. Maximum 6 hours. Comment(s): Admission to the PhD/business administration major/accounting concentration required.

Advertising (012)
490 Special Topics (3) Detailed study of a specialized area of advertising. Topics vary by semester and include advanced media strategy, advanced creative strategy, direct marketing, and multicultural advertising.

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when the student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

510 Advertising and Society (3) Analysis of advertising as institution in a free-enterprise democratic society and its relation to social, legal, cultural, and economic institutions.

520 Advertising and Communications Theory (3) Application of contemporary communications theories of attitude change, information-processing, and persuasion as applied to creative strategy decisions. Comment(s): Admission to the program or consent of the instructor required.

530 Advertising and Public Relations Research (3) Nature, scope, and application of research function to advertising and public relations decisions. (DE) Prerequisite(s): Statistics 531 or equivalent.

540 Advertising Decision Making (3) Analysis of decision making in budgeting, creative strategy, media strategy, research, evaluation, and agency-client relationships. Advertising response functions. Comment(s): Admission to the program or consent of instructor required.

580 Project (3) Capstone project under guidance of faculty. Application of principles from previous coursework. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 hours.

597 Independent Study (3) Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

Aerospace Engineering (018)
Not all the courses listed below are available at both the University of Tennessee, Knoxville, and UTSI campuses.

422 Aerodynamics (3) Theory and design of aerodynamic bodies for desired characteristics. Potential flow theory, viscous effects, and compressibility effects. Subsonic, transonic, and supersonic airfoils. (DE) Prerequisite(s): 351 and 370.

424 Astronautics (4) Solar system, orbital mechanics, propulsion, atmospheric entry including thermal protection materials, human factors in space flight, the space environment, and current topics. (DE) Prerequisite(s): 351. (DE) Corequisite(s): Mechanical Engineering 331.


426 Introduction to Aerospace Design (2) Design process, synthesis, design studies. Individual design reports required. (DE) Prerequisite(s): 351, 370, and 363. (DE) Corequisite(s): Mechanical Engineering 344.

429 Aerospace System Design (3) Synthesis and design of a complete aerospace system. Participation in team design effort including formal presentations and design report. (DE) Prerequisite(s): 422, 425, and 426.

449 Aerospace Engineering Laboratory (3) Designing, conducting, and reporting results of experimental exercises. Test standards and specifications. Analysis of data and formation of conclusions. (DE) Prerequisite(s): 345, 351, and 425.

494 Selected Topics in Aerospace Engineering (1-4) Problems and topics related to developments and practice in aerospace engineering. Repeatability: Not repeatable. May be taken once for 1 – 4 hours. Registration Permission: Consent of instructor.

495 Selected Topics in Aerospace Engineering (1-4) Problems and topics related to developments and practice in aerospace engineering. Repeatability: Not repeatable. May be taken once for 1 – 4 hours. Registration Permission: Consent of instructor.

500 Thesis (1-15) Grading Restriction: P/NP only. Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when the student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

509 Multidisciplinary Project (1) (See Industrial Engineering 509.)

511 Inviscid Flow (3) Kinematics and dynamics of inviscid fluids; potential flow about body, conformal mapping. (DE) Prerequisite(s): 422 or 541, and Mathematics 425.

512 Viscous Flow (3) Derivation of fundamental equations of compressible viscous flow; boundary conditions for viscous heat-conducting flow; exact solutions for Newtonian viscous flow (Navier-Stokes) equations for special cases; similarity solutions. Thermal boundary layers, stability of laminar flows, transition to turbulence, 2-D turbulent boundary layer equations. Incompressible-turbulent mean flow and compressible boundary layer theory.

Regulation Permission: Consent of instructor.

513 Experimental Methods in Fluid Mechanics (3) Experimental techniques with laboratory experiments; representative experiments: hot wire anemometry and turbulence measurements, flow visualization, wind tunnel tests, water table experiments, supersonic flow experiments, boundary layer measurements, laser-optical measurements. (DE) Prerequisite(s): 423 or 541.

515 Air Vehicle Aerodynamics and Performance (3) Application of aerodynamics principles to air vehicles to provide estimates of performance, stability, and control characteristics for subsonic to hypersonic speeds. Relations among thrust, drag, lift and attitude, propulsion systems, vehicle performance characteristics, and trajectory optimization. (DE) Prerequisite(s): 422.

516 Air Vehicle Aerodynamics and Performance (3) Application of aerodynamics principles to air vehicles to provide estimates of performance, stability, and control characteristics for subsonic to hypersonic speeds. Relations among thrust, drag, lift and attitude, propulsion systems, vehicle performance characteristics, and trajectory optimization. (DE) Prerequisite(s): 515.

521 Aerodynamics of Compressible Fluids (3) One-dimensional internal and external flow; waves; small perturbation theory; slender body theory; similarity rules; method of characteristics. (DE) Prerequisite(s): 422.

522 Aerodynamics of Compressible Fluids (3) One-dimensional internal and external flow; waves; small perturbation theory; slender body theory; similarity rules; method of characteristics. (DE) Prerequisite(s): 521.

525 Hypersonic Flow (3) Slender body flow; simililitude; Newtonian theory; blunt body flow; viscous interactions; free molecule and rarefied gas flow. (DE) Prerequisite(s): 512.

527 Aerospace Ground Test Facilities (3) Atmospheric models and similarity considerations; aerodynamic test facilities: continuous and intermittent wind tunnels and ballistic ranges; propulsion test facilities or air breathing and rocket engines; space environment and space vehicle test facilities. (DE) Prerequisite(s): 521, 541, and Mechanical Engineering 522.

531 Magnetohydrodynamics (3) Electromagnetic field theory; chemical kinetics; thermodynamic and thermophysical properties of gas plasmas; governing equations and applications. (DE) Prerequisite(s): 422 and Mathematics 471.

532 Introduction to Turbulence (3) Macroseopscopic effects, analogies, statistical treatment, correlation functions, energy spectra, diffusion; application of turbulent jets and pipe flow. (DE) Prerequisite(s): 511 and 512.

533 Dynamics (3) (See Mechanical Engineering 533.)

534 Atmospheric Entry (3) Reentry trajectories; lift and drag during reentry; vehicle motion and stability during reentry; aerodynamic heating and heat protection systems. (DE) Prerequisite(s): 512. Recommended Background: 522.
535 Mechanical Vibrations (3) (See Mechanical Engineering 534.)
539 Continuum Mechanics (3) (See Engineering Science 539.)
541 Fluid Mechanics I (3) (See Mechanical Engineering 541.)
542 Fluid Mechanics II (3) (See Mechanical Engineering 542.)
544 Transonic Flow (3) Nature of flow at transonic speeds; small disturbance theory; shock wave properties; shock-free flows; strong viscous interaction phenomena; solution techniques.
(DE) Prerequisite(s): 522.
551 Aerospace Mechanics (3) Principles of mechanics applicable to aerospace vehicles, equations of motion, multibody problems and trajectory analysis.
(DE) Prerequisite(s): Mathematics 471.
554 Aerospace Vehicle Stability and Control (3) Static and dynamic longitudinal directional and lateral stability and control. Coupled modes. Motion with free and fixed flight control surfaces. Automatic control systems.
(DE) Prerequisite(s): 423 and 551.
555 Human Vibrations Analysis and Protection (3) (See Biomedical Engineering 555.)
(DE) Prerequisite(s): 423 and 551.
559 Advanced Mechanics of Materials I (3) (See Mechanical Engineering 559.)
571 Finite Elements for Engineering Applications (3) (See Engineering Science 551.)
572 Computational Fluid-Thermal Systems (3) (See Engineering Science 552.)
573 Computational Solid Mechanics (3) (See Engineering Science 553.)
590 Selected Engineering Problems (2-6)
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Enrollment limited to students in problems option.
Registration Permission: Consent of advisor.
595 Seminar (1) All phases of aerospace engineering, reports on current research at the University of Tennessee, Knoxville, and UTSI.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 20 hours.
599 Special Topics in Aerospace Engineering (1-3)
Repeatability: May be repeated. Maximum 6 hours.
600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.
642 Physical Gas Dynamics (3) High speed, high temperature gas flow from molecular point of view. Kinetic theory, statistical mechanics, equilibrium flow, vibrational and chemical rate processes, non-equilibrium vibrational and chemical flow, non-equilibrium kinetic theory, flow with translational non-equilibrium.
(DE) Prerequisite(s): 522 and Mechanical Engineering 522.
645 Theory of Turbulence (3) (See Engineering Science 645.)
659 Advanced Mechanics of Materials II (3) (See Mechanical Engineering 659.)
661 Advanced Topics in Computational Fluid Dynamics (3) (See Engineering Science 651.)
662 Advanced Topics in Computational Fluid Dynamics (3) (See Engineering Science 652.)
(DE) Prerequisite(s): 512, continuum mechanics, and Mathematics 562.
690 Advanced Topics in Aerospace Engineering (3)
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

Africana Studies (023)
421 Comparative Studies in African and African-American Societies (3) Comparative studies of African and African-American societies in such areas as education, religion, and social stratification. Includes the respective views African-Americans and Africans have of each other and concept of Pan-Africanism.
443 Topics in Black Literature (3) (See English 443.)
450 Issues and Topics in African-American Studies (3) Topics vary but include a variety of problems, issues, and individuals from the field of African-American studies.
Repeatability: May be repeated. Maximum 6 hours.
452 Black African Politics (3) (See Political Science 452.)
461 Art of Southern and Eastern Africa (3) (See Art History 461.)
462 Art and Archaeology of Ancient Africa (3) (See Art History 462.)
463 Arts of the African Diaspora (3) (See Art History 463.)
470 African-American Art (3) (See Art History 470.)
473 Black Male in American Society (3) Examines historical images, myths and stereotypes which have developed concerning African-American males in American society. Includes the impact of such critical factors as black feminism, violence, concepts of masculinity, the family, white males, white females, homosexuality, nationalism, and athletics on African-American males in America.
484 African-American Women in American Society (3) Focuses on historical and contemporary social, economic, and political factors in American society as they relate to the black woman. (Same as Women’s Studies 484.)
510 Special Topics (3)
Repeatability: May be repeated. Maximum 6 hours.

Agricultural and Extension Education (042)
440 Communication Techniques in Agriculture (3) Elements of effective use of mass media in agricultural and extension education. Effective technical writing and presentation strategies for agricultural audiences.
450 Agricultural Leadership Development (3) Identification of styles and roles of leadership; development of leadership techniques and skills required in working with organizations and youth groups; methods of resolving conflict, of communicating, of guiding and evaluating; and ethical considerations for leaders.
500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.
501 Creative Component in Lieu of Thesis (3) Capstone experience completed under supervision of major professor and committee. Individual project: literature survey; development of teaching software; development of curriculum materials; development of white paper; or other suitable project.
Grading Restriction: Satisfactory/No Credit grading only.
Comment(s): Students in the non-thesis option only.
Registration Permission: Consent of major professor.
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.
511 Extension History, Philosophy and Objectives (3) Historical and philosophical foundation of adult education in American agriculture, key figures, issues, legislative movement, farmer organizations and programs. Cooperative Extension Service, origin, legislation and growth, and nature of present-day objectives and programs.
(DE) Prerequisite(s): 211 or consent of instructor.
521 Extension Program Planning and Evaluation (3) Theories and models of program development and evaluation and their use in extension education: planning and conducting needs assessments; planning, organizing, implementing and evaluating extension educational program content and learning activities; development and interaction of county, state and federal extension plans of work; and principles, techniques and instruments used to identify, gather and analyze information to evaluate extension programs.
(DE) Prerequisite(s): 211 and 511 or consent of instructor.
522 Educational Technology in Agricultural and Extension Education (3) Advanced concepts and methods relevant to both formal and non-formal instructional methodologies. Processes by which professional change agents influence the introduction, adoption, and diffusion of technological change.

524 Research Methodology (3) Social science research methods related to research in agricultural and extension education. Issues: research design, reliability and validity in measurement, sampling procedures, logic of analysis, scaling and measurement, and selection and interpretation of appropriate inferential tests of significance.

525 Curriculum Development in Agricultural and Extension Education (3) Models, principles, and procedures for developing curricula in agricultural and extension education programs and scheduling learning activities used to implement these planned programs.

526 Agricultural Education for First-Year Teachers (2) Developing competencies needed by first-year teachers for planning, organizing and conducting program of vocational agriculture in local community. Group meetings in selected centers and visits by instructor.

527 Adult Education Strategies in Agricultural and Extension Education (3) Methods of developing and implementing educational programs for adults in agricultural and extension education and related contexts: different learning of adults and children (androgy vs. pedagogy); understanding and determining adult needs, priorities and motivation for participating in educational programs; adoption of new ideas by adult learners; methods and materials effective in teaching adults; developing favorable attitudes toward post-secondary education and life-long learning.

528 Special Topics in Agricultural and Extension Education (1-3) Current issues. Repeatable. Grading permission: Consent of instructor.

530 Advanced Natural Resource Economics (3) Nature of natural resources; economic efficiency as basis for natural resource use; externalities in natural resource use; factors influencing environmental quality; alternative public policy tools for influencing natural resource use or improving environmental quality.

500 Thesis (1-15) Graduation Restriction: P/NP only. Repeatability: May be repeated. Registration Restriction: Master of Science – agricultural economics major.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Graduation Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

503 Managerial Economics for Agribusiness (3) Practical application of economic concepts to agribusiness management and marketing decisions. Topics include supply and demand analysis, market estimation, production economics, cost analysis, pricing decisions, break-even analysis, capital budgeting, time value of money, and risk and uncertainty.

505 Microeconomic Analysis (3) Theory of utility maximization and demand, production, cost, firm behavior, and supply; price in product and factor markets; efficiency and welfare.

512 Advanced Agribusiness Finance (3) Financial and investment analysis tools and concepts and their application to decisions faced by agribusiness firms. Emphasis on financial analysis and planning principles, capital budgeting, debt structure and financing, options, present value concepts, and risk analysis. Recommended Background: Calculus and intermediate microeconomics courses.

520 Research Methods in Agricultural Economics (1) An overview of the theories and processes of economic inquiry. Topics covered include the relationship between theory and applied research, problem formulation, definition of research problems, development of research program statements with goals and objectives, and presentation and interpretation of results.

524 Econometric Methods in Agricultural Economics (3) Application of statistical methods to agricultural economic models; estimation of supply, demand and production functions; microeconomic forecasting models; interpretation of results. Recommended Background: Calculus and statistics courses.

525 Agribusiness Operations Research Methods (3) Applications of operations research methods and concepts for agribusiness. Theoretical background and applied considerations of each technique with an emphasis on applications. Computer and other applications of each technique for relevant agribusiness problems. Recommended Background: Calculus and intermediate microeconomics courses.

530 Agricultural Policy Analysis (3) Evaluation of public policy as related to agricultural industry and rural areas.

412 Agricultural Finance (3) Macro-finance, financial objectives, acquisition of debt and equity funds, capital investments, capital allocation, debt repayment, credit analysis, borrower and lender loan application analysis, insurance strategies, computer applications, kinds and sources of agricultural credit, and financial intermediation.

420 International Agricultural Trade and Marketing (3) Introduction to real and monetary aspects of international trade effect on agricultural commodity flows; partial equilibrium analysis of international trade in agricultural products; institutional aspects of international marketing of agricultural products.

430 Agricultural Policy (3) Values, goals and policy process. Economic rationale and effects of policy. Historical development and current characteristics of commodity market, credit, food, and trade policy.

442 Agribusiness Management (3) Advanced concepts in developing business and marketing plans and in applied management principles such as inventory control and pricing techniques. Discussion of management issues including going international, employee supervision, management succession and guerilla marketing. Teamwork emphasized in managing an agribusiness firm through game simulation. Written and oral presentation required.

450 Agricultural Industry Analysis and Forecasting (3) Analytical tools for decision making in the agricultural sector; analysis of commodity supply and demand conditions; economic modeling; market forecasting, analysis of temporal and spatial patterns.

470 Natural Resource Economics (3) Nature of natural resources; economic efficiency as basis for natural resource use; externalities in natural resource use; factors influencing environmental quality; alternative public policy tools for influencing natural resource use or improving environmental quality.
Agriculture and Natural Resources (088)

491 International Experience in Agriculture and Natural Resources (1-12) Credit for formalized international experiences related to agricultural sciences and natural resources. Determination of credit based on nature of the proposed experience. Student should discuss the opportunity with their faculty advisor prior to the trip to determine if it is appropriate for credit. Credit hours will be determined by the department and college depending on the extent of activity and types of projects and/or presentations to be completed by the student upon return.
Grading: Satisfactory/No Credit or letter grade.
Repeatable: May be repeated. Maximum 12 hours.

512 Teaching Internship in Agriculture and Natural Resources (1) Supervised experience in teaching – test preparation and evaluation of agriculture students.
Repeatable: May be repeated. Maximum 2 hours for MS students and maximum 4 hours for PhD students.

American Studies (099)

423 Geography of American Popular Culture (3) (See Geography 423.)

442 American Humor (3) (See English 442.)

510 Special Topics (3) Repeatable: May be repeated. Maximum 6 hours.

Animal Science (113)

420 Advanced Reproduction (3) Collection, evaluation, and preservation of ova, spermatozoa and embryos; application of methods of natural breeding and techniques of artificial insemination and embryo transfer; herd sire and dam evaluation; pregnancy determination; gestation and parturition; infertility; recent advances in theriogenology.
Contact Hour Distribution: 1 hour and 2 lab.
(DE) Prerequisite(s): 320 or equivalent.

430 Nutrient Evaluation and Ration Formulation (3) Ration nutrient analysis and formulation for beef and dairy cattle, sheep, horses, swine, poultry, laboratory, zoo, and companion animals. Mathematical and computer solutions and applications to formulating complex rations with constraints.
Contact Hour Distribution: 2 hours and 1 lab.
(DE) Prerequisite(s): 330 or equivalent and an introductory computer science course.

481 Beef Cattle Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into complete production and management programs. Structure of industry, enterprise establishment, systems of production, production practices, and improvement programs. Alternatives evaluated in terms of production responses and economic returns.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Completion of animal science sophomore and junior core courses or consent of instructor.

482 Dairy Cattle Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into complete production and management programs. Structure of industry, enterprise establishment, systems of production, production practices, and herd improvement programs. Alternatives evaluated in terms of production responses and economic returns.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Completion of 300-level courses or consent of instructor.

483 Pork Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into complete production and management programs. Structure of industry, enterprise establishment, systems of production, production practices, and improvement programs. Management evaluated in terms of production responses and economic returns.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Completion of 300-level core courses or consent of instructor.

484 Poultry Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into complete production and management programs. Structure of industry, enterprise establishment, systems of production, production practices, and improvement programs. Management evaluated in terms of production responses and economic returns.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Completion of 300-level core courses or consent of instructor.

500 Thesis (1-15) Grading Restriction: S/P/NP only.
Repeatable: May be repeated.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatable: May be repeated.
Credit Restriction: May not be used toward degree requirements.

511 Special Problems in Animal Science (1-4) Repeatable: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

Recommended Background: General undergraduate coursework in anatomy/physiology and biochemistry or consent of instructor.

523 Advanced Mammalian Reproduction (3) Current topics and new frontiers in reproductive biology.
(DE) Prerequisite(s): 320.

530 Animal Nutrition and Metabolism (4) Comparative digestive physiology, digestion, absorption and metabolism of nutrients in ruminant and nonruminant species. Concepts and methodologies of animal growth and nutrient requirements; interrelationships, availability and deficiencies of nutrients.
Recommended Background: Animal nutrition, feeds, and ration formulation course or consent of instructor.

535 Ruminology (2) Anatomy, physiology, and microbiology of rumen ecosystem: microbial fermentation and metabolism of polysaccharides, lipids and nitrogen.
(DE) Prerequisite(s): 530 or consent of instructor.

536 Ecology of Grazing Land Systems (3) (See Plant Sciences 536.)

571 Design and Analysis of Biological Research (3) Experimental design and procedures; selection of experimental units; analysis and interpretation of data; statistical models and contrasts, analyses of variance: covariates, treatment arrangements, mean separation and regression. (Same as Plant Sciences 571.)
Recommended Background: 3 hours of statistics.

572 Least Squares Analysis (3) Least squares estimation and hypothesis testing procedures for linear models; mixed model methodology; full rank and non-full rank situations; covariance structures; estimation of variance components.
Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: 6 hours of statistics.

596 Seminar on Advanced Topics in Animal Science (1) Required of all first- and second-year MS students.
Repeatable: May be repeated. Maximum 2 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.
Grading Restriction: P/NP only.
Repeatable: May be repeated.

621 Advanced Topics in Animal Physiology (1-4) Recent advances and concepts, research techniques, current problems.
Repeatable: May be repeated. Maximum 6 hours.

631 Advanced Topics in Animal Nutrition (1-4) Recent advances and concepts, research techniques, current problems.
Repeatable: May be repeated. Maximum 6 hours.
652 Disorders of the Endocrine System (2) Pathological and physiological aspects of diseases; endocrine glands of various animal species. (Same as Comparative and Experimental Medicine – Veterinary Medicine 652.)
Recommended Background: 3 hours of physiology.

681 Advanced Topics in Animal Health and Well-Being (1-4) Recent advances and concepts, research techniques, and current problems associated with animal health and behavior.
Repeatability: May be repeated. Maximum 6 hours.

696 Seminar (1) Advanced topics in animal science. Required of all first- and second-year PhD students.
Repeatability: May be repeated. Maximum 2 hours.

Anthropology (122)

410 Principles of Cultural Anthropology (3) Exploration and illustration of major concepts, theories, and methods in cultural anthropology, with application to analysis of specific ethnographies.
(DE) Prerequisite(s): 130.

411 Linguistic Anthropology (3) Basic linguistic concepts applied to research in cultural anthropology, particularly investigation of relationships between language and culture. (Same as Linguistics 411.)
(DE) Prerequisite(s): 130 or Linguistics 200.

412 Folklore in Anthropology (3) Introduction to anthropological study of folklore, using folklore and folklore materials from various tribal, peasant, and complex societies.
(DE) Prerequisite(s): 130 or consent of instructor.

413 Dynamics of Culture (3) Definition and in-depth study of major forms of culture change, ranging from evolution and diffusion to religious revitalization and political revolt. Continuity and change in diverse cultural settings examined through use of archaeological, ethnographic, and contemporary cases.
(DE) Prerequisite(s): 130 or consent of instructor.

414 Political Anthropology (3) Examination of the organization and dynamics of power and politics in both stateless and state-level societies. Role of symbols, rituals, and ideologies in producing and reproducing power relations. The relationship between actors (individuals) and structures. The encapsulation of traditional political forms and systems within modern states.
(DE) Prerequisite(s): 130 or consent of instructor.

415 Environmental Anthropology (3) Overview of theoretical and methodological approaches to the study of human / environmental interactions. Impacts of environmental change on society and culture; human impacts on environmental change.
(DE) Prerequisite(s): 130.
Registration Permission: Consent of instructor.

416 Applied Anthropology (3) Introduction to principles, practice and ethics of anthropology applied to practical problems in non-academic settings. Overview of career opportunities in various domains of applied anthropology.
(DE) Prerequisite(s): 130 or consent of instructor.

431 Ethnographic Research (3) Conceptual and practical exploration of methods and techniques cultural anthropologists use in fieldwork.
(DE) Prerequisite(s): 130 or consent of instructor.

432 Anthropology of Warfare and Violence (3) Origins and tactics of warfare; overview of cultural foundations of warfare and structural violence; and effects on communities, social institutions, environments, and social organization.
(DE) Prerequisite(s): 130.
Registration Permission: Consent of instructor.

435 Historical Archaeology Laboratory (3) Laboratory procedures for processing, identification, and interpretation of artifacts from historical sites. Artificial material from historic East Tennessee sites used for class projects.
Recommended Background: 361.

436 Cities and Sanctuaries of the Greek and Roman World (3) (See Classics 436.)

442 Intensive Survey of the Archaeology of the Prehistoric Aegean (3) (See Classics 442.)

443 Intensive Survey of the Archaeology of Greece (3) (See Classics 443.)

444 Intensive Survey of the Archaeology of Etruria and Rome (3) (See Classics 444.)

462 Early European Prehistory (3) Origins and evolution of human culture in Europe through beginnings of settled life. Primary focus on Paleolithic/Mesolithic chronology and lifeways.
(DE) Prerequisite(s): 120 or consent of instructor.

463 Rise of Complex Civilizations (3) Development of complex societies in old world from origins of agricultural economics to rise of states. Focus on Mesolithic, Neolithic, and Metal Age lifeways in Africa, Europe, and Asia.
(DE) Prerequisite(s): 120 or consent of instructor.

464 Principles of Zoarchaeology (3) Basic osteological studies of major vertebrate groups; with emphasis on the aboriginal’s use of animal subsistence and culture. Identification and interpretation of archeologically derived mollusk and vertebrate remains; with introduction to laboratory use of comparative collections.
(DE) Prerequisite(s): 120 or consent of instructor.

465 Urban Archaeology (3) Field archaeology and interpretation of archeological remains on historic urban sites in the United States. Course content will include lectures and field and laboratory research on urban sites in East Tennessee.
Recommended Background: 361.

480 Human Osteology (4) Intensive examination of the human skeleton. Contact Hour Distribution: 3 hours and 1 lab.
(DE) Prerequisite(s): 110 or consent of instructor.

481 Museum Studies I: Museums, Purpose and Function (3) (See Art 481.)

482 Museum Studies II: Exhibition Planning and Installation (3) (See Art 482.)

484 Museum Studies III: Field Projects (1-12) (See Art 484.)


490 Primate Evolution (3) Living and fossil primate taxonomy, ecology, and comparative anatomy. Survey of primate fossil record with emphasis on the origin or major primate lineages.
(DE) Prerequisite(s): 110.

494 Primate Behavior (3) Social organization and behavior of selected primates: group composition, size, and structure; patterns of mating; other social interactions; communication; and cultural behavior. Application of primate studies to human ethology.
(DE) Prerequisite(s): 110 or consent of instructor.

500 Thesis (1-15)
Grading Restriction: P/NC grading only.
Repeatability: May be repeated. Maximum 18 hours.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

510 Method and Theory in Cultural Anthropology (3) Development of primary theoretical orientations by cultural anthropologists; formulation of research problems and methods of collecting, organizing, and utilizing data.
Registration Permission: Consent of instructor.

511 Special Topics in Cultural Anthropology (3) Seminars for advanced students on topics of special interest: ethnomedicine, psychological anthropology, comparative social organization, religion, and art.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

512 Urban Studies in Anthropology (3) Process of urbanization examined cross-culturally; theory and method in researching urban communities; urban problems and applied anthropology.

515 Medical Anthropology (3) Cultural impact on disease patterning, theories of disease causation, and models of therapy. Theoretical and applied aspects of the anthropological study of health and disease.

517 Forms of Social Inequality (3) Anthropological perspectives on societies stratified along lines of rank, caste, race, ethnicity, and class; inequalities engendered by sex role structure. Construction of social distinctions before and after rise and consolidation of modern world system. Intersections of race and ethnicity with class and gender.

520 Seminar in Zooarchaeology (3) Approaches to analysis and interpretation of archaeological fauna. Intensive reading; evaluation and discussion of major faunal studies, guides to identification, methods of presenting faunal data.
Repeatability: May be repeated. Maximum 6 hours.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>410</td>
<td>History and Theory of Urban Form (3)</td>
<td>History, theory, and legal aspects of architectural preservation and restoration. Selected historical and contemporary examples. Basic urban design issues and exemplary design approaches examined through lectures, readings, essays, and sketch studies. Historical change in urban form and design.</td>
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</tr>
<tr>
<td>413</td>
<td>Medieval Architecture (3)</td>
<td>History of architecture from decline of Rome to beginning of Renaissance. (Same as Medieval Studies 415.)</td>
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</tr>
<tr>
<td>415</td>
<td>Medieval Architecture (3)</td>
<td>History of architecture from the mid-20th century.</td>
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<tr>
<td>420</td>
<td>History of American Architecture (3)</td>
<td>Consideration of architecture and city planning in the United States from the pre-Columbian period until the mid-20th century.</td>
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<tr>
<td>423</td>
<td>Computer Applications in Design II (3)</td>
<td>Faculty-initiated courses. Topics vary. Repeatability: May be repeated. Maximum 12 hours.</td>
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</tr>
<tr>
<td>432</td>
<td>Computer Applications in Design III (3)</td>
<td>Advanced course that integrates three-dimensional modeling and technical analysis with computers to augment building design. Independent studies under faculty direction.</td>
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</tr>
<tr>
<td>433</td>
<td>Architectural Development (3)</td>
<td>Principles and practice of the architect as a developer. Impact of economics, finance and urban policy on the design and development of real estate.</td>
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</tr>
<tr>
<td>445</td>
<td>Advanced Lighting (3)</td>
<td>In-depth analysis and innovative concepts in design of lighting.</td>
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<tr>
<td>473</td>
<td>Architectural Photography (3)</td>
<td>Photography as a design, research, and presentation medium. Application of photographic techniques, printing and processing. Color, black and white.</td>
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</tr>
<tr>
<td>500</td>
<td>Thesis (1-15)</td>
<td>Open to all students. Grading Restriction: P/NP only. Repeatability: May be repeated.</td>
<td></td>
</tr>
</tbody>
</table>
502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

503 Modern Architecture: Histories and Theories (3) History and theory of modern architecture: late 19th and 20th centuries through broad-based examinations of question of modernity and specific case studies of buildings, projects, landscapes and theories.

507 Architecture, Culture and Modernity (3) Scope of ideas generated in architecture’s recent history to reveal and explain production and reception of architecture: historical background necessary to understand those concepts. Complements history sequence but in specialized field of theory.

509 Seminar in Architectural Technology (3) Technological aspects influencing building form. Role of technical aspects of structural, environmental and building infrastructure as integrated systems supporting access use and expression of building.

514 Seminar in Ethical Imperatives (3) Social, cultural, philosophical and moral issues which impact professional responsibilities. Attitudes, values, and ideas that address formation of profession’s ethos.

515 Seminar in Issues in Urban Design (3) Investigations of urban forms, patterns, and attitudes that have shaped towns and cities.
Registration Permission: Consent of instructor.

516 Material and Methods of Construction (3) Properties of interior and exterior building materials and their relation to construction methods and detailing. Theory of materials selection and application and role materials and methods play in design process.

521 Principles of Architectural Form (3) Historical and contemporary architectural theory through investigation of literature and related examples. Theories of understanding and theories of application related to generation of architectural form and space in response to both cultural and environmental focus.
Registration Restriction(s): Master of Architecture – architecture major.

525 Special Topics in Architecture (1-3) Student- or instructor-initiated course.
Grading Restriction: Satisfactory/No Credit or letter grade.
Repeatability: May be repeated. Maximum 9 hours.

526 Directed Readings in Architecture (3) Readings on topics of interest: primary texts, history, theory, urban issues, technology and professional practice.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

528 Topics in Architectural History and Theory (3) Historic topics, ideas, and theories in architecture.
Registration Permission: Consent of instructor.

535 Presentation Design I (3) Basic techniques and understanding of graphic presentation design within the profession of architecture. Addresses fundamental design principles, page layout, image manipulation and typography, employing computer software applications. Conducted through lectures, assigned projects, assigned readings, labs, exams and/or critiques.
(DE) Prerequisite: 231.
Registration Permission: Consent of instructor.

536 Presentation Design II (3) Advanced techniques and understanding of graphic presentation design within the profession of architecture. Addresses document and layout, image manipulation and typography, employing computer software applications. Conducted through lectures, assigned projects, assigned readings, labs, exams and/or critiques.
(DE) Prerequisite: 535.
Registration Permission: Consent of instructor.

545 Principles of Environmental Control I (3) Introduction to heating, ventilating, air conditioning, solar energy, plumbing, and fire-protection systems.
(DE) Prerequisite(s): 180.
Comment(s): Enrollment is limited to Master of Architecture students.

551 Research Methods (3) Quantitative and qualitative methods of research in architectural inquiry. Systematic study and application of applied and speculative investigations in field of architectural research. Review and identification of techniques and methodologies and applications for architectural research and scholarship.

553 Advanced Topics in Architectural Technology (3) In-depth investigations and analysis: architectural technology lighting, structure, enclosure, mechanical and other architectural technologies.
Registration Permission: Consent of instructor.

562 Professional Practice (3) Management and organizational theories and practices for delivering professional design services: assessment of building industry and its influence on practice, analysis of basic management functions within professional firms; legal and ethical concerns facing practitioners today; and introduction to special obligations and privileges of design professional.

571 Architectural Design Studio: Building Groups/Complexes (6) Investigations analyzing cultural and contextual influences and precedents informing architectural form, space and structure in communal complex of buildings. Design of residential, recreational, educational, religious and communal facilities and/or faculty time before degree is completed.

(DE) Prerequisite(s): 571.

(DE) Prerequisite(s): 572.

(DE) Prerequisite(s): 551.

589 Urban Site Planning Workshop (4) Explores ideas, vocabulary, conventions, and technical skills essential to a critical understanding of how design and planning operate within the various scales of urban and ecological context. Examines both underlying terrain elements (landform, vanishing, water, climate) and human site interventions (urban infrastructure, buildings, and landscape). Strategies and analysis techniques for reading, mapping, and analyzing urban sites are introduced, as are issues, language, and principles of site design in urbanized landscapes. Commentary is open to all majors.
Registration Permission: Consent of instructor.

591 Foreign Study (1-9)
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission(s): Consent of instructor and approval of graduate program in architecture.

592 Off-Campus Study (1-9)
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission(s): Consent of instructor and approval of graduate program in architecture.

593 Independent Study (1-9)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission(s): Consent of instructor and approval of graduate program in architecture.

Art (140)

481 Museum Studies I: Museums, Purpose and Function (3) Purposes, functions, and development of museums of art, history, natural and applied science. (Same as Anthropology 481.)

482 Museum Studies II: Exhibition, Planning and Installation (3) Exhibition concept development and implementation. Exhibition design and installation techniques. Publicity, production, matting and framing, shipping and storage. (Same as Anthropology 482.)
(DE) Prerequisite(s): 481 or consent of instructor.

484 Museum Studies III: Field Projects (1-12) Special field projects including restoration, preservation, registration, and other related research on or off campus. (Same as Anthropology 484.)
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 481 and 482.
Registration Permission: Consent of instructor.

499 Special Topics (3) Student- or instructor-initiated course offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
<table>
<thead>
<tr>
<th>COURSES OF INSTRUCTION</th>
<th>191</th>
</tr>
</thead>
</table>

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

507 Professional Practices: Teaching Internship (1) Individual study in development of skills and methodology in teaching studio courses.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 4 hours.
Credit Restriction(s): May not be applied toward degree requirements.
Comment(s): Enrollment is limited to students who are not GTAs.
Registration Permission: Consent of instructor.

591 Foreign Study (1-6)
Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-6)
Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction: May not be applied toward the art history requirement.

Art Ceramics (135)

421 Ceramics: Advanced Handbuilding (6) Continued investigation of ceramic form with an emphasis on the development of individual direction.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 321 and 322.

422 Ceramics: Advanced Throwing (6) Continued, in-depth investigation of ceramic form; emphasis on the development of individual direction.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 321 and 322.

424 Ceramics: Clays and Glazes (3) Clay chemistry, clay bodies, glaze theory, and calculation. Formulating, mixing and testing of clay bodies and glaze formulas.
(DE) Prerequisite(s): 320.

429 Ceramics: Special Topics (3) Student- or instructor-initiated courses to be offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

521 Graduate Ceramics I (2-5)
Repeatability: May be repeated. Maximum 10 hours.

525 Graduate Ceramics II (2-5)
Repeatability: May be repeated. Maximum 10 hours.

593 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction: May not be applied toward the art history requirement.

599 Projects in Lieu of Thesis (10)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 20 hours.
Comment(s): Completion of all graduate coursework and successful second-year evaluation by graduate faculty required.

Art Design/Graphic (136)

400 Typography (3) Principles of typography as well as classical and contemporary type forms, as vehicles for communication. An intensive introduction to the fundamentals of type, from individual letterforms to large bodies of textual information. Attention to formal, technological, rhetorical and historical issues.
(DE) Prerequisite(s): Art 295 and Art Design/Graphic 251.

405 Computer Enhanced Graphic Design (3) Exploration of new technologies and their significance to graphic design.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 351 and 356 with a grade of C or better.
Registration Permission: Consent of instructor.

410 Advanced Typographic Investigation (3) Expands on principles introduced in Typography (Art Design/Graphic 400). Projects will include work in reflective as well as electronic environments with an emphasis on personal exploration.
(DE) Prerequisite(s): Art Design/Graphic 400.

425 Illustration (3) Develops skills and critical analysis for effective visual communication. Projects will explore the relationship between image and meaning. Students will explore a variety of media as they develop a personal visual vocabulary.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): Art 295 and Art Design/Graphic 251.

451 Advanced Graphic Design (3) Theory and techniques of visual problem-solving as applied to advanced applications of graphic design.
(DE) Prerequisite(s): 352 with a grade of C or better.

452 Graphic Design Seminar (3) Discussion of design and professional issues including politics, economics, and ethics for the graphic designer. Culminates in a student-initiated project.
(DE) Prerequisite(s): 451 with a grade of C or better.

456 Graphic Design Practicum (1-12) Practical work experience in the graphic design field. Must be prearranged with department.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

459 Special Topics in Graphic Design (3) Student- or instructor-initiated course offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

550 Studies in Graphic Design/Illustration History (3) Design and illustration c. 1850 to present.
Repeatability: May be repeated. Maximum 6 hours.
Comment(s): Enrollment is limited to MFA candidates.

551 Graphic Design I (2-6)
Repeatability: May be repeated. Maximum 10 hours.

552 Graphic Design II (2-6)
Repeatability: May be repeated. Maximum 10 hours.

553 Computer Enhanced Design (2-6)
Repeatability: May be repeated. Maximum 10 hours.
Registration Permission: Consent of instructor.

593 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction: May not be applied toward the art history requirement.

599 Projects in Lieu of Thesis (10)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 20 hours.
Comment(s): Completion of all graduate coursework and successful second-year evaluation by graduate faculty required.

Art Drawing (137)

419 Special Topics in Drawing and Painting (3) Student- or instructor-initiated course offered at convenience of department to enhance and expand the painting, drawing, and watercolor curriculum.
Repeatability: May be repeated. Maximum 12 hours.
Registration Permission: Consent of instructor.

511 Graduate Drawing I (2-6)
Repeatability: May be repeated. Maximum 10 hours.

512 Graduate Drawing II (2-6)
Repeatability: May be repeated. Maximum 10 hours.

593 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction: May not be applied toward the art history requirement.

599 Projects in Lieu of Thesis (10)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 20 hours.
Comment(s): Completion of all graduate coursework and successful second-year evaluation by graduate faculty required.
Art Education (141)
510 History and Philosophy of Art Education (3) United States from 1860s to present. Registration Permission: Consent of instructor.

520 Studies in Art Education (3) Issues and topics current to the field of art education. Registration Permission: Consent of instructor.

530 Production and Critical Pedagogy in Art (3) Relationship of production to aesthetics and critical analysis of works of art.

540 Use and Construction of Instructional Materials for Teaching Art (3) Examination and construction of curriculum and instructional aids related to teaching strategies in art education.

Art History (139)
403 History of Photography (3) Survey of history of photography from introduction of daguerreotype and calotype to more recent trends. Emphasis will be placed on aesthetics and the use of photography as a medium for artistic expression.

411 Art of South and Southeast Asia (3) Survey of art and architecture of the Indian subcontinent and Southeast Asia from 2000 BC to the 20th century. The major achievements of each period are examined in relation to their religious, political, and social contexts.

415 Art of China (3) Survey of art and architecture of China from the Neolithic period to the 20th century. The major achievements of each period are examined in relation to their religious, political, and social contexts.

416 Chinese Art of the 20th and 21st Centuries (3) Survey of Chinese art from the late 19th century through the present. Hong Kong, Taiwanese, and expatriate artists are also considered.

419 Art of Japan (3) Survey of the art and architecture of Japan from the Neolithic period to the 20th century. The major achievements of each period are examined in relation to their religious, political, and social contexts.

425 Early Christian and Byzantine Art to 1350 (3) Art in Italy and the Eastern Empire from the beginnings of Christian art to c. 1350. Mosaic and painting, sculpture and architecture. (Same as Judaic Studies 425.)

431 Medieval Art of the West, 800-1400 (3) Western European art of the Dark Ages, Romanesque, and Gothic periods. (Same as Judaic Studies 431; Medieval Studies 431.)

441 Northern European Painting, 1350-1600 (3) From courtly art of late Middle Ages to Northern Renaissance. Jan van Eyck, Roger van der Weyden, and Dürer; early printmakers. (Same as Medieval Studies 441.)

442 Art of Northern Europe, 1600-1675 (3) Concentrated study of Bruegel, Rubens, Rembrandt, Georges de La Tour, Vermeer, Poussin, and Hals.

451 Art of Italy, 1250-1450 (3) Development of exploration of naturalism. Revival of antiquity and development of theories of perspective in the Early Renaissance. Including Duccio, Giotto, Masaccio, Donatello, Botticelli. (Same as Medieval Studies 451.)


453 Art of Southern Europe, 1575-1700 (3) Concentrated study of Caravaggio, Bernini, and Italian Baroque developments in all media. Spanish Baroque painting and sculpture with special attention to Velázquez.

454 Renaissance and Baroque Theory (3) Addresses the theory of Western art in the early modern period with emphasis on the development and evolution in European Art during the Renaissance and Baroque periods. (DE) Prerequisite(s): 172 and 173 or consent of instructor.

461 Art of Southern and Eastern Africa (3) Art traditions of the eastern and southern regions of Africa. Sculpture, painting, pottery, textiles, architecture and human adornment will be examined. Some ancient Stone and Iron Age traditions will be examined, but the main emphasis will be on the diverse ethnic and regional art traditions practiced in the area from 19th century to present. (Same as Africana Studies 461.)

462 Art and Archeology of Ancient Africa (3) Historical art traditions of sub-Saharan Africa. Topics to be covered include prehistoric rock paintings; art from archaeological sites and ancient kingdoms. The time period covered ranges from the first and second millennia BC for some of the early terracotta sculpture and rock paintings, the 11th through 19th centuries AD for the later ancient kingdoms. (Same as Africana Studies 462.)

463 Arts of the African Diaspora (3) Examines the aesthetic, philosophical and religious patterns of the African descendants of Brazil, Surinam, the Caribbean and the United States. Emphasis will be placed on the full range of art forms, including the sculptural and performance traditions, as well as architecture, textile, basketry and pottery art forms. (Same as Africana Studies 463.)

464 Oceanic Art (3) Concentrated study of selected sculpture, textiles, architecture and other traditional art forms of Polynesia, Micronesia, and Melanesia. Objects are discussed on the basis of style, style relationship, iconography and the uses to which they were put in their traditional religious, political and social contexts.

470 African-American Art (3) Traces the artistic and social legacy of African-American art from the eighteenth century to the present day. Specifically, this class will focus on the ways in which artists used creativity to confront, deny, or complicate understandings of racial identity and racism. Examines broad scope of artistic production including painting, sculpture, photography, multi-media, fiction writing, and video art. (Same as Africana Studies 470.)

472 History of 20th-Century American Art (3) Developments in architecture, painting, and design from 1900.

473 19th-Century American Art (3) Examines painting, sculpture, and print culture from the Revolutionary War to the turn of the 20th century.

474 Theory of 20th-Century Art in Europe and America (3) Addresses the theoretical basis for the modern movement. Emphasis on analyzing and discussing individual works of art in light of contemporary writings by artists and theorists.


476 History of 20th-Century Painting and Sculpture in Europe (3) Development of the Modern and Post-Modern movements in Europe. Investigation of progression of abstraction through more recent conceptual trends. Analysis of the work of individual artists such as Picasso, Matisse, and many others.

479 Special Topics in Art History (3) Student- or instructor-initiated course offered at convenience of department. Repeatability: May be repeated. Maximum 12 hours.

483 History of American Sculpture (3) American sculpture from prehistory to the 1960s.

489 Studies in Art History (3) Concentration in individually selected area. Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.

518 History of African-American Painting (3) African-American art from the 19th century to the present. (Same as Africana Studies 518.)

520 Studies in Art Education (3) Issues and topics current to the field of art education. Registration Permission: Consent of instructor.

525 Early Christian and Byzantine Art to 1350 (3) Art in Italy and the Eastern Empire from the beginnings of Christian art to c. 1350. Mosaic and painting, sculpture and architecture. (Same as Judaic Studies 525.)

571 Studies in Medieval Art (3) Art and architecture of the Middle Ages – major monuments from Byzantium or western Europe. Repeatability: May be repeated with consent of department. Maximum 6 hours. Comment(s): For MFA candidates.

572 Studies in Italian Renaissance Art (3) Art and architecture of the 14th, 15th, and/or 16th centuries in Italy. Early or High Renaissance or Mannerist periods. Repeatability: May be repeated with consent of department. Maximum 6 hours. Comment(s): For MFA candidates.

573 Studies in Baroque Art (3) Seventeenth century art and architecture – major artists and works from southern or northern Europe. Repeatability: May be repeated with consent of department. Maximum 6 hours. Comment(s): For MFA candidates.

574 Studies in Modern Western Art (3) Selected topics in 19th- and 20th-century western art. Repeatability: May be repeated with consent of department. Maximum 6 hours. Comment(s): For MFA candidates.

575 Studies in Modern American Art (3) Selected topics in 19th- and 20th-century American art. Repeatability: May be repeated with consent of department. Maximum 6 hours. Comment(s): For MFA candidates.

576 Studies in Asian Art (3) Selected topics in Japanese or Chinese Art. Repeatability: May be repeated with consent of department. Maximum 6 hours. Comment(s): For MFA candidates.

579 Special Topics in Art History (3) Student- or instructor-initiated course offered at convenience of department. Repeatability: May be repeated with consent of department. Maximum 9 hours. Comment(s): For MFA candidates.
Art Media Arts (134)

431 Photography III (3-6) Individual development of photographic problems and techniques.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 231, 330, and 331.

433 History of Film and Modern Art (3) Study of the development and interaction between cinematic arts and visual arts within the context of modern art history. (Same as Cinema Studies 433.)
Comment(s): Available for art history credit.

435 Cinematography as Art (4) Continued development of concepts and techniques for the creation of film as an art form with an emphasis on individual projects. (Same as Cinema Studies 435.)
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 235 and 330 or consent of instructor.

436 Video Art (4) Continued development of concepts and techniques for the creation of video works as an art form with emphasis on individual projects. (Same as Cinema Studies 436.)
Repeatability: May be repeated. Maximum 12 hours.

439 Special Topics in Media Arts (3) Student- or instructor-initiated course offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.

441 Digital Photography II (3) Continuation of exploration and implications of use of computer in photography.
(DE) Prerequisite(s): 330 and 341.
Registration Permission: Consent of instructor.

531 Photography I (2-6)
Repeatability: May be repeated. Maximum 10 hours.

532 Photography II (2-6)
Repeatability: May be repeated. Maximum 10 hours.

535 Media Arts I (2-6)
Repeatability: May be repeated. Maximum 10 hours.

536 Media Arts II (2-6)
Repeatability: May be repeated. Maximum 10 hours.

577 Studies in Media as Art (3) Selected topics in theory and history of media as art form.
Repeatability: May be repeated. Maximum 9 hours.

593 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction(s): May not be applied toward the art history requirement.

599 Projects in Lieu of Thesis (10)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 20 hours.
Comment(s): Completion of all graduate coursework and successful second-year evaluation by graduate faculty required.

Art Printmaking (132)

441 Digital Photography II (4) Continuation of imaging: intaglio, relief, lithography, relief printing, screenprinting, monoprint, papermaking, book arts, and/or photo-print processes.
Repeatability: May be repeated. Maximum 12 hours.
(DE) Prerequisite(s): 330 or consent of instructor.

Continued development of concepts and techniques for the creation of video works as an art form with emphasis on individual projects. (Same as Cinema Studies 436.)
Repeatability: May be repeated. Maximum 12 hours.

449 Special Topics in Sculpture (3) Student- or instructor-initiated course offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.

561 Printmaking I (2-6) Directed exploration of any or all matrix-based imaging: intaglio, relief, lithography, screen printing, photo-print methods, and monoprint.
Repeatability: Not repeatable. May be taken once for 2-6 hours.

562 Printmaking II (2-6) Directed exploration of any or all matrix-based imaging: intaglio, relief, lithography, screen printing, photo-print methods, and monoprint.
Repeatability: Not repeatable. May be taken once for 2-6 hours.
(DE) Prerequisite(s): 561.

563 Printmaking III (2-6) Directed exploration of any or all matrix-based imaging: intaglio, relief, lithography, screen printing, photo-print methods, and monoprint.
Repeatability: Not repeatable. May be taken once for 2-6 hours.
(DE) Prerequisite(s): 561 and 562.

564 Printmaking IV (2-6) Directed exploration of any or all matrix-based imaging: intaglio, relief, lithography, screen printing, photo-print methods, and monoprint.
Repeatability: Not repeatable. May be taken once for 2-6 hours.
(DE) Prerequisite(s): 561, 562, and 563.

593 Independent Study (1-6)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists.
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

599 Projects in Lieu of Thesis (10)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 20 hours.
Comment(s): Completion of all graduate coursework and successful second-year evaluation by graduate faculty required.

Art Sculpture (143)

441 Advanced Sculpture (3) Individual development of sculptural problems and techniques. Students work independently while participating in group projects, critique, and discussion.
Repeatability: May be repeated. Maximum 12 hours.
Recommended Background: 6 hours of 300-level sculpture.

449 Special Topics in Sculpture (3) Student- or instructor-initiated course offered at convenience of department.
Repeatability: May be repeated. Maximum 12 hours.
Recommended Background: Successful completion of any portfolio review.

541 Graduate Sculpture I (2-6)
Repeatability: May be repeated. Maximum 10 hours.

542 Graduate Sculpture II (2-6)
Repeatability: May be repeated. Maximum 10 hours.

593 Independent Study (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.

595 Visiting Artist Seminar (2) Contemporary art issues by different visiting artists.
Repeatability: May be repeated. Maximum 8 hours.
Credit Restriction: May not be applied toward the art history requirement.
### 599 Projects in Lieu of Thesis (10)
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated. Maximum 20 hours.
Comment(s): Completion of all graduate coursework and successful second-year evaluation by graduate faculty required.

### Asian Languages (144)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>431</td>
<td>Readings in Chinese Literature (Same as Chinese 431.)</td>
<td>(3)</td>
<td>Repeatability: May be repeated. Maximum 9 hours. Recommended Background: Mastery of intermediate-level Chinese or consent of instructor.</td>
</tr>
<tr>
<td>451</td>
<td>Readings in Pre-Moderen Japanese Literature (Same as Japanese 451.)</td>
<td>(3)</td>
<td>Repeatability: May be repeated. Maximum 9 hours. Recommended Background: Mastery of intermediate-level Japanese or consent of instructor.</td>
</tr>
<tr>
<td>452</td>
<td>Readings in Modern Japanese Literature (Same as Japanese 452.)</td>
<td>(3)</td>
<td>Repeatability: May be repeated. Maximum 9 hours. Recommended Background: Mastery of intermediate-level Japanese or consent of instructor.</td>
</tr>
</tbody>
</table>

### Asian Studies (145)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>471</td>
<td>Selected Topics in Asian Studies (Same as Asian Languages (144))</td>
<td>(3)</td>
<td>Repeatability: May be repeated. Maximum 6 hours. Content varies.</td>
</tr>
</tbody>
</table>

### Astronomy (150)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>411</td>
<td>Astrophysics (3) Development of analytical physical models of galactic structure of the universe, stellar and interstellar matter, and planetary systems. Topical and interdisciplinary approach includes consideration of quasars, pulsars, black holes and current developments in the field. Acceptable for credit toward the physics major.</td>
<td>(3)</td>
<td>(DE) Prerequisite(s): Physics 136 or 138 or 222 or 232. Registration Permission: Consent of instructor.</td>
</tr>
<tr>
<td>490</td>
<td>Special Topics in Astronomy (1-3) Topics of current interest in astronomy and astrophysics. Acceptable for graduate credit in physics with consent of department.</td>
<td>(3)</td>
<td>Repeatability: May be repeated with consent of department. Maximum 9 hours.</td>
</tr>
</tbody>
</table>

### Audiology and Speech Pathology (160)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>431</td>
<td>Stuttering (3) Nature, appraisal, and treatment.</td>
<td>(3)</td>
<td>(DE) Prerequisite(s): 300 or consent of instructor.</td>
</tr>
<tr>
<td>433</td>
<td>Observation of Clinical Practice (1)</td>
<td>(3)</td>
<td>(DE) Prerequisite(s): 320 or consent of instructor.</td>
</tr>
<tr>
<td>434</td>
<td>Clinical Practice in Speech-Language Pathology II (1-4)</td>
<td>(3)</td>
<td>(DE) Prerequisite(s): 433. Registration Permission: Consent of instructor.</td>
</tr>
<tr>
<td>435</td>
<td>Introduction to Speech Sound Disorders (3) Etiology, diagnosis, and treatment of articulatory and phonological disorders.</td>
<td>(3)</td>
<td>(DE) Prerequisite(s): 300 and 305 or consent of instructor.</td>
</tr>
<tr>
<td>440</td>
<td>Voice Disorders (3) Etiology, diagnosis, and treatment of organic and functional voice disorders.</td>
<td>(3)</td>
<td>(DE) Prerequisite(s): 300 and 306 or consent of instructor.</td>
</tr>
<tr>
<td>455</td>
<td>Problems in Speech Pathology (1-3)</td>
<td>(3)</td>
<td>Repeatability: May be repeated. Maximum 6 hours. Registration Permission: Consent of instructor.</td>
</tr>
<tr>
<td>461</td>
<td>Introduction to Language Pathology in Children (3) Etiology, diagnosis, and treatment of language impairments in children.</td>
<td>(3)</td>
<td>(DE) Prerequisite(s): 320 or consent of instructor.</td>
</tr>
<tr>
<td>473</td>
<td>Introduction to Audiologic Assessment (3) Basic principles of clinical audiometry; pure tone, speech, masking and overview of special auditory tests.</td>
<td>(3)</td>
<td>(DE) Prerequisite(s): 300. Registration Permission: Consent of instructor.</td>
</tr>
<tr>
<td>475</td>
<td>Appraisal of Speech and Language Disorders (3) Diagnostic procedures for children and adults with speech and language problems including observation and practice with diagnostic tests.</td>
<td>(3)</td>
<td>(DE) Prerequisite(s): 300. Registration Permission: Consent of instructor.</td>
</tr>
</tbody>
</table>

### 494 Introduction to Aural Habilitation/Rehabilitation of the Hearing Impaired (3) Introduction to psychosocial aspects, amplification components/characteristics, assistive devices, speech acoustics, speech perception, speech reading, parent-infant, preschool and school years of children, communication impairments/ handicaps/remediation of adults, effects of aging/remediation on the elderly, and case studies. | (3) | (DE) Prerequisite(s): 305 and 473 or consent of instructor. |

### 500 Thesis (1-15)
Grading Restriction: P/NP only.
Repeatability: May be repeated.

### 502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. | (1-15) | Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements. |

### 506 Neural Bases of Speech and Language (3) Structure and function of central and peripheral nervous systems, role in speech and language. | (3) | (DE) Prerequisite(s): 306. |

### 507 Anatomy and Physiology of Hearing (3) Structure and function of the peripheral and central auditory systems, and their roles in mediating auditory processes. | (3) | (DE) Prerequisite(s): 473 or consent of instructor. |

### 511 Introduction to Research in Speech and Hearing (3) Analysis of research techniques, fundamentals of statistics, application of statistics, and completion of a proposal and hypothetical pilot research project. | (3) | Repeatability: May be repeated. Maximum 9 hours. |

### 512 Clinical Practice in Audiology (1-4) | (1-4) | Repeatability: May be repeated. Maximum 24 hours. |

### 515 Practicum in Aural Rehabilitation (1-4) | (1-4) | Repeatability: May be repeated. Maximum 9 hours. |

### 516 Language Sample Analysis (3) Methods of characterizing and describing language behaviors. | (3) | (DE) Prerequisite(s): 320 or equivalent. |

### 518 Adult Neurogenic Communication Disorders I (3) This course will assist students in developing basic biological, social, clinical, and theoretical understandings of commonly observed neurological impairments. | (3) | (DE) Prerequisite(s): 506 or consent of instructor. |

### 519 Adult Neurogenic Communication Disorders II (3) This course will assist students in developing an advanced understanding of the neural, behavioral, social, clinical, and theoretical understandings of acquired neurological cognitive-linguistic impairments. | (3) | (DE) Prerequisite(s): 506 and 518 or consent of instructor. |

### 522 Seminar in Speech Sound Disorders (3) Current research in diagnosis and management of speech sound disorders. | (3) | (DE) Prerequisite(s): 435 or consent of instructor. |

### 523 Seminar in Voice Disorders (3) Current research in diagnosis and management of voice disorders. Multicultural, gender, and age-related issues. | (3) | (DE) Prerequisite(s): 440 or consent of instructor. |

### 525 Counseling and Communication Disorders (3) Issues related to the role of counseling in clinical practice in speech pathology and audiology. Includes discussion of counseling needs and approaches, including multicultural issues. | (3) | Repeatability: May be repeated. Maximum 15 hours. |

### 526 Dysphagia (3) Clinical diagnosis, evaluation, and treatment of adult swallowing disorders and critical interpretation of research literature on dysphagia. | (3) | (DE) Prerequisite(s): 506 or consent of instructor. |

### 527 Language, Culture, and Communication Disorders (3) Multicultural issues across the lifespan; theoretical rationales for speech and language development and use, assessment and treatment practices. | (3) | Grading Restriction: Satisfactory/No Credit grading only. |

### 531 Seminar on Stuttering (3) Current significant research in stuttering. | (3) | (DE) Prerequisite(s): 431 or consent of instructor. |

### 533 Advanced Clinical Practice in Speech-Language Pathology (1-4) Repeatability: May be repeated. Maximum 15 hours. | (1-4) | (DE) Prerequisite(s): 434 or equivalent. Comment(s): Enrollment for fewer than 2 hours must have prior departmental approval. Registration Permission: Consent of instructor. |
534 Advanced Clinical Practice in Speech-Language Pathology (1-4)
Repeatability: May be repeated. Maximum 15 hours.
(DE) Prerequisite(s): 434 or equivalent.
Comment(s): Enrollment for fewer than 2 hours must have prior departmental approval.
Registration Permission: Consent of instructor.

535 Advanced Clinical Practice in Speech-Language Pathology: Off-Campus Sites (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Recommended Background: 100 hours clinical experience.
Comment(s): Enrollment for fewer than 2 hours must have prior departmental approval.
Registration Permission: Consent of instructor.

538 Advanced Clinical Practice in Speech-Language Pathology: Public Schools (1-4)
Repeatability: May be repeated. Maximum 15 hours.
Comment(s): Enrollment for fewer than 2 hours must have prior departmental approval.

539 Motor Speech Disorders (3) Neuromotor organization for speech production; types of motor speech disorders and associated neuromuscular symptomatology; diagnosis and management of motor speech disorders.
(DE) Prerequisite(s): 506.

540 Structural Speech Disorders (3) Etiology, diagnosis and clinical management of craniofacial and resonance disorders.
(DE) Prerequisite(s): 306 and 435.

541 Pediatric Oromotor Disorders (3) Evaluation, diagnosis, and treatment of pediatric oromotor disabilities that affect normal acquisition of feeding and prespeech skills.
(DE) Prerequisite(s): 506 or consent of instructor.

542 Hearing Disorders (3) Effects of heredity, development/aging, diseases, and physical agents on hearing.
(DE) Prerequisite(s): 473 or consent of instructor.

543 Amplification Technology (3) Description of hearing aid circuits, components and performance characteristics. Electroacoustical and real-ear analysis of hearing aids. Coupler material and geometry effects. Practical experience in troubleshooting, repair, and construction of hearing aids.
(DE) Prerequisite(s): 473 and 507 or consent of instructor.

(DE) Prerequisite(s): 473, 507, and 543 or consent of instructor.

545 Sound Measurement Techniques and Hearing Conservation (3) Techniques of measurement and analysis of sound: hearing conservation in schools and industry.
Registration Permission: Consent of instructor.

546 Audiologic Assessment (3) Theoretical bases for behavioral audiometry and acoustic immittance measurement.

547 Special Problems in Audiology (1-3)
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 473 or equivalent.
Registration Permission: Consent of instructor.

552 Seminar in Speech Pathology (2-3) Current significant research in speech pathology. Topics vary.
Repeatability: May be repeated with consent of department. Maximum 9 hours.
Recommended Background: 9 hours in speech pathology.

555 Special Problems in Speech-Language Pathology (1-3)
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

556 Independent Study in Speech-Language Pathology (1-3)
Repeatability: May be repeated. Maximum 6 hours.
Registration Permission: Consent of instructor.

558 Phonological Disorders (3) Current theories and approaches to assessment and intervention for individuals with difficulty acquiring or using speech sound system of English.
(DE) Prerequisite(s): 435 or consent of instructor.

561 Child Language Disorders (3) Current literature on assessment and intervention techniques for young language learners.
(DE) Prerequisite(s): 461 or consent of instructor.

563 Language Disorders: Birth to Three (3) Overview of family-focused, transdisciplinary intervention process. Assessment/treatment of infants, toddlers, and preschoolers. Description of disabilities and resulting communication disorder.
(DE) Prerequisite(s): 461 or consent of instructor.

573 Pediatric Audiology for Education Professionals (3) Basic principles in the identification and management of hearing loss in infants and children; social and psychological concomitants of auditory disorder; genetic hearing loss and other high-risk types of impairment related to hearing; educational alternatives and state and federal guidelines.
Credit Restriction: Students with credit in 574 cannot receive credit for 573.
(DE) Prerequisite(s): 473.

574 Pediatric Audiology for Audiology Majors (3) Theoretical and practical considerations in evaluation and treatment of hearing loss in infants and children. Audiological intervention in case management of hearing-impaired child; amplification, educational alternatives, and state and federal guidelines.
Credit Restriction: Students with credit in 573 may also receive credit for 574.
(DE) Prerequisite(s): 507, 546, and 576.
Registration Restriction(s): Audiology major.

576 Physiologic Assessment of the Auditory System I (3) Otoacoustic emissions, electrocochleography, and auditory brainstem responses. Anatomical origins, principles, and applications. Use of these responses in evaluation of auditory function and determination of site-of-lesion.
(DE) Prerequisite(s): 507 and 546 or consent of instructor.

577 Physiologic Assessment of the Auditory System II (3) Anatomy, physiology, and pathophysiologic of vestibular system and other systems that contribute to balance. Practicum in electroneystagmography.
(DE) Prerequisite(s): 507, 542, 546, and 576 or consent of instructor.

581 Assessment of Central Auditory Processing (3) Overview of current central auditory processing disorder (CAPD) literature and assessment procedures, with emphasis on a holistic view by combining perceptual, electrophysiological, linguistic, and cognitive measurements.

582 Speech and Language Services in School (3) Organization and implementation of speech and language programs in schools.

583 Physiologic Assessment of the Auditory System II (3) Middle-latency, long-latency, and event-related potentials. Neurophysiological mechanisms, principles, and applications. Use of these potentials in evaluation of neurological and cognitive function.
(DE) Prerequisite(s): 576 or consent of instructor.

584 Amplification for Children with Hearing-Impairment (3) Study of strategies for selecting and fitting amplification systems for children; outcome measures and service coordination.
(DE) Prerequisite(s): 543, 544, and 574 or consent of instructor.

585 Cochlear Implants (3) Overview of cochlear implants, focusing on theory of auditory stimulation and cochlear implant systems; candidacy, surgical preparation, and follow-up/outcome measures; the rehabilitation process; and cochlear implant case presentations.
(DE) Prerequisite(s): 507, 576, and 583 or consent of instructor.

586 Standards and Practice Issues in Audiology (3) Overview of professional practice standards, ethics, medical/legal issues, business practices, and reimbursement procedures in audiology.
(DE) Prerequisite(s): 512 or consent of instructor.

591 Foreign Study (1-15)
Repeatability: May be repeated. Maximum 30 hours.

592 Off-Campus Study (1-15)
Repeatability: May be repeated. Maximum 30 hours.

593 Independent Study (1-15)
Repeatability: May be repeated. Maximum 15 hours.

594 Aural Habilitation/Rehabilitation of the Hearing-Impaired (3) Study of grieving process, counseling, group and individual amplification practices, and reimbursement procedures in audiology.

595 The Verbotonal System: Auditory/Speech Perception (3) Innovative theory, therapy procedures, and S UVAG amplification/filters for diagnosis/evaluation/remediation of spoken language/listening skills of hearing-impaired children/adults: use of rhythms, movements, and suprasegmentals; special audiometric tests, acoustic filters, correcting misarticulations through optimal listening; central auditory treatment; second (foreign) language through listening/spoken language; relationship of concepts to conventional concepts/practice; student research reports.
(DE) Prerequisite(s): 305, 473, and 494 or consent of instructor.
600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/INP only.
Repeatability: May be repeated.

601 Experimental Phonetics (3) Acoustical and perceptual analyses of speech production and overall oral communication.
Registration Permission: Consent of instructor.

602 Psychoacoustics (3) Auditory perception and reception of acoustic stimuli.
(DE) Prerequisite(s): 507 or consent of instructor.

604 Molecular Genetics and Pharmacology of Hearing (3) Study of genetics, pharmacology, and general cellular processes as they relate to hearing.
(DE) Prerequisite(s): 507 or consent of instructor.

605 Speech Perception and Hearing Impairment (3) Study of perception of speech stimuli, with particular emphasis on the effects of hearing impairment on perception.

611 Experimental Design in Speech and Hearing (3) Analysis of experimental design in theses and related journals. Generation of experimental designs.
Registration Permission: Consent of instructor.

613 Externship in Audiology (1-9) Off-campus clinical training experience.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of academic advisor.

626 Advanced Seminar in Neurologically-based Communication Disorders (3) Topics vary.
Repeatability: May be repeated. Maximum 6 hours.
(DE) Prerequisite(s): 518 and 526.

650 Advanced Seminar in Audiology (3-6) Topics vary.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

655 Practicum in College Teaching (1-3) Supervised experience in college teaching.
Grading Restriction: Satisfactory/No Credit grading only.
Registration Permission: Consent of instructor.

656 Directed Research (1-4) Participation in ongoing or non-dissertational research.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

657 Directed Study in Speech Pathology (1-3) Topics vary.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

658 Directed Study in Audiology (1-3) Topics vary.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

659 Directed Study in Speech Science (1-3) Topics vary.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

660 Directed Study in Hearing Science (1-3) Topics vary.
Repeatability: May be repeated. Maximum 9 hours.
Registration Permission: Consent of instructor.

661 Advanced Seminar: Language Disorders in Children (3) Topics vary.
(DE) Prerequisite(s): 561 or consent of instructor.

662 Advanced Seminar in Audiologic Assessment (3) Synthesis of information on audiologic and vestibular assessment and application of clinical cases.
(DE) Prerequisite(s): 542, 546, 574, 576, and 577 or consent of instructor.

663 Advanced Seminar in Aural Habilitation/Rehabilitation (3) Synthesis of information on audiologic habilitation and rehabilitation cases.
(DE) Prerequisite(s): 543, 544, 584, and 594 or consent of instructor.

664 Advanced Seminar in Amplification (3) Synthesis of information on amplification technology, amplification for adults with hearing impairment, and case studies.
(DE) Prerequisite(s): 543, 544, 584, and 594 or consent of instructor.

Aviation Systems (169)

500 Thesis (1-15)
Grading Restriction: P/INP only.
Repeatability: May be repeated.

501 Aviation Systems: An Overview (3) Aviation systems, present and future. Socioeconomic base, aerospace and propulsion technology, meteorology, air traffic control, airport community interface, and technological trends and developments pertinent to present status, and future development of air transportation.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

503 Air Vehicles (3) Current capabilities and future requirements for civilian and military air vehicles. Parameters significant for air vehicle type selection. Integration of air vehicle into aviation systems.
(DE) Prerequisite(s): 501.

504 Airports and the Community (3) Structure of airports and their communities. Technology and economics of cargo, baggage, ticket, and passenger handling. Airport management, economics and logistics. Interfacing with community. Plans, programs and developments for collecting and distributing passengers and freight from various types of airports. Types of airport developments and their projections.

505 Introduction to Airborne Radar (3) Theory and application of airborne radar. Radar detection and measurement techniques through aviation systems applications. Ground effects on radar signals of multipath and clutter. Pulsed operation, coding, filters, processing techniques, Doppler effects. Problems of range and range rate and tracking. Methods and techniques for reducing radar cross section.

506 Aircraft Design (3) Design process, compromise of conflicting requirements, economical, industrial, and legal aspects. Definition of mission requirements, synthesis and optimization techniques, safety and reliability, systems integration, standards and regulations, teamwork, and decision-making process.

507 Introduction to Airborne Systems (3) Theory and application of airborne radar systems. Synthetic aperture radar, active and passive radar, SAR, lidar, and military applications. Radar theory: geometric dilution of precision, antennas, tracking, etc. Integration of SAR, lidar, and military applications. Radar theory: geometric dilution of precision, antennas, tracking, etc. Integration of SAR, lidar, and military applications.

508 Flight Test Instrumentation (3) Principles of measurement, measuring devices with views toward both ground and flight aerospace testing: measurement fundamentals, sensors for specific parameters (e.g., temperature, heat flux, flow rate, pressure, acceleration, vibration, strain, and humidity), data bus integration, signal condition, telemetry, and fabrication.

509 Introduction to Aircraft Structures (3) Design and analysis of structures: weight and modern materials used for aircraft structures. Topics: load determination and aviation regulations, airworthiness, ultimate loads, limit loads, load factors; simplifying assumptions to safe side; basics of stress and strain, elasticity, shear, bending, torsion; statically indeterminate systems; frames; structural instabilities; buckling of columns, thin plates; tension field beams; principles of stressed skin construction; open, closed, thin-walled beams; tapered beams, fuse-lages and frames, wings and ribs; laminated composite structures; elementary aeroelasticity.

510 Special Topics in Aviation Systems (3) Current problems.
Repeatability: May be repeated. Maximum 15 hours.
Registration Permission: Consent of instructor.
Credit Restriction: Maximum of 12 hours may be applied toward degree requirements.

511 Theory and Aviation Applications of GPS (3) Global Positioning System (GPS) for improved navigation and situational awareness for civil and military applications. GPS theory: geometric dilution of precision, satellite positioning, ionospheric delay, differential GPS, and GPS errors. Applications for navigation and aircraft flight-testing. Integration of GPS for aviation infrastructure and for air vehicle navigation, concepts of WAAS and LAAS.

512 Helicopter Performance Flight Test Techniques (3) Experimental test techniques for helicopter performance flight testing. Theoretical derivation of flight test techniques. Participation in series of flight test experiments demonstrating acquisition of flight test data. Instrumentation and data reduction techniques.

513 Helicopter Stability and Control Flight Test Techniques (3) Experimental test techniques for helicopter stability and control flight testing. Theoretical derivation of flight test techniques. Participation in series of flight test experiments demonstrating acquisition of flight test data. Instrumentation and data reduction techniques.
514 Systems Flight Testing (3) Experimental test techniques for helicopter and airplane flight systems. Approach and design for testing airborne systems. Theory and operation of typical flight systems: aircraft systems, navigation systems, communications systems, and specific mission systems.

515 Aviation Human Factors (3) Human factors pertinent to aviation: concept of human factors, human error, fatigue, body rhythms, performances, motivation, vision, and visual illusions, communication, attitudes, training and devices, displays and controls, space and layout, anthropology, flight deck design and evaluation, aircraft cabin design and evaluation, flying qualities evaluation, and performance measurement techniques. Applied aviation systems.

516 Aircraft Flight Controls (3) Feedback control concepts, root locus techniques, bode analysis, PID control design, and controller and observer design concepts applied to aircraft. Complex analysis and matrix algebra.

521 Experimental Flight Mechanics (3) Performance. Experimental techniques for flight mechanics. Specially equipped airborne laboratory: student participation in series of experiments demonstrating acquisition of flight test data. Necessary theory supports class experiments. Tests cover a broad range of aircraft performance, stability and control characteristics in addition to instrumentation and data reduction methods.

522 Experimental Flight Mechanics (3) Stability and control. Experimental techniques for flight mechanics. Specially equipped airborne laboratory: student participation in series of experiments demonstrating acquisition of flight test data. Necessary theory supports class experiments. Tests cover a broad range of aircraft performance, stability and control characteristics in addition to instrumentation and data reduction methods. (DE) Prerequisite(s): 422.


550 Project in Aviation Systems (3) Repeatability: May be repeated. Maximum 15 hours. Credit Restriction: Maximum of 3 hours may be applied toward degree requirements. Comment(s): Non-thesis aviation systems majors only.

Biochemistry and Cellular and Molecular Biology (188)

401 Biochemistry-Molecular Biology I (4) First semester of a two-course sequence providing in-depth coverage of biochemistry and molecular biology. Covers amino acid structure and chemistry, protein structure and chemistry, protein folding, enzyme behavior and function, regulation mechanisms, catalysis and energy transfer, synthetic metabolism including photosynthesis, and protein transport. (DE) Prerequisite(s): Biology 240 and Chemistry 350, 360, and 369.

402 Biochemistry-Molecular Biology II (4) Second semester of a two-course sequence providing in-depth coverage of biochemistry and molecular biology. Covers structure of DNA and RNA, experimental methods of analyzing nucleic acids, mechanisms of RNA and protein synthesis, mechanisms of DNA replication, repair and recombination, chromosome structure and function, regulation of gene expression, genome structure and genomics, and mechanisms of biological regulation. (DE) Prerequisite(s): Biology 240 and Chemistry 350, 360, and 369.


404 Plant Molecular Biology (4) Introduction to current research approaches and methodologies in plant developmental biology and molecular genetics. Contact Hour Distribution: Laboratory and lecture. (DE) Prerequisite(s): Biology 140 and 240.

419 Cellular and Comparative Biochemistry Lab (2) Experiments with enzymes, nucleic acids, and membranes and organelles. Chromatography, kinetics, hybridization, sequencing, and immunochromatographic methods. (DE) Prerequisite(s) or (DE) Corequisite: 401 or 410.

421 Cell and Tissue Structure and Function (4) Study of animal cells and tissues at light and electron microscope levels. Contact Hour Distribution: 2 hours and 2 labs. (DE) Prerequisite(s): Biology 140.

440 General Physiology (3) Principles of cellular and organ-system animal physiology. (DE) Prerequisite(s): Biology 140. (DE) Corequisite(s): Chemistry 350 and 360. Recommended Background: Physics 221 and 222.

465 Human Genetics (3) Genetic and molecular principles and problems of human inheritance. (DE) Prerequisite(s): Biology 240.

471 Biophysical Chemistry (3) Physicochemical principles with applications to biological systems. Thermodynamics; chemical equilibrium; solution chemistry; transport; electrochemistry; kinetics; enzyme catalyzed reactions. (Same as Chemistry 471.) (DE) Prerequisite(s): Chemistry 350 and 360, Mathematics 125, and general biology or consent of instructor.

480 Physiology of Exercise (3) (See Exercise Science 480.)

481 Biophysical Chemistry (3) Physicochemical principles with applications to biological systems. Elementary quantum chemistry; interactions of light with biological molecules; optical and magnetic spectroscopy; light scattering; case studies of selected macromolecules. (Same as Chemistry 481.) (DE) Prerequisite(s): Chemistry 350 and 360, Mathematics 125, and general biology or consent of instructor.

500 Thesis (1-15) Repeatability: May be repeated. Grading Restriction: P/NP only.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Credit Restriction: May not be used toward degree requirements.

510 Computational Structural Biochemistry (1) Introduction to computational tools, internet resources and databases for biophysical research to analyze and model protein structures and to study protein-ligand interactions. (DE) Prerequisite(s): 511. Registration Permission: Consent of instructor.

511 Advanced Protein Chemistry and Cellular Biology (3) Cellular structure and function at molecular and supramolecular level in progression: protein structure and function; membrane structure and function; bioenergetics and membrane proteins. (DE) Corequisite(s): 510. Recommended Background: Prior knowledge of cell biology and biochemistry. Registration Permission: Consent of instructor.

512 Advanced Molecular Biology (3) Regulation of nucleic acid expression and protein activity. Nucleic acid structure and function; replication and repair of nucleic acids; gene expression; protein synthesis; post-translational protein modification; mitosis and meiosis; cell cycle and cell growth. (DE) Prerequisite(s): 511 or consent of instructor.

513 Advanced Protein Biochemistry and Cell Biology II (3) Advanced topics of cellular function and regulation of cell division and growth, and structure and function of supramolecular structures: cytoskeleton and cell junctions and adhesions. (DE) Prerequisite(s): 511.

515 Experimental Techniques I (2-4) Introduction to modern experimental methodology and instrumentation in biochemistry, molecular biology and cell biology, including cell culture; spectrophotometry; microscopy; nucleic acid purification and analysis; protein assays; enzyme purification; electrophysiology; computer analysis of nucleic acid and protein sequences. Team-taught lecture/demonstration format. Repeatability: May be repeated. Maximum 6 hours. Comment(s): Primarily for departmental graduate students.

516 Experimental Techniques II (2-4) Laboratory rotations. Students work in laboratory of faculty member on clearly defined project. Written proposal and oral report required. Repeatability: May be repeated. Maximum 8 hours. (DE) Prerequisite(s): 515. Comment(s): Primarily for departmental graduate students.

517 Physical Biochemistry (3) Physics and chemistry of biological systems and molecules. Thermodynamics; diffusion and transport; physical chemistry of macromolecules; enzyme kinetics; binding reactions; spectroscopy; electrophysics. (DE) Prerequisite(s): 511 or consent of instructor.

520 Special Topics (1-3) Selected directed readings or special course in topics of current interest. Consult departmental listings for offerings. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated with consent of instructor. Maximum 6 hours.
(De) Prerequisite(s): 401 and one semester of introductory plant physiology or cell biology.

523 Advanced Plant Physiology II (3) Growth and differentiation of plants at molecular, cellular and organismal levels. Regulation of development; macromolecular interpretation of differentiation, dormancy, germination, flowering, and senescence.  
(De) Prerequisite(s): 401 and one semester of introductory plant physiology or cell biology.

525 Graduate Research Participation (3-12) Tutorial laboratory experiences.  
Repeatability: May be repeated. Maximum 12 hours.

530 Experimental Design and Analysis (2) Development of skills in strategies of experimental design and interpretation of experimental results. Critical discussion of research articles illustrating issues in experimental design. Preparation of grant proposal in standard format to be read and discussed by class and by panel of faculty expert in area of proposal.  
Registration Permission: Consent of instructor.

550 Advanced Concepts in Neurobiology/Physiology (3) Concepts related to neurobiology/physiology with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced.  
Registration Permission: Consent of instructor.

552 Physiology of Hormones (3) Cellular and organismal action of hormones in invertebrate and vertebrate animals.  
Contact Hour Distribution: 2 hours and 1 lab. 
Recommended Background: 410. 
Registration Permission: Consent of instructor.

559 Biophysical Crystallography (3) Theories and practices of X-ray diffraction, neutron diffraction and neutron scattering to elucidate the structure of nucleic acids, proteins, nucleosomes, ribosomes and viruses. Application of 3-D structures in designing drugs against AIDS, cancer, cardiac disease and neurodegenerative disorders.  
Recommended Background: 401 or two 300-level chemistry courses or Physics 240. 
Registration Permission: Consent of instructor.

560 Advanced Concepts in Structural Biology/Biochemistry (3) Concepts related to structural biology/biochemistry with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced.  
Repeatability: May be repeated. Maximum 12 hours.

Contact Hour Distribution: Two 3-hour labs. 
Comment(s): Approved graduate students in department only.

564 Introduction to Electron Microscopy-Scanning Electron Microscope (3) Practical introduction to techniques of electron microscopy and to scanning electron microscope. Use of microscope, introduction to darkroom techniques and digital image processing, preparation of samples for observation, and special project.  
Contact Hour Distribution: 2 hours and 1 lab. 
Registration Permission: Consent of instructor.

570 Advanced Concepts in Cellular/Molecular Biology (3) Concepts related to cellular/molecular biology with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced.  
Repeatability: May be repeated. Maximum 12 hours.  
Registration Permission: Consent of instructor.

Repeatability: May be repeated. Maximum 12 hours.  
Registration Permission: Consent of instructor.

591 Foreign Study (1-15)  
Repeatability: May be repeated. Maximum 15 hours.

592 Off-Campus Study (1-15)  
Repeatability: May be repeated. Maximum 15 hours.

593 Independent Study (1-15)  
Repeatability: May be repeated. Maximum 15 hours.

600 Doctoral Research and Dissertation (3-15)  
Grading Restriction: P/INP only.  
Repeatability: May be repeated.

601 Departmental Seminar (1) Invited speakers. Topics posted in advance. Required every semester in residence.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated. Maximum 15 hours.

603 Graduate Research Colloquium (1) Seminars and lectures dealing with current advances in fields of biochemical and biophysical methods. Mechanisms of enzyme catalysis, gene expression, membrane structure and function, metabolic regulation, physical biochemistry, molecular genetics, cell biology, neurobiology, and related topics. Topics posted in advance. Required every semester in residence.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated. Maximum 15 hours.

605 Journal Club in Neurophysiology/Physiology (1) Readings and discussion based on current literature.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated. Maximum 12 hours.

606 Journal Club in Structural Biology/Biochemistry (1) Readings and discussion based on current literature.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated. Maximum 12 hours.

607 Journal Club in Cellular/Molecular Biology (1) Readings and discussions based on current literature.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated. Maximum 12 hours.

608 Journal Club in Genetics/Developmental Biology (1) Readings and discussion based on current literature.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated. Maximum 12 hours.

610 Current Topics in Biochemistry, Cellular, and Molecular Biology (1-3) Critical reviews of research problems and methods in biochemistry, cell biology and/or molecular biology. Oral presentations, written reports, computer simulations by faculty and students.  
Repeatability: May be repeated. Maximum 4 hours.  
Registration Permission: Consent of instructor.

612 Advanced Topics in Environmental Toxicology (1-3) (See Ecology and Evolutionary Biology 612.)

615 Special Topics in Biochemistry, Cellular, and Molecular Biology (3) Biochemical and biophysical methods, mechanisms of enzyme catalysis, gene expression, membrane structure and function, metabolic regulation, physical biochemistry, molecular genetics, cell ultrastructure and physiology, neurobiology, and related topics.  
Repeatability: May be repeated. Maximum 9 hours.  
(De) Prerequisite(s): 511 and 512 or consent of instructor.

Biomedical Engineering (192)

408 Cell and Tissue Engineering (3) Mammalian cell culture. Effects of mechanical forces on cells. Tissue engineering of cardiovascular and orthopedic devices.  
(De) Prerequisite(s): 310 and Biology 140.

430 Biomedical Engineering Laboratory (4) Experience with the unique problems associated with making measurements and interpreting data in living systems. Experiments may include mechanical testing of biological materials, imaging and physiological measurements (EKG, EMG, ECG, etc.).  
(De) Prerequisite(s): 310 and 346 or consent of instructor.

473 Applied Biomechanics (3) Applications of biomechanics to the industrial and orthopedic area. Design of orthopedic implant devices; biomechanics of injury and protection.  
(De) Prerequisite(s): Mechanical Engineering 321.  
(De) Corequisite(s): 310 and Materials Science and Engineering 474.

475 Design of Artificial Internal Organs (3) Design, development and evaluation of artificial internal organs; analysis of transport processes in therapeutic devices for design optimization; current research and development needs. Ethical considerations.  
(De) Prerequisite(s): Aerospace Engineering 341 and Mathematics 231.

494 Special Project in Biomedical Engineering (1-3) Problems related to recent developments and practice.  
Repeatability: May be repeated. Maximum 6 hours.

495 Special Project in Biomedical Engineering (1-3) Problems related to recent developments and practice.  
Repeatability: May be repeated. Maximum 6 hours.
500 Thesis (1-15)  
Grading Restriction: P/NP only.  
Repeatability: May be repeated.

502 Registration for Use of Facilities (1-15)  
Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated.  
Credit Restriction: May not be used toward degree requirements.

507 Application of Linear Algebra in Engineering Systems (3) (See Chemical Engineering 507.)

509 Multidisciplinary Project (1) (See Industrial Engineering 509.)

511 Biotransport Processes (3)  
Cellular transport and electrical properties from a combined biological, physical, and engineering point of view.  
Matter transport across cellular membranes involving diffusion, osmosis, coupled solute and solvent transport, carrier-mediated transport, and ion transport.  
Homeostatic mechanisms involved in maintaining cellular solute concentrations, volume, and potential.  
Electrically inexcitable and excitable cells, lumped parameter and distributed-parameter cell models, linear electric properties of cells, and voltage gated ion channels.  
(DE) Prerequisite(s): Electrical and Computer Engineering 301 or consent of instructor.

531 Advanced Biomechanics I (3)  
Derivation of mathematical models of the human body using Kane’s Method of Dynamics to create system equations of motions.  
Mathematical models will pertain to human non-implanted and implanted joints.  
Models will be created by hand and using the symbolic manipulation algorithm Autole (Same as Mechanical Engineering 531.).  
(DE) Prerequisite(s): Mechanical Engineering 231.

534 Mechanical Vibrations (3) (See Mechanical Engineering 534.)

538 Ultrasonographic and Bioinstrumentation (3)  
Basic ultrasound principles including wave equation, impedance, acoustic properties of biological tissues, etc.  
Transducers, beam patterns, resolution, and diagnostic imaging configurations for static and dynamic real-time imaging principles.  
Doppler physics, Doppler spectral analysis, image quality, image artifacts, clinical safety and measurement techniques, and quality control.  
Registration Permission: Consent of instructor.

539 Continuum Mechanics (3) (See Engineering Science 539.)

541 Fluid Mechanics I (3) (See Mechanical Engineering 541.)

548 Optimization Techniques in Biomedical Engineering (3)  
Current techniques in optimization.  
Emphasis on applying optimization techniques to problems in biomedical imaging.  
Registration Permission: Consent of instructor.

552 Computational Biomechanics (3)  
Practical use of general-purpose commercial finite elements packages for simulations related to orthopedic and sport biomechanics.  
Prediction of failure and performance of bone, joints and prosthetic devices.  
(DE) Prerequisite(s): Mechanical Engineering 231 and 321.

555 Human Vibrations Analysis and Protection (3)  
Concepts of whole body vibrations, background information on the development of ANSI and ISO Standards for the protections of workers from whole body vibrations; how to apply the standards to meet the EU requirements; measurement methods and signal processing requirements for whole body vibration; background information on the development of ANSI and ISO Standards for the protections of workers for vibration white finger syndrome; development criteria for current ANSI, ISO, and EU standards; measurements methods and requirements, effectiveness of anti-vibration gloves.  
(Same as Aerospace Engineering 555; Mechanical Engineering 555.)  
(DE) Prerequisite(s): Mechanical Engineering 363 and 534.  
Registration Permission: Consent of instructor.

559 Advanced Mechanics of Materials I (3) (See Mechanical Engineering 559.)

561 Finite Elements for Engineering Applications (3) (See Engineering Science 551.)

562 Computational Fluid-Thermal Systems (3) (See Engineering Science 552.)

571 Biomechanics of Hard and Soft Tissue (3) (See Engineering Science 571.)

572 Biomedical Fluid Mechanics (3) (See Engineering Science 572.)

574 Multidimensional Medical Image Analysis (3)  
Applied mathematical and physical principles for different medical imaging modalities, image formation, reconstruction, enhancement and filtering, representation and analysis, registration and camera calibration models, shape and texture, transforms, features extraction, segmentation, clustering, introduction to pattern recognition and classification based on non-parametric techniques, parametric techniques, and neural networks models, 2D matching, introduction to biometrics, application in medical image segmentation, classification, and computerized medical diagnosis of diseases.  
(DE) Prerequisite(s): 572, and Electrical and Computer Engineering 472.

577 Neural Networks in Engineering (3) (See Nuclear Engineering 577.)

582 Micro- and Mesostructures (3)  
Examines physical principles, design techniques, fabrication techniques, and testing technologies needed for the modern biomedical engineer working in the micro fabrication field in miniaturized environments.  
This is a hands-on hardware and software course that includes some laboratory experiments and use of MEMS design software.  
Registration Permission: Consent of instructor.

587 Dynamic Modeling and Simulation (3) (See Mechanical Engineering 587.)

590 Selected Biomedical Engineering Problems (2-6)  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated.  
Maximum 6 to 8 credit hours.  
Comment(s): Enrollment is limited to students in the non-thesis option.  
Registration Permission: Consent of instructor.

595 Seminar (1)  
All phases of biomedical engineering, reports on current research at UTK and UTSA.  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated.  
Maximum 20 hours.

599 Special Topics in Biomedical Engineering (1-3)  
Grading Restriction: Satisfactory/No Credit grading only.  
Repeatability: May be repeated.  
Maximum 12 hours.  
Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15)  
Grading Restriction: P/NP only.  
Repeatability: May be repeated.

610 Advanced Topics in BME (3)  
Current research topics of interest in biomedical engineering.  
Repeatability: May be repeated.  
Maximum 9 hours.  
Registration Permission: Consent of instructor.

611 Fields, Forces and Flows in Cells and Tissues (3)  
Applications of equilibrium and non-equilibrium thermodynamics to rate processes and forces in cells and tissues.  
Fields in heterogeneous media, electric double layers, and electromechanical forces in physiological systems.  
Fluid and solid continuum mechanics of porous hydrated biological tissues.  
Electrophoretic, electroosmotic flows, and diffusion-reaction.  
Electro-mechanical and physicochemical interactions in biomaterials and cells.  
Case studies in membrane transport, electrode interfaces, electrical, mechanical, and chemical transduction in tissues.  
Cardiovascular, orthopedic and other clinical examples.  
(DE) Prerequisite(s): 511 or consent of instructor.

631 Advanced Biomechanics II (3)  
Using the symbolic manipulation algorithm, difficult systems pertaining to the human body will be modeled.  
A more in depth analysis of Kane’s method of multibody dynamics will also be implemented in these models.  
Each student will focus on one complex model that pertains to an orthopedic complication that the orthopedic industry needs solved.  
(Same as Mechanical Engineering 631.)  
(DE) Prerequisite(s): 531.

632 Biomechanics Design (3)  
Design of an implant, orthopaedic mechanical, orthopaedic instrument or a rehabilitation device for a sponsoring orthopaedic company.  
The design project will include patent searches, literature searches and a final report.  
(DE) Prerequisite(s): 531.

659 Advanced Mechanics of Materials II (3) (See Mechanical Engineering 659.)

674 Neuro-Fuzzy Pattern Recognition in Medicine (3)  
Pattern recognition and computer vision fundamentals, human vision system, principles of image formation and human perception, camera models, sampling and quantization and image transforms. Applications of neuro-fuzzy systems in medicine.  
(DE) Prerequisite(s): 574.

682 Biological Applications of Micro and Nanoscale Systems (3)  
Emerging techniques in biological and biomedical research on the micro and nanoscale.  
Biomaterials, soft lithography, nanomedicine, microfluidic principles, sensor principles and microsensors, microactuators and drug delivery, polymerase chain reactions, and DNA microarrays.  
(DE) Prerequisite(s): 582.
Biosystems Engineering (196)

411 Mechanical Systems Engineering (3) Fundamentals of power delivery systems and simple mechanisms; selection and design of mechanical, hydraulic, and tractive power transmission systems. Emphasis on off-road vehicles and bioprocessing systems.

Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: 2 semesters of calculus.

416 Hydrologic and Water Quality Engineering (3) An introduction to hydrology including: hydrologic variability, precipitation, evapotranspiration, infiltration, runoff, erosion, water quality and non-point pollution, energy dissipation, streamflow measurement, hydrographs, routing, open channel flow, and urban hydrology. (Same as Civil Engineering 416.)

Recommended Background: Hydraulics or fluid mechanics.

431 Bioprocess Engineering (3) Development of interdisciplinary bioprocess engineering; basics of biology in an engineering perspective; enzymatic reaction kinetics; metabolism and bioenergetics; cell growth kinetics and product formation; engineering principles applied to bioprocess engineering including mass balance, energy balance, and reaction kinetics; reactor design and systems; introduction to bioseparations; practical aspects of bioprocess engineers and process development.

Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: Thermodynamics, heat and mass transfer.

451 Electronic Systems (4) Basic electronics with biological applications. Analog and digital electronics; sensing and controlling physical and environmental parameters; sensor selection and interfacing; signal conditioning; process control. Includes laboratory experiments and design projects.

Contact Hour Distribution: 3 hours and 1 lab.
Recommended background: Electrical circuits.

500 Thesis (1-15)
Grading Restriction: P/NP only.
Registration Restriction(s): Master of Science – biosystems engineering major.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed.
Grading Restriction: Satisfactory/No Credit grading only.
Repeatability: May be repeated.
Credit Restriction: May not be used toward degree requirements.

503 Seminar (1) (See Environmental and Soil Sciences 503.)

519 Modeling Techniques and Applications (3) Engineering approach to mathematical modeling of physical phenomena. Systems definitions and boundaries; types and formulation of models and solution techniques; verification and calibration techniques; model applications and case studies.

Contact Hour Distribution: 2 hours and 1 lab.
Comment(s): Graduate standing in engineering required.

525 Soil Erosion and Sediment Yield (3) (See Environmental Engineering 525.)

530 Research Problems in Biosystems Engineering (1-3) Theoretical and experimental studies relating to current problems in agricultural engineering.
Repeatability: May be repeated. Maximum 6 hours.

532 On-Site Domestic Wastewater Treatment, Dispersal and Reuse (3) Design and management of domestic on-site wastewater treatment and dispersal systems, use of the soil as a medium for final treatment and for wastewater dispersal, concepts of the decentralization of domestic wastewater management, and reuse of treated water for irrigation. (Same as Biosystems Engineering Technology 532.)

(Any) Prerequisite(s): 2 semesters of calculus.

543 Instrumentation and Measurement (3) Modern instrumentation techniques. Static and dynamic response of instrumentation; signal conditioning; temperature, moisture, optical radiation, displacement, strain, pressure, velocity, acceleration, and flow measurements; digital data acquisition and control. (Same as Environmental Engineering 543.)

Contact Hour Distribution: 2 hours and 1 lab.
(Any) Prerequisite(s): 451 or coursework in electronics and computer circuits.

552 Biological Treatment Theory (3) (See Environmental Engineering 552.)

555 GIS and GPS Applications to Biosystems (3) Theory and applications of Geographical Information Systems (GIS) and Global Positioning Systems (GPS); acquiring, managing, and analyzing spatially-varying data. Site-specific agriculture, environmental site assessment, natural resource management, and hydrology. (Same as Biosystems Engineering Technology 555.)

Contact Hour Distribution: 2 hours and 1 lab.
Comment(s): Students with graduate standing in engineering, biological or physical sciences only.

562 Selected Topics in Natural Resource Engineering (3) Topics in engineering for the characterization, conservation, and protection of soil, water, and air resources in spite of human activities such as off-road vehicle use, agriculture, mining, construction and land development, or waste application.
Repeatability: May be repeated. Maximum 12 hours.

572 Selected Topics in Machinery, Control, and Instrumentation Systems (3) Topics in the engineering of machinery, sensors, and data collection and analysis systems, and the use of these systems in ways that enhance productivity, increase efficiency, boost economic return, and protect environmental resources.
Repeatability: May be repeated. Maximum 12 hours.

582 Selected Topics in Processing (3) Topics in the engineering of biological and physical processes and of biological systems, from the production of raw materials through to high-demand value-added products.
Repeatability: May be repeated. Maximum 12 hours.

575 Applied Microbiology and Bioengineering (3) (See Chemical Engineering 575.)

591 Environmentally-Sensitive Spray Applications (3) Develops the concepts of spray drift causes and corrective actions to lessen the effects of pesticides in the environment. Concepts are based on factors related to dosage transfer and the competing physics of droplet delivery under a variety of atmospheric conditions. Mass balance procedures are emphasized to validate measures of spray drift. Sprayer equipment components and operation factors affecting spray drift are introduced as operator controlled measures to minimize spray drift. The role of pesticide label language is incorporated into course concepts. Best management practices are developed to ensure practical applications of course concepts are emphasized. The student will learn how to implement spray drift reduction practices as well as make objective conclusions about spray drift test data.

Registration Permission: Consent of instructor.

600 Doctoral Research and Dissertation (3-15)
Grading Restriction: P/NP only.
Registration Restriction(s): Doctor of Philosophy – biosystems engineering major.

603 Seminar (1) (See Environmental and Soil Sciences 603.)

619 Mathematical Modeling for Engineers (3) Describing physical and biological settings with mathematical expressions. Applying dimensional analysis, linear and nonlinear ordinary differential equations, partial differential equations, systems of linear equations, linearization, moving boundary problems, and series solutions to solve mathematical expressions.
(Any) Prerequisite(s): 519.

650 Selected Topics (1-3) Lecture, group discussion, and individual study on specialized developments.
Repeatability: May be repeated. Maximum 6 hours.

Biosystems Engineering Technology (194)

422 Food and Process Engineering Technology (3) Application of basic engineering principles to agricultural and food processes. Fluid handling, drying, evaporation, thermal processing, heating and cooling, refrigeration systems, and materials handling.

Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: General physics.

432 Agricultural Machinery and Tractors (3) Functions, selection, matching, and management of agricultural machinery systems. Tractor power ratings, engine and transmission systems, hydraulic systems, hitching, and ballasting. Field and material capacity, field efficiency, cost analysis, and machinery replacement strategies. Functional analyses of tillage operations, planters and drills, no-tillage systems, hay harvest systems, forage and small grain harvesting, and cotton harvesting. Crop drying processes, off-road machinery safety considerations, and operator ergonomics.

Contact Hour Distribution: 2 hours and 1 lab.
Recommended Background: 2 semesters of calculus.