572 Biomedical Fluid Mechanics (3) Application of fluid mechanics theory to fluid flows in living systems. Solutions to differential equations of motion for blood flow in arteries, veins and the microcirculation. Measurement of flow properties of blood and other biological fluids. Analysis of pathological flows, blood flow through arterial stenoses. Study of flow through artificial heart valves and in extracorporeal devices. Prereq: 541. (Same as Biomedical Engineering 572.)

576 Expert Systems in Engineering (3) (Same as Mechanical Engineering 576; Nuclear Engineering 576.)

577 Neural Networks in Engineering (3) (Same as Biomedical Engineering 577; Mechanical Engineering 577; Nuclear Engineering 577.)

578 Fuzzy Systems in Engineering (3) (Same as Nuclear Engineering 578.)

581 Special Topics in Engineering Mechanics (3) Mechanics problems related to recent developments. Prereq: Consent of instructor. May be repeated with consent of department.

585 Green Engineering (3) (Same as Chemical Engineering 581; Environmental Engineering 581.)

590 Selected Engineering Problems (2-6) Enrollment limited to students in problems program. Prereq: Consent of advisor. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

595 Seminar (1) All phases of engineering science, reports on current research at UTK and UTOSI. May be repeated. Satisfactory/No Credit grading only.

600 Doctoral Research and Dissertation (3-15) P/NP only.


645 Theory of Turbulence (3) Mathematical descriptions of turbulence; isotropic turbulence, energy spectra, Kolmogoroff’s hypothesis, large and small eddy structure for turbulent flows; turbulent diffusion by continuous movement; applications to turbulent jets, wakes, pipe flow, and boundary layers. Prereq: 542. (Same as Aerospace Engineering 645.)

651-652 Advanced Topics in Computational Fluid Dynamics (3, 3) Modern approximation theory for non-linear Navier-Stokes systems. Algorithm constructions; finite element, finite volume; accuracy, convergence, stability; smooth and non-smooth solutions; shocks, artificial dissipation mechanisms. Two- and three-dimensional, compressible viscous and inviscid flows; potential, Eular and complete Navier-Stokes descriptions: turbulence closure models, reacting flows; mixed subsonic-supersonic. Computer projects, production software. Prereq: 551, 552. (Same as Aerospace Engineering 651-652; Mechanical Engineering 661-662.)

653-654 Advanced Topics in Computational Solid Mechanics (3, 3) Fracture mechanics; singularity solutions; non-linear constitutive problems, variable stiffness, initial strain-stress methods, plasticity, creep; geometrically non-linear problems, large deflection, stability, shell structures, solids; accuracy, convergence, adaptive grids; systems of nonlinear equations, solvers. Use of production-level finite element software. Computer projects. Prereq: 553. (Same as Aerospace Engineering 653-654; Mechanical Engineering 663-664.)

657 Computational Mechanics Seminar (1) Current developments in computational fluid/thermal/structural mechanics. For departmental thesis students only. May be repeated.

659 Advanced Mechanics of Materials II (3) (Same as Aerospace Engineering 659; Biomedical Engineering 659; Mechanical Engineering 659.)

671 Advanced Topics in Applied Artificial Intelligence (3) (Same as Mechanical Engineering 671; Nuclear Engineering 671.)

681 Advanced Topics in Engineering Mechanics (3) Advanced problems in mechanics, group or individually. Prereq: Consent of instructor. May be repeated with consent of department.

Mechanical Engineering (650)

NOTE: Not all the courses listed below are available at both the University of Tennessee, Knoxville, and UTOSI campuses.


451 Systems and Controls (3) Analytical models of physical systems; comprised of combinations of mechanical, fluid, electrical, and thermal systems. Analysis and design of feedback control systems using transient and frequency response techniques, stability analysis, sampled data systems. Prereq: 345. Electrical and Computer Engineering 301.

452 Computational Mechanics (3) Integration of fundamental physical laws, mathematical methods and computational techniques necessary to develop engineering analysis and design capabilities. Finite element method. Prereq: 321, Aerospace Engineering 341.

455 Introduction to Design (2) Engineering economy, optimization, design for automation, reliability, patents and product liability; design of mechanical engineering solid mechanics system. Participation in team design effort; design report. Prereq: 563.

456 Introduction to Thermal Design (2) Engineering economy, optimization, design for automation, reliability, patents and product liability; design of mechanical engineering thermal-fluid system. Participation in team design effort; design report. Prereq: 332, 344.


471 Refrigeration and Air Conditioning (3) Vapor compression and absorption cycles; heat pump systems; psychrometric processes; air washers; cooling towers; solar radiation; building heat transmission. Prereq: 332, 344.

475 Thermal Engineering (3) Thermal systems, turbomachinery, heat exchangers, combustion and system analysis and design, second law and economic analysis. Prereq: 332, 344.

479 Thermal Engineering Design (4) Design of complete thermal-fluid system, economic, technical and optimization aspects. Participation in team design effort, formal presentations and design report. Prereq: 456, 475.

483 Introduction to Reliability Engineering (3) (Same as Chemical Engineering 483; Industrial Engineering 483; Nuclear Engineering 483.)

484 Introduction to Maintenance Engineering (3) (Same as Chemical Engineering 484; Industrial Engineering 484; Materials Science and Engineering 484; Nuclear Engineering 484.)

494-495 Selected Topics in Mechanical Engineering (1-4, 1-4) Problems and topics related to developments and practice in mechanical engineering. Prereq: Consent of instructor.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

504 Product Development Process (1) Basic elements in product development process and project management. Business and engineering interrelations to development and commercial manufacturing of new products. Multidisciplinary teams to explore possible new product opportunities. Prereq: Consent of instructor. (Same as Industrial Engineering 504.)


506 Product Selection and Evaluation (2) Development of operational requirements and features for new product having potential for business venture. Market potential, design feasibility and manufacturing requirements. Design alternatives created and evaluated against set of performance requirements determined from market analysis. Preferred product concept selected by end of semester. Prereq: 504. (Same as Industrial Engineering 506.)

507 Application of Linear Algebra in Engineering Systems (3) (Same as Chemical Engineering 507; Electrical and Computer Engineering 507; Materials Science and Engineering 507.)

508 Integrated Product, Process and Manufacturing System Design (3) (Same as Industrial Engineering 508.)

509 Multidisciplinary Project (1) (Same as Industrial Engineering 509; Nuclear Engineering 509.)

510 Prototype Development and Evaluation (3) Prototype of selected product made and tested against required operating conditions. Design changes implemented to meet customer’s needs. Fabrication drawings and manufacturing plans finalized for introduction of product to marketplace. Prototype development managed using project management plan. Prereq: 555.

512 Heat Transfer II (3) Analysis of steady-state and time-dependent heat conduction by numerical methods. Analysis of laminar and turbulent convection heat transfer in internal and external flows, forced and buoyancy driven flows. Prereq: 541.

514 Phase Change Heat Transfer (3) Mechanisms and modeling of nucleate, transition and film boiling processes; critical heat flux; forced convection boiling and post dry-out heat transfer; condensation processes; heterogeneous nucleation, dropwise and filmwise condensation; flow condensation; liquid-solid phase change processes; moving phase fronts; mathematical modeling. Prereq: 344, 511.


521-522 Thermodynamics I and II (3,3) Macroscopic thermodynamics, including First and Second Law analyses, availability, phase and chemical equilibrium criteria, combustion, gas mixtures, and property relations. Determination of thermodynamic properties from molecular structure, spectroscopic data, kinetic theory, statistical mechanics, quantum physics, Schrödinger equation. Prereq: 332.

523 Special Topics in Thermodynamics (3) Application of thermodynamics to current interest in mechanical engineering. Prereq: Consent of instructor.

525 Combustion and Chemically Reacting Flows I (3) Fundamentals: thermochemistry, chemical kinetics and conservation equations; phenomenological approach to laminar flames; diffusion and premixed flame theory; single droplet combustion; deflagration and detonation theory; stabilization of combustion waves in laminar streams; laminar flamelet models; introduction to turbulent flames. Prereq: 522, 541, or consent of instructor.

526 Combustion and Chemically Reacting Flows II (3) Advanced topics: phenomenological approaches to turbulent flames; fundamentals of turbulent flow; application of probability density functions to turbulent flames; turbulent reacting flows with premixed and/or non-premixed reactants; spray combustion models; fluidized bed combustion; chemically reacting boundary layer flow; gas turbine and/or rocket motor combustors; furnaces; introduction to supersonic combustion and hypersonic flows. Prereq: 525.

527 Thermal Systems Analysis I (3) Analysis of basic principles of heat transfer, fluid mechanics, and thermodynamics to develop solution models for parametric analysis of thermal systems problems via commercial software. Prereq: 544.


531 Advanced Biomechanics I (3) (Same as Biomedical Engineering 531.)

533 Dynamics (3) Kinematics and dynamics of particles in three dimensions. Rotating coordinate systems. Hamilton’s principle. Lagrange’s equations of motion. Kinematics and dynamics of rigid bodies. Prereq: Mathematics 431 or Engineering Analysis, undergraduate vibrations course. (Same as Aerospace Engineering 533; Engineering Science 533.)

534 Mechanical Vibrations (3) Vibrations of linear, discrete, undamped and damped systems. Lagrange’s equations for holonomic systems. Modal analysis. Laplace transform. Response to mechanical transients. Prereq: Undergraduate vibrations course. (Same as Aerospace Engineering 533; Biomedical Engineering 534, Engineering Science 534.)

537 Mechanical Systems Analysis (3) Application of basic principles of rigid body dynamics, strength of materials, and continuum mechanics to development of models for parametric analysis of mechanical systems using commercial software. Prereq: 231, 321.

539 Continuum Mechanics (3) (Same as Aerospace Engineering 539; Biomedical Engineering 539; Engineering Science 539.)

541 Fluid Mechanics I (3) Derivation of equations governing flow of inviscid and viscous fluids (conservation of mass, Newton’s second law, conservation of energy). Equations of state and constitutive relations. Euler and Navier-Stokes forms and nondimensionalization. Exact solutions and introduction to potential and boundary-layer flows. Prereq: Fluid mechanics. (Same as Aerospace Engineering 541; Biomedical Engineering 541; Engineering Science 541.)

542 Fluid Mechanics II (3) Equations of viscous fluid flows. Basic concepts and equations of turbulent flow. Separation, stability and transition. Laminar and turbulent boundary-layer flows. Exact, approximate, and numerical solutions. Prereq: 541. (Same as Aerospace Engineering 542; Engineering Science 542.)

551-552 Mechanical Engineering Design (3,3) Design of mechanical engineering devices and systems. Prereq: Consent of instructor.

555 Human Vibrations Analysis and Protection (3) (Same as Aerospace Engineering 555; Biomedical Engineering 555.)

559 Advanced Mechanics of Materials I (3) Elasticity in three dimensions: equations of equilibrium, strain-displacement relations, compatibility, constitutive equations. Energy methods. Beams on elastic foundation, unsymmetrical bending, shear center, beam-columns, buckling, plastic collapse. Prereq: Mechanical Engineering 321, (Same as Aerospace Engineering 559; Biomedical Engineering 559; Engineering Science 559.)

561 Finite Elements for Engineering Applications (3) (Same as Aerospace Engineering 571; Biomedical Engineering 561; Engineering Science 551.)

562 Computational Fluid Dynamics (3) (Same as Aerospace Engineering 572; Biomedical Engineering 562; Engineering Science 552.)

563 Computational Solid Mechanics (3) (Same as Aerospace Engineering 573; Engineering Science 553.)

576 Expert Systems in Engineering (3) (Same as Engineering Science 576; Nuclear Engineering 576.)

577 Neural Networks in Engineering (3) (Same as Biomedical Engineering 577; Engineering Science 577; Nuclear Engineering 577.)

581 Rocket Propulsion I (3) Rocket propulsion fundamentals; thermodynamics of nonreacting and chemically reacting ideal gases, rocket nozzle design; ideal rocket performance parameters; rocket heat transfer; chemistry of propellants; liquid rocket engine systems; ground testing; introduction to solid propellant rockets. Prereq: Consent of instructor.

582 Rocket Propulsion II (3) Solid propellant rocket performance, homogeneous and heterogeneous propellant chemistry and combustion system performance, thermal decomposition and gas phase reaction models; effect of chamber pressure and additives on solid propellant burn rates, erosive burning; analysis of two-phase solid rocket exhaust flow. Introduction to nuclear and electric propulsion; electrical resistance and electric field (ion) engine performance, magnetohydrodynamic thrusters, traveling wave thrusters; exotic propulsion systems. Prereq: Consent of instructor.

584-585 Turbomachinery Systems I, II (3,3) Ideal cycle analysis of turbine engines, real cycle analysis, component performance analysis, component design and systems integration (inlets, nozzles, combustors, compressors, turbines), flowthrough theory, turbine engine component matching, transient operation, surge and rotating stall, engine control systems, structural considerations. Prereq: First year graduate standing and consent of instructor.

586 Mechanics and Control of Robotic Manipulators (3) Fundamentals of robotic manipulation: kinematics and dynamics of manipulators, control systems design, trajectory planning, advanced force and impedance control strategies. Prereq: 451, 533, or equivalent.

587 Dynamic Modeling and Simulation (3) Modeling and analysis of physical systems and parameter identification. Mathematical modeling methods and approximations. Digital simulation techniques and practices. Design and control applications. Prereq: 451 or equivalent. (Same as Biomedical Engineering 587.)

588 Introduction to Hybrid Electric Vehicles (3) Series, parallel, and dual configurations. Sizing and analysis of typical HEV components: motors, auxiliary power sources, on-board energy storage, and fuels. Steady-state HEV force and power modeling schemes. Powertrain design using various computer simulation tools. Prereq: Consent of instructor.

589 Hybrid Vehicle Control Systems Design and Analysis (3) Dynamic modeling, simulation and analysis of complete hybrid electric vehicle systems. Linear control design techniques and discrete logic design applied to HEV power trains and operating mode controls. Digital and real-time control and hardware issues of automotive systems. Design and human factors engineering issues of vehicle controls and displays. Prereq: 588 or consent of instructor.

590 Selected Engineering Problems (2-6) Enrollment limited to students in programs program. Prereq: Consent of advisor. May be repeated. Satisfactory/No Credit grading only.

594 Culminating Integrated Project Report (3) Final phase of product development process. Multidisciplinary teams submit and defend comprehensive project report. Report includes all engineering and business considerations necessary to convince potential investors to fund proposed business venture. Prereq: Consent of instructor. (Same as Industrial Engineering 594; Nuclear Engineering 594.)

595 Seminar (1) All phases of mechanical engineering, reports on current research at the University of Tennessee, Knoxville, and the University of Tennessee Space Institute. May be repeated. Satisfactory/No Credit grading only.
599 Special Topics in Mechanical Engineering (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

610 Advanced Topics in Fluid Mechanics and Heat Transfer (3) Advanced theory and application of fluid mechanics and heat transfer; natural convection, multi-phase flow, high speed reacting and nonreacting flows, advanced boundary layer techniques, combustion, perturbation and variational methods of analysis, heat exchanger theory and design. May be repeated. Maximum 9 hours. Prereq: Consent of instructor.

613 Advanced Radiation Heat Transfer (3) Radiation heat transfer in absorbing, emitting and scattering media; interaction of thermal radiation with conduction and convection heat transfer. Prereq: 511, 512.

621 Advanced Topics in Solid Mechanics (3) Advanced theory and applications in mechanics, dynamics, vibrations, and strength of materials. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

631 Advanced Biomechanics II (3) (Same as Biomedical Engineering 631.)

642 Advanced Topics in Thermodynamics (3) Comparison of macroscopic and microscopic approach; equilibrium of pure substances, metastable states. Non-equilibrium thermodynamics. Prereq: Consent of instructor.

651-652 Advanced Topics in Computational Fluid Dynamics (3,3) (Same as Aerospace Engineering 661-662; Engineering Science 651-652.)

653-654 Advanced Topics in Computational Solid Mechanics (3,3) (Same as Aerospace Engineering 663-664; Engineering Science 653-654.)

659 Advanced Mechanics of Materials I 1 (3) Plane stress and plane strain in rectangular and polar coordinates; stress functions. Torsion of noncircular sections. Disks, thick-walled tubes, thick-walled pressure vessels. Theory of rectangular and circular plates, plates with holes, axi-symmetric shells. Stress concentrations. Prereq: Mechanical Engineering 559 or consent of instructor. (Same as Aerospace Engineering 659; Biomedical Engineering 659; Engineering Science 659.)


671 Advanced Topics in Applied Artificial Intelligence (3) (Same as Engineering Science 671; Nuclear Engineering 671.)


Department of
NUCLEAR ENGINEERING
http://www.eng.utk.edu/nuclear/

H. L. Dodds, Head and Graduate Liaison

Professors
Dodds, H.L. (IBM Professor), PhD, PE ...............................................Tennessee
Fontana, M.H. (Research), PhD, PE .................................................Purdue
Groer, P.G., PhD .................................................... Vienna (Austria)
Grossbeck, M.L. (Research), PhD .................................................Illinois
Mihalcz, J.T. (Research), PhD ......................................................Tennessee
Miller, L.F., PhD, PE .................................................................Texas A&M
Mynatt, F.R. (Research), PhD ......................................................Tennessee
Ruggles, A.E., PhD .................................................................Rensselaer Polytechnic Institute
Townsend, L.W., PhD .........................................................Idaho
Upadhyaya, B.R., PhD, PE .........................................................California (San Diego)

Associate Professors
Hines, J.W., MBA, PhD ..............................................................Ohio State
Pevey, R.E., MBA .................................................................Emory
PhD, PE .................................................................................Tennessee
Scott, T.H., PhD, PE .................................................................Florida

Assistant Professors
Gribok, A.V. (Research), PhD ......................................................IPPE (Russia)
Mousa, H.M. (Research), PhD ......................................................Tennessee

Adjunct Faculty
DeHart, M.D., PhD .................................................................Texas A&M
Gehin, J.C., PhD .................................................................Massachusetts Institute of Technology
Icenhour, A.S., PhD .................................................................Tennessee
Nichols, T.L., MD .................................................................Tennessee
Ramsey, C.R., PhD .................................................................Tennessee

Emeriti Faculty
Uhrig, R.E. (Distinguished Professor), PhD, PE ...............................Iowa State

MAJOR DEGREES
Nuclear Engineering ...............................................................MS, PhD

The Department of Nuclear Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees. Students may elect a traditional nuclear engineering program focusing on fission energy or fusion energy, or a radiological engineering concentration, which prepares students for careers in the radiation safety field (health physics). Both programs are designed for graduates of accredited undergraduate programs in engineering, physics, chemistry, biology, or mathematics.

All entering students must have, as a minimum, competency in mathematics through ordinary differential equations, competency in atomic and nuclear physics, and competency consistent with an introductory course in nuclear engineering. If such competencies do not exist, the student must take appropriate courses for undergraduate credit. In addition, students without a BS degree in nuclear engineering, or the equivalent, must take 431 (Radiation Protection) and 470 (Nuclear Reactor Theory I), both of which may be taken for graduate credit. The department head is the contact for all interested students, both those with nuclear engineering degrees and those from other disciplines.

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 program 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 six hours of elective courses in mathematics, statistics or computer science.
- Six hours in either nuclear engineering or a related field.
• One of the following three options for a culminating experience:
  a. A thesis project (6 hours of 500).
  b. Two to four engineering practice projects (6 hours of 598).
  c. One engineering practice project (3 hours of 598) plus 6 hours of additional nuclear engineering coursework.

Thus, options (a) and (b) result in a minimum total of 30 hours and option (c) results 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 UT Knoxville 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 in nuclear engineering program 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 conferred 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 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 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.

Program Curriculum for Dual MS-MBA Degree • Nuclear Engineering Major

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 program 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 U.S. 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 Graduate School 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.

Program Curriculum for Dual MS-MBA Degree • 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
Mechanical Engineering 508 Integrated Product, Process, and Manufacturing System Design .......................... 3
Summer

Internship ................................................................................................. —
Business Administration 514 Integrated Business Simulation ................. 3
Nuclear Engineering 509 Project Management ...................................... 1
Fall — Second Year

Industrial Engineering 511 Business Planning and Commercialization ...... 1
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 66

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 degrees 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, biology, 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 in nuclear engineering include:

- A minimum of 48 semester hours beyond the bachelor’s degree, exclusive of credit for the MS thesis or nuclear engineering practice.
- A minimum of 24 semester hours in doctoral research, Nuclear Engineering 600.
- A minimum of 30 semester hours in nuclear engineering courses numbered 500 and above (or the equivalent), with at least 9 semester 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 semester hours in mathematics, computer science, or statistics courses beyond nuclear engineering undergraduate requirements numbered 400 or above.
- A minimum of 6 semester 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 12 hours of written examination that is administered over a three-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 semester 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 Maintenance and Reliability Engineering

The College of Engineering offers a graduate certificate in maintenance and reliability engineering. The program is designed primarily for part-time students in that all of the courses are available through distance education (see http://www.anywhere.tennessee.edu/ne/default.htm).

The 12-credit certificate is earned by completing 483 and 484, which are cross-listed among all participating departments in the College of Engineering, plus two elective courses selected from a list of courses provided by the participating departments. Currently, the available elective courses are Industrial Engineering 516 and 591, Mechanical Engineering 534 and 599, and Nuclear Engineering 579 and 585. The selection of elective 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.

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 in that all of the courses are available through distance education (see http://www.anywhere.tennessee.edu/ne/default.htm).

The 12-credit 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 301 (Fundamentals of Nuclear and Radiological Engineering) prior to beginning the graduate coursework described above.

GRADUATE COURSES

Nuclear Engineering (716)

403 Nuclear and Radiological Engineering Laboratory II (3) Cross section measurements, diffusion properties of neutrons, shielding dynamics and controls, alpha and beta spectroscopy, radiation fields and dosimetry. Prereq: 304.

404 Nuclear Fuel Cycle (3) Mining, milling, fabrication, in-core management, reprocessing, waste disposal, regulatory and radiation health issues and requirements. Prereq: 470 or equivalent.

406 Radiation Shielding (3) Types of radiation sources, fundamentals of gamma ray and neutron attenuation, biological effects, approximate methods of shield design, discrete ordinates, and Monte Carlo. Prereq: Physics 232.

421 Introduction to Nuclear Criticality Safety (3) Fundamentals of nuclear criticality safety; criticality accidents; safety standards; overview of experiments, computational methods, and applications. Prereq: 301.

431 Radiation Protection (3) External and internal dosimetry, biological effects of radiation, radiation detection, radiation risk assessment. Prereq: 301.
470 Nuclear Reactor Theory I (3) Fundamentals of reactor physics relative to cross sections, kinematics of elastic scattering, reactor kinetics, reactor systems and nuclear data. Analytical and numerical methods applicable to general criticality problems, eigenvalue searches, perturbation theory, and multigroup diffusion equations. Prereq: 301.

483 Introduction to Reliability Engineering (3) Probabilistic failure models, parameter estimation (maximum likelihood, Bayes techniques), model identification and comparison, accelerated life tests, failure prediction, system reliability, preventive maintenance and warranties. Prereq: Senior standing or consent of instructor. (Same as Chemical Engineering 483; Industrial Engineering 483; Mechanical Engineering 483.)

484 Introduction to Maintenance Engineering (3) Principles of maintenance and reliability engineering, and maintenance management. Information extraction from machinery measurements, rotating machinery diagnostics, nondestructive testing, life prediction, failure models, lubrication oil analysis, establishing predictive maintenance program, and computerized maintenance management systems. Prereq: Senior standing in engineering and consent of instructor. (Same as Chemical Engineering 484; Industrial Engineering 484; Materials Science and Engineering 484; Mechanical Engineering 484.)

494 Special Topics in Nuclear Engineering (3) Problems related to recent developments and practice. Prereq: Senior standing and consent of instructor. May be repeated. Maximum 6 hours.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

509 Multidisciplinary Project (1) (Same as Industrial Engineering 509; Mechanical Engineering 509.)

511-512 Transport Processes in Nuclear Engineering (3,3) Rheology of Newtonian and non-Newtonian fluids; integral and system conservation equations for single and multi-component fluids; in-depth development of differential conservation equations for mass, energy, and momentum; exact and approximate solutions of equations of motion; boundary layer analysis; numerical analysis of fluid flow and heat transfer.

521 Nuclear Systems Dynamics and Control (3) Introduction to state variable methods for system dynamics and control analysis and application of these methods to nuclear plant dynamics, simulation and control problems.


541 Reactor Fuel Management (3) Topics relative to in-core fuel management. Applicable topics in reactor physics, fuel depletion, isotopic inventories, reactivity control and numerical methods. Prereq: 470 or consent of instructor.


543 Selected Topics in Nuclear Criticality Safety (3) Criticality safety computational and experimental methods for enrichment, fabrication, storage, reprocessing, and transport applications; overview of safety practices and regulatory requirements. Prereq: 421 or consent of instructor.

550 Radiation Measurements Laboratory (3) Physics and electronics associated with radiation detection and measurement, methods of data analysis. Applicability of particular detector measurements and fundamentals of radiation detection instrumentation operation. Prereq: 551 or consent of instructor.


552 Radiological Assessment and Dosimetry (3) Transport of radionuclides in environment, food chain pathways, internal dosimetry and personnel dosimetry. Prereq: 551 or consent of instructor.

553 Radiation Risk Analysis (3) Methods for radiation risk prediction, survival analysis, parameter estimation, real data analysis, extrapolation techniques. Prereq: 552 or consent of instructor.

567 Medical Physics I (3) Ionizing radiation use in radiation therapy to cause controlled biological effects in cancer patients. Physics of interaction of various radiation modalities with body equivalent materials and physical aspects of clinical applications. Lecture and lab. Prereq: Consent of instructor.

568 Medical Physics II (3) Physics of ionizing radiation therapy with emphasis on quality assurance, treatment planning, radiation protection, and special treatment procedures. Lecture and lab. Prereq: 567.

571 Reactor Theory and Design (3) Analytical and numerical techniques for neutronics modeling of nuclear systems. Forward and adjoint Boltzmann transport equation. Multigroup diffusion theory. Core analysis methods and codes. Prereq: 470 or consent of instructor.

572 Nuclear System Design (3) Design and analysis of a nuclear system, interface with non-nuclear aspects of system design: system reliability and economics: class project. Prereq: Consent of instructor.

577 Neural Networks in Engineering (3) Neural network technology for use in intelligent systems; rationale for neural computing, structure of neural computing systems, programming. Prereq: Consent of instructor. (Same as Biomedical Engineering 577; Engineering Science 577; Mechanical Engineering 577.)

578 Fuzzy Systems in Engineering (3) Fuzzy numbers, fuzzy environment, uncertainty and randomness, approximate reasoning, fuzzy models and structures, decision process in fuzzy environment, fuzzy computing, fuzzy logic controllers, fuzzy expert systems and other engineering applications. (Same as Engineering Science 578.)

579 Advanced Monitoring and Diagnostic Techniques (3) Fundamentals of machinery monitoring and diagnosis and application of advanced statistical and artificial intelligence based techniques such as ridge regression, principal component analysis (PCA), linear and non-linear partial least squares (PLS), neural networks, and fuzzy logic. Prereq: Graduate standing or consent of instructor.


582 Monte Carlo Analysis (3) Analysis of radiation transport problems in radiation shielding by Monte Carlo method, use of MCNP code system. Random sampling, evaluation of integrals, analog particle transport, techniques of variance reduction, forward and adjoint modes of analysis, importance function biasing, splitting/weight window survival biasing and contribution theory. Prereq: Consent of instructor.

585 Process System Reliability and Safety (3) Qualitative and quantitative techniques for assessing and improving process systems reliability and safety. Fault tree analysis and associated dependent failure analysis. Prereq: Consent of instructor. (Same as Chemical Engineering 585.)

594 Culminating Integrated Project Report (3) (Same as Industrial Engineering 594; Mechanical Engineering 594.)

597 Special Topics in Nuclear Engineering (3) Lectures and recitation on recent advances in nuclear engineering. Prereq: Consent of instructor. May be repeated with consent of department.

598 Nuclear Engineering Practice (3-9) Experience in solving and reporting on engineering problems. Prereq: Approval of department. May be repeated. Enrollment limited to alternative plan students. Satisfactory/No Credit grading only.

600 Doctoral Research and Dissertation (3-15) P/NP only.

611-612 Selected Topics in Reactor Theory (3,3) Transport theory, control rod theory, stochastic methods. Selected topics from literature. Prereq: 572.

621 Selected Topics in Radiation Protection (3) Prereq: 551, 552. May be repeated with consent of department.

653 Theory of Information Processing (3) Modern system theoretical methods for evaluating system performance from dynamic measurements. Prereq: 522 or equivalent.

671 Advanced Topics in Applied Artificial Intelligence (3) Recent advances in engineering applications of artificial intelligence. Prereq: 577. (Same as Engineering Science 671; Mechanical Engineering 671.)

697 Special Topics in Nuclear Engineering (3) Investigation of new developments. Prereq: Consent of instructor. May be repeated with consent of department.
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 W. 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 semester hours of credit, including all required courses. The required average is 2.0 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 credit hours taken in residence were earned. Averages are computed on weighted grades. Grades are on an alphabetical scale from A+ to F. No credit toward the JD degree is awarded for grades of D- or F.

Eligible law students may receive up to six (6) semester hours of credit toward the JD degree 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 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
- 833 Representing Enterprises OR
- 978 Transactional Tax Planning

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 degree, 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.

**Concentration in Advocacy and Dispute Resolution**

Students interested in a concentration in advocacy and dispute resolution must complete all of the following courses:

- 813 Evidence
- 815 Introduction to Advocacy and Professional Responsibility
- 920 Trial Practice
- 921 Pretrial Litigation
- 922 Advanced Trial Advocacy
- 928 Case Development and Resolution

Students electing a concentration in advocacy and dispute resolution may not take any of the above courses on a Satisfactory/No Credit basis.

**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 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 semester 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 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 semester 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 semester 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 semester hours approved by the College of Law. The 6 hours of law courses in which the student has earned a 2.3 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 conferred both of 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 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 semester 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 nine semester 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 nine semester 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 or 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 semester 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.

Courses

Law (613)

801 Civil Procedure I (3) Binding effect of judgments, selecting proper court (jurisdiction and venue), ascertaining applicable law, and federal and state practice.


803 Contracts I (3) Basic agreement process and legal protections afforded contracts: offer and acceptance, consideration and other bases for enforcing promises; the Statute of Frauds, unconscionability and other controls of promissory liability. Introduction to relevant portions of Article 2 of the Uniform Commercial Code.

804 Contracts II (3) Continuation of Contracts I. Issues arising after contract formation: interpretation, duty of good faith; conditions, impracticability and frustration of purpose; remedies; third party beneficiaries; assignment and delegation. Considerable coverage of Article 2 of the Uniform Commercial Code with respect to remedies, anticipatory repudiation, impracticability and good faith.

805 Legal Process I (3) Lawyer-like use of cases and statutes in prediction and persuasion. Analysis and synthesis of common law decisions; statutory interpretation; fundamentals of expository legal writing and legal research.

806 Legal Process II (3) Continuation of Legal Process I. Formal legal writing, appellate procedure, and oral advocacy.

807 Torts I (3) Intentional torts, defenses and privileges related to intentional torts; negligence: standard of care, professional malpractice, and liability of owners and occupiers of land; defenses based on plaintiff’s conduct: contributory and comparative negligence, assumption of risk, failure to take precautions, and avoidable consequences; causation, proximate cause; duty rules; and questions of joint and several or several liability.

808 Torts II (3) Vicarious liability and related concepts; strict liability for dangerous animals and abnormally dangerous activities; products liability; nuisance, defamation and invasion of privacy; economic torts: misrepresentation and interference with contract and prospective opportunities; immunities: those of government, governmental employees, charities and family members, and damages.

809 Criminal Law (3) Substantive aspects of criminal law; general principles applicable to all criminal conduct; specific analysis of particular crimes; defenses to crimes.

810 Property (4) Introductory course treating issues of ownership, possession, and title in the areas of: landlord-tenant relations; estates in land and future interests; co-ownership and marital property; real estate sales agreements and conveyances; title assurance and recording statutes; servitudes; and selected aspects of nuisance law, eminent domain and zoning.

812 Constitutional Law (4) Fundamental principles of American constitutional law: federalism, separation of powers, equal protection of law, and constitutional protection of other fundamental individual rights.

813 Evidence (4) Rules regulating introduction and exclusion of oral, written and demonstrative evidence at trials and other proceedings, including relevance, competence, impeachment, hearsay, privilege, expert testimony, authentication, and judicial notice. Coreq: 920 for students electing concentration in advocacy.

814 Legal Profession (3) Legal, professional and ethical standards applicable to lawyers. Not open to students who have taken 815.

815 Introduction to Advocacy and Professional Responsibility (3) Theory and morality of advocacy in adversarial system, and legal, ethical, and professional standards applicable to lawyers and especially lawyers as advocates.

818 Fundamental Concepts of Income Taxation (3) Introduction to basic statutory analysis, fundamental principles of federal individual income tax, and pervasive income tax concerns that arise in practice. Federal concept of gross income, pattern of exclusions, exemptions and deductions from gross income used to arrive at tax base; special treatment of capital gains and losses; and rate structure.


821 Administrative Law (3) Administrative agency decision-making processes and judicial review of administrative decisions: procedural standards for informal and formal administrative adjudication and rule-making (attention to Federal Administrative Procedure Act); constitutional due process standards in administrative settings; and availability, scope and timing of judicial review of agency actions.

822 Legislation (3) Interpretation and drafting of statutes, legislative process, and legislative power; comparison of judicial views on legislative process with both realities of legislative process and applicable constitutional principles.


827 Business Associations (4) Legal problems associated with formation, operation, and dissolution of unincorporated and incorporated business firms; legal rights of duties of firm members: principals and agents, partners and limited partners, members, managers, and governors of limited liability companies, and corporate shareholders, directors, and officers; and others with whom members interact in connection with firm’s business.

828 Corporate Finance (3) Legal issues arising in conjunction with corporate financial transactions: issuance of debt and various types of equity securities, distributions to shareholders, mergers and other corporate acquisitions. Legal valuation of corporate securities.

830 Securities Regulation (3) Basic structure of federal securities law. Legal problems associated with raising of capital by new and growing enterprises; securities transactions by promoters, officers, directors and other insiders; antifraud provisions; and provision of legal and other professional services in connection with securities transactions. Recommended prereq or coreq: 827.

833 Representing Enterprises (3-5) Capstone course for concentration in business transactions. Simulated business transactions and completion of major planning drafting project. Transactions vary: formation of new business, acquisition of existing business, development of real estate project, various financing transactions and corporate reorganization. Prereq: Completion of all courses for concentration in business transactions.

834 Antitrust (3) Federal antitrust laws; monopolization, price-fixing, group boycotts, and anticompetitive practices generally; government enforcement techniques and private treble damage suits.

840 Commercial Law (4) Basic coverage of most significant provisions of Uniform Commercial Code: security interests in personal property (Art. 9 of U.C.C. and relevant Bankruptcy Code provisions); commercial paper, including checks, notes and other negotiable instruments (Arts. 3 and 4 of U.C.C.); sales of goods, including coverage of portions of Art. 2 of U.C.C. not covered in Contracts.

842 Contract Drafting Seminar (2) Practical fundamentals of drafting contracts of different types.

843 Debtor-Creditor Law (3) Basic elements of federal bankruptcy law: claims, property of estate, automatic stay, discharge, avoidance powers, assumption and rejection of contracts, priority of distributions, and distinction between liquidation and rehabilitation. Enforcing judgments outside of bankruptcy.

844 Business Reorganizations and Workouts (3) An examination of reorganization under chapter 11 of the United States Bankruptcy Code from petition date to confirmation of a plan of reorganization as well as coverage of the use of extensions, compositions, workouts and other non-bankruptcy methods of adjusting the rights or parties to business transactions. Although not required as prerequisites, an understanding of the subject matter of Commercial Law and especially Debtor/Creditor law is strongly recommended. The course satisfies the expository writing requirement.
847 Advanced Constitutional Law (2-3) Advanced study of issues in American constitutional law. Specific course offerings vary. Subjects include: constitutional structure of American governmental institutions, federalism, separation of governmental powers; relationship between legislative and executive branches, relationship among states and between states and federal government, and constitutional amendment process; state constitutional law. Tennessee constitution and differences between state and federal constitutional law; Bill of Rights and 14th Amendment to Constitution: constitutional rights as protected by Bill of Rights and 14th Amendment. Prereq: 812. May be repeated under different topic.

848 Civil Rights Actions (3) Litigation to vindicate constitutional rights in private actions against the government and its officials, as well as rights protected by other civil rights legislation; elements of cause of action under 42 U.S.C. sec. 1983; actions against federal government officials under the Bivens doctrine; institutional and individual immunities; relationship between state and federal courts in civil rights actions; and remedies for violations of constitutional and other civil rights.

849 Discrimination and the Law (3) Comparison of race, sex, and other forms of discrimination with respect to education, employment, housing, political participation and other social and economic activities; historical landmarks and current issues in discrimination law.

850 Supreme Court (3) History of Supreme Court and of procedures by which Court arrives at decisions; influences of justices’ ideology and role of Court in political system.

854 Investigatory Criminal Procedure (3) Police practices and constitutional rights of persons charged with crimes: arrest; search and seizure; identification; interrogation and confessions; electronic eavesdropping; and right to counsel.

855 Adjudicatory Criminal Procedure (3) Pre- and post-trial procedures in criminal case: bail; preliminary hearing; grand jury; prosecutorial discretion; discovery, speedy trial; plea bargaining; jury trial; and double jeopardy. Federal Rules of Criminal Procedure.

859 Criminal Law Seminar (2) Advanced problems in criminal law and administration of justice. Prereq: 809.

862 Family Law (3) Survey of laws affecting formal and informal family relationships: premarital disputes; ante nuptial contracts; creation of common law and formal marriage; legal effects of marriage; support obligations within family; legal separation, divorce, alimony, and property settlements; child custody and child support; adoption; illegitimacy.

863 Children and the Law (3) Legal relationships between children, families and state; juvenile justice; foster care; adoption; educational issues: special education; child abuse and neglect; health care and income maintenance: advocacy for children and families.

866 Environmental Law and Policy (3) Study, through methods of public policy analysis, of responses of legal system to environmental problems: environmental litigation; Clean Air Act; Clean Water Act; National Environmental Policy Act; and selected regulatory issues.

867 Environmental Law Seminar (2) Selected topics in environmental law.

873 American Legal History (3) Selected topics in American legal history.

877 Jurisprudence (3) Critical or comparative examination of legal theories, concepts, and problems: legal positivism; natural law theory; legal realism; idealism; historical jurisprudence; utilitarianism; Kantianism; sociological jurisprudence; policy science; and critical studies.

879 Law and Economics (3) Relationship between legal and economic thought; application of basic economic concepts to legal problems; economics in legal decision making; scholarly support for and criticism of economic analysis of law. Designed for students with no undergraduate background in economics or mathematics.

881 Law and Literature (3) Reading literary works, development of philosophy, and reading technique applicable to both law and life.

886 Public International Law (3) Law-creating processes and doctrines, principles and rules of law that regulate mutual behavior of states and other entities in international system.

887 International Business Transactions (2-3) Doing business with foreign persons and in foreign countries; acquisition and use of property within foreign country; regulation of international business transactions by international organizations and foreign governments; analysis of international conventions and laws of foreign countries affecting business and comparison of those conventions and laws with United States law.

895 Labor Relations Law (3) Political, social and economic influences in development of federal labor relations laws; employee rights of self-organization, union and employer unfair labor practices; strikes, lockouts, boycotts, and collective bargaining processes; enforcement of collective agreements; individual rights of employees; federal preemption and state regulation.

943 Land Use Law (3) Private land use controls: nuisance, easements, real covenants, equitable servitude and homeowner associations; public land use controls: zoning, subdivision controls, eminent domain, and regulatory takings.

946 Business Law Clinic (6) Supervised fieldwork assuming substantial responsibility for representing clients with various business and transactional matters. Exploration and development of fundamental professional skills involved in practicing business and transactional law. Interviewing and counseling clients, negotiating with other attorneys and parties, planning, negotiating and documenting transactions and dispute resolutions, conducting factual investigations and legal audits of businesses, and monitoring and ensuring compliance with federal, state and local statutes, rules and regulations. Prereq: 818, 826, 827, 972. Prereg or coreq: 842. 826 may be waived for those with sufficient business background. May not receive credit for both 946 and 905.

947 Prosecution Externship (6) Supervised fieldwork required to be admitted to practice as prosecutor and to assume substantial responsibility for prosecution of criminal cases in state or federal courts. Classes on Tennessee or federal criminal law and procedure and prosecution function. Under direct supervision of full-time, experienced prosecutor and other professional prosecutors in office. Assist in investigation of crimes, interview and preparation of witnesses, drafting of relevant documents, negotiation and formal presentation of guilty pleas, presentation of cases to grand jury, and representation of government in preliminary hearings and felony trials. Prereq: Third-year standing, 813, 920, and either 854 or 855, and consent of instructor. May not receive credit for both 947 and 905.

950 Computers and Law (3) Impact of computers on law and practice of law: expert systems; legal skills required in building expert systems; common law office uses of computers; and computerized research. Preparation of lawyers to think effectively concerning use of computers. Prior computer experience not necessary.

956 Entertainment Law (3) Role of law and lawyer in entertainment industry. Course content varies. Music industry: music copyright laws; artist/manager relationships; recording contract negotiations; industry labor unions; and performing right organizations.

957 Law, Science and Technology (3) Legal implications of advanced technologies; adaptation of law to challenges posed by new kinds of knowledge and new ways of doing things. Biotechnology, regulation of scientific research, space law, legal issues relating to new information technologies, nanotechnologies, and others designated by instructor.

958 Women and The Law (3) Treatment and status of women in American legal system: women as political actors, as family members, as participants in workforce, as targets of violence and as members of legal profession; introduction to current approaches to gender justice.

959 Intellectual Property (3) Intellectual property and related interests under federal and state law: patents; trademarks; trade secrets; copyright; right of publicity; unfair competition.

960 Employee Benefits Law (2-3) Employee Retirement Income Security Act, federal law governing employee benefit plans sponsored by private employers. Applied problem method of instruction: questions, issues, and problems involving employee benefit plans likely to arise in general litigation or business transaction practice. For three credit hours, includes Chapter 400 of Internal Revenue Code.

962 Law and Medicine Seminar (2) Effects of legal rules on delivery and quality of medical care: nature of physician-patient relationship; unauthorized practice of medicine; medical education, licensing and specialization; hospital staff privileges; medical malpractice liability: standard of care, proof, causation, defenses, and damages; protection of patient autonomy; consent, informed consent, conception and abortion, choice of treatment, and death and dying; control of communicable diseases; organ transplantation and medical resource allocation.


973 Wealth Transfer Taxation (3) Taxation of gratuitous transfers of wealth during life (gift tax) and at death (estate tax) and of generation skipping transfers. Prereq or coreq: 935.

975 Tax Theory (3) Method and purposes of governmental revenue collection through examination of economic and political theory; comparative analysis of various actual and proposed patterns of taxation: income tax, consumption tax, sales tax, and value-added tax. Required preparation of expository essay on aspect of tax theory chosen by student. Limited enrollment.


980 Insurance (3) Types of insurance: life, property, health, accident and liability insurance; regulation of insurance industry; interpretation of insurance contracts; insurable interest requirement; conditions, warranties and representations; coverage and exclusions; duties of agents; excess liability; subrogation; and bad faith actions against insurers. Liability insurance defense problems: duty to defend, notice and cooperation issues, and conflicts of interest.

983 Products Liability (3) Scope of doctrine and theories of recovery; potential plaintiffs and defendants; statutory and contractual limitations on recovery; damages; causation; and defenses.

985 Workers’ Compensation (3) Workers’ Compensation system for compensating victims of work-related accidents and diseases; requirements for covered employer-employee relationship; accidental injuries or occupational diseases arising out of and in course of employment; causation; nature of medical, disability, and death benefits; exclusiveness of compensation remedy against employer and co-employees; and rights and liabilities of non-employers; administrative and procedural aspects of Workers’ Compensation practice; and various law reform measures.

990 Issues in the Law (3) Selected topics. May be repeated.

991 Issues in the Law Seminar (2) Selected topics. May be repeated.

993 Directed Research (1-2) Independent research and writing under direct supervision of faculty member. Proposals must be approved by supervising faculty member and by the Dean or the Dean’s designee. Maximum of once each semester during last two years of study. Prereq: Second-year standing.

994 Independent Study (1-4) Independent study under direct supervision of faculty member. Proposals must be approved by supervising faculty member and by the Dean or the Dean’s designee. Maximum of once each semester during last 3 semesters of study.

995 Transactions: The Tennessee Journal of Business Law (1-2) Performance of duties of staff member or editor of Transactions: The Tennessee Journal of Business Law. Responsibilities vary each semester: writing of case synopsis, writing of article, and/or performing other assigned duties related to operation. Members of Transactions who are not on senior editorial board receive one hour of credit for successfully completing two consecutive semesters of service. Members of senior editorial board receive two hours of credit for each full year of satisfactory service. May be repeated. Satisfactory/No Credit grading only. Does not count toward total number of elective upper-division courses taken Satisfactory/No Credit.

996 Law Review (1) Performance of duties as staff member or editor of Tennessee Law Review. Responsibilities vary each semester as specified in Tennessee Law Review Policy Manual: writing of case note, comment or article, and/or performance of other assigned duties related to operations of Tennessee Law Review. Completion of potentially publishable comment or article for Tennessee Law Review satisfies expository writing requirement. May be repeated. Satisfactory/No Credit grading only. (Does not count toward total number of elective upper division courses taken Satisfactory/No Credit.)

997 Moot Court (1) Participation as member of faculty-supervised interscholastic moot court competition. May be repeated. Satisfactory/No Credit grading only. (Will not count toward total number of elective upper division courses taken Satisfactory/No Credit.)

998 Planning and Drafting Project (1) Preparation and completion of planning and drafting project under faculty supervision in conjunction with substantive courses when such planning and drafting option is provided by course instructor. May be repeated.
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. More specific information about the programs may be obtained under Nursing, Departments and Courses of Instruction, or by contacting the Director of MSN or PhD Program, the University of Tennessee, College of Nursing, 1200 Volunteer Boulevard, Knoxville, Tennessee 37996-4180, (865) 974-4151.

MASTER OF SCIENCE IN NURSING
Nursing Major

The College of Nursing offers the Master of Science in Nursing degree with concentrations in adult health nursing, family nurse practitioner, mental health nursing, nurse anesthesia, nursing administration, and nursing of women and children. The program is accredited by the National League for Nursing Accrediting Commission that may be contacted at 61 Broadway, New York, NY 10006, Tel: 1-800-669-9656, 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.  

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 550 or above if native language is not English.
  • Applicants for nurse anesthesia require an interview.
  • Hold a bachelor’s degree in nursing (BSN) from an accredited program.
    a. Hold or be eligible for licensure to practice nursing in Tennessee.
    b. Have an undergraduate GPA of 3.0 or higher on a 4-point scale, or a GPA of 3.3 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 3.0 on a 4-point scale.
    b. Have satisfactorily completed the following prerequisite courses: chemistry (8 hours); microbiology (including lab); anatomy and physiology (6-8 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.

Non-Degree Status
  Only 503, 505, 510, 511, and 515 are open to students in Non-Degree Status. Students not yet accepted into the master’s program must see the Chair of the MSN Program for advising prior to enrolling in any course.

Special Requirements
  • 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 2-person CPR certification.
  • Non-registered nurse students must have completed courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 semester hours of behavioral science courses.
  • Contact student services for more detailed information about the application process: Student Services/MSN Program, the University of Tennessee College of Nursing, 1200 Volunteer Boulevard, Knoxville, Tennessee 37996-4180; phone: (865) 974-7606.

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
  All students must complete a minimum of 36 semester hours distributed as follows:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core (9 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>503 Health Promotion in Advanced Practice Nursing</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>510 Theoretical Foundations of Nursing</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>520 Advanced Practice Nursing and Health Delivery Systems</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Advanced Practice Core (9 credits)*</td>
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<td></td>
</tr>
<tr>
<td>504 Advanced Health/Physical Assessment</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>505 Advanced Clinical Pharmacology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>515 Advanced Pathophysiology for Nursing Practice (not required for nurse anesthesia students)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Required for nurse anesthesia students:</td>
<td></td>
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</tr>
<tr>
<td>506 Advanced Anesthesia Pharmacology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>516 Advanced Pathophysiology Neurological and Cardiovascular with Anesthesia Implications</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>517 Advanced Pathophysiology Respiratory/Renal with Anesthesia Implications</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>518 Advanced Pathophysiology Obstetrics/Regional Anesthesia</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>521 Basics of Nurse Anesthesia</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>522 Integrated Health Science for Anesthesia</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>523 Advanced Principles of Nurse Anesthesia Practice</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>


As other written or oral questions designed to measure student examination will consist of an oral defense of the thesis as well as required by the Graduate Council. For thesis students, the Final Examination Requirements with the addition of 471.

For students in the MSN program, the intent of enrolling in the MSN program follow the same plan as completing a BSN at the University of Tennessee, Knoxville, with the other challenge options. RN’s who are in the process of completing the NLN ACE Examination. See undergraduate catalog for required courses. They must also complete 305, 432, and 452 and complete or successfully challenge the following:

Research (6-9 credits)
501 Nursing Research: Methods, Design and Analysis ................. 3
500 Thesis ................................................................................. 6
OR
582 Scholarly Inquiry for Advanced Practice Nursing .................. 3

Concentration (12-17 credits)—choose one
530-531 Adult Health Nursing I, II ............................................. 13
544-545-546-547-548-549 Clinical Nurse Anesthesia Practicum/
Seminar I, II, III, IV, V, VI ......................................................... 40
550-551 Nursing of Women and Children I, II ......................... 16
560-561 Mental Health Nursing I, II ............................................ 12
570-571-572 Family Nurse Practitioner I, II, III ......................... 17
590-591 Nursing Administration I, II ............................................ 12

Elective (9 credits)
Required for students in nursing administration concentration only. ........ 9

*Not required for nursing administration concentration.

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
<td>311 Foundations of Professional Nursing Practice</td>
<td>5</td>
</tr>
<tr>
<td>319 Pathophysiology of Health Deviations</td>
<td>4</td>
</tr>
<tr>
<td>333 Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>341 Health Promotion</td>
<td>3</td>
</tr>
<tr>
<td>351 Pharmacology I</td>
<td>2</td>
</tr>
<tr>
<td>361 Health Maintenance and Restoration Across the Life Span</td>
<td>5</td>
</tr>
<tr>
<td>381 Professional Leadership Issues I</td>
<td>2</td>
</tr>
<tr>
<td>382 Health Promotion and Maintenance in the Community</td>
<td>4</td>
</tr>
<tr>
<td>406 Pharmacology II</td>
<td>2</td>
</tr>
<tr>
<td>415 Family/Community Health Nursing</td>
<td>6</td>
</tr>
<tr>
<td>421 Health Maintenance and Restoration in Mental Health</td>
<td>4</td>
</tr>
<tr>
<td>454 Professional Leadership Issues</td>
<td>2</td>
</tr>
<tr>
<td>461 Health Restoration Across the Life Span</td>
<td>5</td>
</tr>
<tr>
<td>432 Health Promotion, Maintenance and Restoration in the Community</td>
<td>3</td>
</tr>
</tbody>
</table>

Registered nurses whose bachelor’s degrees are in nursing must have completed courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 hours of behavioral science courses. They must also complete 305, 432, and 452 and complete or successfully challenge the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
<td>311 Foundations of Professional Nursing Practice</td>
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</tr>
<tr>
<td>319 Pathophysiology of Health Deviations</td>
<td>4</td>
</tr>
<tr>
<td>333 Health Assessment</td>
<td>3</td>
</tr>
<tr>
<td>351 Pharmacology I</td>
<td>2</td>
</tr>
<tr>
<td>361 Health Maintenance and Restoration Across the Life Span</td>
<td>5</td>
</tr>
<tr>
<td>403 Health Promotion and Maintenance in Childbearing Families</td>
<td>5</td>
</tr>
<tr>
<td>406 Pharmacology II</td>
<td>2</td>
</tr>
<tr>
<td>421 Health Maintenance and Restoration in Mental Health</td>
<td>4</td>
</tr>
<tr>
<td>454 Professional Leadership Issues</td>
<td>2</td>
</tr>
<tr>
<td>461 Health Restoration Across the Life Span</td>
<td>5</td>
</tr>
<tr>
<td>490 Specialty Preceptorship</td>
<td>4</td>
</tr>
</tbody>
</table>

A total of 19 credits can be obtained by successful completion of the NLN ACE Examination. See undergraduate catalog for other challenge options. RN’s who are in the process of completing a BSN at the University of Tennessee, 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 examination will consist of an oral defense of the thesis as well as other written or oral questions designed to measure student mastery of the entire program of study. For non-thesis students, the written examination will cover the entire program of study and may, at the discretion 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 required 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 unethical, unprofessional or unsafe behavior, or behavior that places the client in jeopardy, the student will be required to withdraw from the program.
- Students are expected to maintain a 3.0 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 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 3.0 as a result of earning grades of C in other courses will be placed on academic 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 3.0 or better and the grade for clinical concentration work is at least 3.0.

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

ADMISSION
- Associate degree or diploma in nursing.
- Minimum grade point average 3.0 (on 4 point scale) for all pre-professional course requirements.
- Eligible to practice as a registered nurse in Tennessee (licensed 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 (6-8 hours) nutrition (covering 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 3.0 GPA.
- Achieve a competitive score on the combined verbal and the quantitative portions of the Graduate Record Examination.
# Bachelor of Science in Nursing Courses

- RN’s are exempt from sophomore level Nursing 201 (Introduction 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 decision score of 100 is achieved (per section), the student will receive proficiency credit for Nursing 361, 403, 461, and 421.
- 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 credit hours are required for the baccalaureate degree with the last 30 hours of credit completed in residence at the university of Tennessee, Knoxville.

The following schedules demonstrate full-time attendance. Plans for part-time attendance must be arranged with the RN advisor and communicated to all involved faculty.

## ADULT HEALTH NURSING

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>432</td>
<td>Health Promotion, Maintenance and Restoration in Community</td>
<td>3</td>
</tr>
<tr>
<td>305</td>
<td>Transitions to Professional Nursing</td>
<td>5</td>
</tr>
<tr>
<td>*333</td>
<td>Health Assessment</td>
<td>1</td>
</tr>
<tr>
<td>*351</td>
<td>Pharmacology I</td>
<td>2</td>
</tr>
<tr>
<td>511</td>
<td>Statistical Application to Nursing Research</td>
<td>3</td>
</tr>
<tr>
<td>*319</td>
<td>Pathophysiology of Health Deviations</td>
<td>4</td>
</tr>
<tr>
<td>*406</td>
<td>Pharmacology II</td>
<td>2</td>
</tr>
<tr>
<td>442</td>
<td>Directed Clinical Practice in Community Health Nursing</td>
<td>2</td>
</tr>
<tr>
<td>501</td>
<td>Nursing Research</td>
<td>3</td>
</tr>
<tr>
<td>510</td>
<td>Theoretical Foundations of Nursing</td>
<td>3</td>
</tr>
<tr>
<td>503</td>
<td>Health Promotion in Advanced Practice</td>
<td>3</td>
</tr>
<tr>
<td>515</td>
<td>Advanced Clinical Pathophysiology</td>
<td>3</td>
</tr>
<tr>
<td>504</td>
<td>Advanced Health/Physical Assessment</td>
<td>3</td>
</tr>
<tr>
<td>505</td>
<td>Advanced Pharmacology</td>
<td>3</td>
</tr>
<tr>
<td>520</td>
<td>APN and Health Care Delivery Systems</td>
<td>3</td>
</tr>
<tr>
<td>530</td>
<td>Adult Health Nursing I</td>
<td>6</td>
</tr>
<tr>
<td>582</td>
<td>Scholarly Inquiry for APN</td>
<td>3</td>
</tr>
<tr>
<td>531</td>
<td>Adult Health Nursing II</td>
<td>7</td>
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</tbody>
</table>

## MENTAL HEALTH NURSING

<table>
<thead>
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<th>Course Code</th>
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<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>432</td>
<td>Health Promotion, Maintenance and Restoration in Community</td>
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<td>Transitions to Professional Nursing</td>
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<tr>
<td>*333</td>
<td>Health Assessment</td>
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<tr>
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<td>Statistical Application to Nursing Research</td>
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<td>501</td>
<td>Nursing Research</td>
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<td>Theoretical Foundations of Nursing</td>
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<td>503</td>
<td>Health Promotion in Advanced Practice</td>
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<td>Advanced Clinical Pathophysiology</td>
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<td>504</td>
<td>Advanced Health/Physical Assessment</td>
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<tr>
<td>505</td>
<td>Advanced Pharmacology</td>
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<td>520</td>
<td>APN and Health Care Delivery Systems</td>
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</tr>
<tr>
<td>560</td>
<td>Psych/Mental Health Nursing I</td>
<td>6</td>
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<tr>
<td>582</td>
<td>Scholarly Inquiry for APN</td>
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<td>561</td>
<td>Psych/Mental Health Nursing II</td>
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## NURSING OF WOMEN AND CHILDREN**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
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<tbody>
<tr>
<td>432</td>
<td>Health Promotion, Maintenance and Restoration in Community</td>
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<td>505</td>
<td>Advanced Pharmacology</td>
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<td>520</td>
<td>APN and Health Care Delivery Systems</td>
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<tr>
<td>577</td>
<td>Special Topics (1-3) or Child Development**</td>
<td>1-3</td>
</tr>
<tr>
<td>551</td>
<td>Nursing of Women and Children II</td>
<td>6</td>
</tr>
<tr>
<td>582</td>
<td>Scholarly Inquiry for APN</td>
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</tr>
</tbody>
</table>

**PNP students must complete a graduate level child development course

**NNP students must complete Nursing 577

## FAMILY NURSE PRACTITIONER

<table>
<thead>
<tr>
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<td>571</td>
<td>Family Nurse Practitioner I</td>
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## NURSING ADMINISTRATION

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<td>505</td>
<td>Advanced Pharmacology</td>
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<tr>
<td>520</td>
<td>APN and Health Care Delivery Systems</td>
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<tr>
<td>591</td>
<td>Nursing Administration Microanalysis</td>
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<td>590</td>
<td>Nursing Administration Macroanalysis</td>
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<td>582</td>
<td>Scholarly Inquiry for APN</td>
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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. 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 graduate grade point average of 3.3 on a 4.0 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 scores of at least 550 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 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:

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<td>Hours</td>
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<td>601 Philosophy and Theory for Nursing Science</td>
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<td>603 Nursing Research and Inquiry</td>
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<td>605 Middle-Range Theoretical Formulations for Nursing Science Development</td>
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<td>606 Nursing Research Seminar</td>
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<td>607 Qualitative Nursing Research</td>
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<td>608 Quantitative Nursing Research</td>
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<td>609 Research Practicum*</td>
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<td>610 Nursing Science Seminar</td>
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<td>612 Health and Nursing Policy/Planning</td>
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<td>613 Nursing Leadership in Complex Systems</td>
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<td>615 Inferential Statistics</td>
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<td>616 Multivariate Statistics</td>
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<td>617 Cognates</td>
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<td>619 Elective</td>
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<td>660 Dissertation</td>
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Total 67

* Note: 1 hour per semester, must be taken for 2 semesters. Possible cognate areas include, but are not limited to, anthropology, child and family studies, psychology, education, management, medical ethics, 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.
- A minimum grade of B in all nursing doctoral courses and a 3.0 cumulative GPA are required for continuation in the program.

Gerontology Minor

Graduate students in the College of Nursing may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration.
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 Education Principles and Strategies (3) and 565 Nursing Education Practicum (3). Students select from a listing of courses in the College of Education, Health, and Human Sciences (see CON Graduate Handbook for listing) or may substitute courses at the discretion of the student and advisor.

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 credits. Most students complete 16-20 hours of course credit with the exception of those pursuing the nurse anesthesia certificate. Typically, this 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, 531, and 572, plus additional hours as determined by the college.

• Family Nurse Practitioner

Course requirements are 570, 571, and 572, plus additional hours as determined by the college.

• 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, 521, 522, 523 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 (3) and 565 (3). Students select from a listing of courses in the College of Education, Health, and Human Sciences (see CON Graduate Handbook for listing) or may substitute courses at the discretion of the student and advisor.

- Nursing of Women and Children

Course requirements are 550 and 551, plus additional hours as determined by the college.

GRADUATE COURSES

Nursing (720)

400 Aging and Society (3) An examination of the health and social effects of longevity and the aging process including societal and personal attitudes about old age. Resources, trends, issues, and potentials of aging are explored. Volunteer community service, a service learning component, is required. Open to students in all colleges.

402 Gerontology Practicum (3) Off-campus supervised experience in gerontology. Offered as part of the gerontology minor. Open to students in all colleges. Prereq: Consent of instructor.

500 Thesis (1-15) P/NP only.

501 Nursing Research: Methods, Design, and Analysis (3) Basic principles of research process in application to clinical questions; critical evaluation of nursing and health-related research. Prereq or coreq: Graduate level statistics.

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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Health Promotion in Advanced Practice Nursing (3) Principles of health promotion, education, and innovative strategies for achieving wellness of individuals, families, groups, and communities. Prereq: Admission to MSN program or consent of instructor.

504 Advanced Health/Physical Assessment (3) Development of advanced clinical reasoning and assessment skills to determine client health status and needs. Application of physiological, pathophysiological, and psychosocial concepts with implications for advanced practice nursing. Didactic (2.5) and lab (5). Prereq: Admission to MSN program or consent of instructor.

505 Advanced Clinical Pharmacology (3) Pharmacological agents utilized to treat common, recurrent health problems; indications, contraindications, side and interactive effects of commonly prescribed drugs. Prereq: Undergraduate pharmacology course or consent of instructor.


509 Graduate Seminar in Public Health (1) Same as Exercise Science 509; Nutrition 509; Public Health 509; Social Work 509.

510 Theoretical Foundations of Nursing (3) Historical evolution of nursing science; nursing’s metaparadigm and selected philosophies, conceptual models and theories as structures which guide critical thinking in analysis, reasoning, and decision making for advanced practice nursing. Prereq: Admission to MSN program or consent of instructor.

511 Statistical Applications to Nursing Research (3) Descriptive and inferential statistics: statistical concepts and applications to clinical settings and their applications to advanced practice nursing.

515 Advanced Pathophysiology for Nursing Practice (3) Advanced physiologic and pathophysiologic concepts, principles, and theories applied to deviations of human systems. Prereq: Undergraduate pathophysiology course.

516 Advanced Pathophysiology: Neurological/Cardiovascular with Anesthesia Implications (3) Review of anatomy and physiology integration of pathophysiology involved in patients requiring anesthetic care for cardiac surgical procedures (both children and adults) with and without cardiopulmonary bypass, intercavernous surgical procedures for vascular and mass occupying lesions, patients requiring somatosensory evoked potential monitoring, and patients requiring anesthesia for noncardiac and non-neurological procedures who present with either neurological and/or cardiovascular comorbidity. Prereq: 521. Coreq: 523.


520 Advanced Practice Nursing and Health Delivery Systems (3) Nursing’s role in dynamic health care system: health policy and organizational, social, ethical, political, economic and technological factors which impact advanced practice nursing and delivery of health care. Prereq: Admission to MSN program or consent of instructor.


522 Integrated Health Science for Anesthesia (3) Fundamental principles of chemistry and physics as related to practice of nurse anesthesia. Correlation of principles to clinical anesthesia practice. Prereq or coreq: 521.


530 Adult Health Nursing I (6) Advanced nursing practice for health promotion, restoration, and maintenance of young, middle-aged, and older adults. Theories and research to advanced practice with individual clients in variety of settings. Didactic (2) and practicum (4). Prereq: 504, 505, 515. Prereq or coreq: 503, 510, 520.

531 Adult Health Nursing II (7) Continuation of 530. Delivery, provision, and management of health care for adult groups and communities. Didactic (2) and practicum (5). Prereq: 530, 501.

544-545-546-547-548-549 Clinical Nurse Anesthesia Practicum/Seminar I, II, III, IV, V, VI (2-11) Integration and application of theoretical foundations and development of clinical skills in nurse anesthesia practice under supervision of Certified Registered Nurse Anesthetist (CRNA) and/or anesthesiologist. Prereq for 544: Admission to nurse anesthesia concentration. Prereq for 545: 544, 521, 504, 505. Must be taken in sequence.

550 Nursing of Women and Children I (8) Advanced practice nursing for women and children; clinical experience in role of nurse practitioner or clinical nurse specialist in variety of settings. Health promotion and nursing interventions for actual or potential health problems of women, children, and families. Didactic (3) and practicum (5). Prereq: 504, 505, 515. Prereq or coreq: 503, 510, 520.

551 Nursing of Women and Children II (8) Continuation of 550. Role refinement of nurse practitioner or clinical specialist in health maintenance and restoration for women, children, and families. Didactic (3) and practicum (5). Prereq: 550, 501. Prereq or coreq: 582.

560 Mental Health Nursing I (6) Theories of advanced therapeutic interventions for clients experiencing actual and potential mental health problems: advanced practice nursing in specialty of mental health; clinical practice with clients of various ages in acute care and community settings. Didactic (2) and practicum (4). Prereq: 504, 505, 515. Prereq or coreq: 503, 510, 520.

561 Mental Health Nursing II (6) Continuation of 560. Advanced practice nursing in community settings for families and groups with actual and potential mental health problems. Didactic (2) and practicum (4). Prereq: 560, 501. Prereq or coreq: 582.

565 Teaching Practicum (1-6) Individually designed teaching experience in collegiate nursing program or nursing practice setting. Objectives to be developed collaboratively by student and faculty. Prereq or coreq: 564 and consent of instructor. Satisfactory/No Credit or letter grade.

566 Educational Principles and Strategies (3) Exploration and analyses of selected education, curriculum, teaching-learning, measurement, and evaluation principles and theories as applied to instruction of undergraduate nursing students, staff development, and patient education. Prereq: Consent of instructor.

570 Family Nurse Practitioner I (4) Application of advanced health/physical assessment and diagnostic reasoning in nursing management and primary care of individuals and their families with actual and potential acute health problems; clinical experience in role of family nurse practitioner in variety of settings. Prereq: 504, 505, 515.

571 Family Nurse Practitioner II (6) Continuation of 570. Nursing management and primary care of individuals and their families in all developmental life stages; clinical experience in variety of settings. Didactic (2) and practicum (2). Prereq: 570. Prereq or coreq: 503, 510, 520. Didactic (2) and practicum (4).

572 Family Nurse Practitioner III (7) Continuation of 571. Management of chronic health problems of individuals and families in all developmental life stages; role refinement and exploration of major issues of family nurse practitioner; clinical experience in variety of settings. Didactic (2) and practicum (5). Prereq: 571, 501. Prereq or coreq: 582.

577 Special Topics (1-3) Topic is determined by faculty and student interest. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

582 Scholarly Inquiry for Advanced Practice Nursing (3) Utilization of research process through experiential learning or critical evaluation of science in area of interest. Conducted under faculty guidance and culminating in scholarly paper. Prereq or coreq: 501 or consent of instructor. May be repeated. Maximum 6 hours.

583 Directed Clinical Practice (1-12) Additional opportunities for advanced nursing practice. Objectives to be developed collaboratively by student and faculty. Prereq: Enrollment in or completion of graduate level courses in clinical nursing. Maximum 12 hours. Satisfactory/No Credit or letter grade.

585 Seminar in Gerontology (1) (Same as Counselor Education 585; Educational Psychology 585; Exercise Science 585; Health 585; Public Health 585; Social Work 585; Sociology 585.)

590 Nursing Administration: Macro-Analysis (6) Exploration, analysis, and application of selected organizational, management, and leadership theories and financial principles to delivery of nursing services. Structure, functions, organization, behaviors, and adaptive processes of health care organizations. Didactic (2) and practicum (4). Prereq: 503, 510. Prereq or Coreq: 501, 520.

591 Nursing Administration: Micro-Analysis (6) Utilization of human and financial resources, conflict resolution, and organizational development with application to mid-level and top-level nursing administration positions. Didactic (2) and practicum (4). Prereq: 503, 510. Prereq or coreq: 501, 520.

593 Independent Study (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

601 Philosophy and Theory for Nursing Science (3) Philosophical and historical context of knowledge for nursing science; in-depth analysis of health-related theories as frameworks for knowledge-building; concept development in theory building.


606 Nursing Research Seminar (3) Selected topics pertaining to dissertation proposal process, research experience, and defense.

607 Qualitative Nursing Research (3) Critique and application of qualitative research methods. Prereq: 601, 602, 603.


609 Research Practicum (1-3) Supervised individual or group research experience under guidance of faculty. Prereq: Consent of instructor. May be repeated. Maximum 12 hours. Satisfactory/No Credit or letter grade.

610 Nursing Science Seminar (2) Critical Analysis and synthesis of literature in selected focus area within nursing science. Prereq: Admission to doctoral program in nursing or consent of instructor.

612 Health and Nursing Policy/Planning (3) Policies affecting nursing education and practice; health policies and political processes; interactions between health professionals, consumer groups, and government in health policy development and health planning activities.

613 Nursing Leadership in Complex Systems (3) Analysis and evaluation of nursing leadership/management in complex professional, academic and health care systems.

614 Nursing Preceptorship (3) Individually-designed practicum, field, or internship experiences in variety of administrative, educational, research, or clinical practice settings. Prereq: 601, 602.
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 Knoxvile, offered the two-year master’s program. The doctoral program was inaugurated in 1983. In 1985 the BSSW 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 which 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 which 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 college also offers a post-master’s certificate program in management and community practice. The Tennessee state school social work licensure program is available to currently enrolled MSSW students. Application materials are available from the College of Social Work, Henson Hall, Knoxville, Tennessee 37996-3333, or at http://csw.utk.edu. Please specify MSSW, PhD, or certificate program on the request.

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 Master of Science in Social Work program prepares social workers to provide professional leadership in clinical social work practice and social work management and community practice. These objectives are met through a curriculum requiring of all students a professional foundation and a concentration in either clinical social work practice or social work management and community practice. The MSSW program is accredited by the Council on Social Work Education.

ADMISSION

Admission to the master’s program is based on the following requirements:

- 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 2.7 or higher on a 4.0 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 2.7 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 3.0 or above in their undergraduate work with substantial preparation in the social sciences.

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 3.0 or higher; and personal qualifications acceptable for entrance into the professional practice of social work. Students admitted into advanced standing are required to complete a minimum of 36 hours of study in either of the college’s concentrations—clinical social work practice or social work management and community practice. 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 semester credits 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 nine hours by proficiency examination, with the exception of field practice courses. Students interested in proficiency examinations are referred to the Graduate Catalog statement describing the procedure for applying for examination.

REQUIREMENTS

- The program requires successful completion of a minimum total of 60 semester hours including completion of the foundation curriculum (30 hours) and 30 hours in one of the two concentrations (clinical social work practice or social work management and community practice).
• Students may select a thesis or non-thesis option. Students pursuing the thesis option receive six credit hours for successful completion.
• Students must successfully complete a comprehensive exam or thesis defense.
• Students must have an overall GPA of 3.0 or better on all graded courses and satisfactory performance in field.

Professional Foundation Curriculum

All students must complete 30 semester hours in the foundation curriculum consisting of 24 hours in foundation classroom courses and 6 hours in field practice. The foundation is the initial phase of the master’s program. It contributes to the process of professional identification and presents a comprehensive, broad base of theory, knowledge and skills from which to practice. The foundation classroom courses include Foundations of Social Work Practice I, II and III; Human Behavior in the Social Environment I and II; Social Welfare Policy and Services; Social Work Research; and Social Work and Oppression. Students also complete a two-semester field placement, Field Practice (6 hours). Upon successful completion of the foundation curriculum, all students must complete a minimum of 30 hours in the concentration curriculum including field practice (12 hours). Students select a concentration in clinical social work practice or social welfare management and community practice.

Field Practice

Field instruction is a critical component of the student’s first- and second-year programs. Through cooperation with a wide range of social agencies and human service programs throughout Tennessee, the college is able to provide field placements in a variety of social work practice areas. The faculty works closely with the placement agencies and the field instructors to ensure that students have quality field practice experiences that meet the objectives of the core curriculum and the concentration.

The college uses a concurrent class and field plan. Students are in field two days per week during the first year and three days per week during the second year.

First-year agency placements are selected to provide practice experiences related to the foundation curriculum content. Within the placement, each student’s experiences are planned and designed according to educational objectives.

Second-year placements are selected according to the student’s area of concentration, individual career interests, and educational needs. The student actively participates with the field practice coordinator and the educational committee in selection of the second-year placement. The second-year field placement experience focuses on the integration of social work knowledge and values and emphasizes the acquisition and development of practice skills.

Students are responsible for meeting the requirements of their placement agencies in terms of office hours and workload coverage. This responsibility takes precedence over scheduled university breaks and may result in variations in holidays and office hours for the student.

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

Clinical Social Work Practice Concentration

The clinical social work practice concentration focuses on students developing expertise in clinical social work practice with client systems including individuals and small groups, particularly with clients from high-risk and vulnerable groups. The concentration emphasizes theoretical and empirical knowledge and practice skills in differential assessment, clinical interventions and practice evaluation. The concentration also emphasizes knowledge and skills directed toward (1) amelioration of complex psychosocial, interpersonal problems; (2) ethically sound and culturally sensitive practice; and (3) influencing the development of services and programs that are responsive to the needs of vulnerable, high-risk clients and groups.

Required courses:
• 521 Clinical Social Work Practice with Individuals (3 hours)
• 525 Clinical Social Work Practice with Groups (3 hours)
• 526 Evaluating Clinical Practice (3 hours)
• 582-583 Field Practice (12 hours)
Minimum of three (total of 9 hours) advanced course electives as follows:
• One or more from a pool of advanced clinical practice courses
• One or more from a pool of advanced general courses

Social Welfare Management and Community Practice Concentration

The social welfare management and community practice concentration focuses on students’ developing skills directed toward the management and analysis of complex service delivery needs within organizations and communities, knowledge and skills in the development of service intervention strategies to address such and related needs, and the organizational and management skills that enable practitioners to work in a variety of challenging and turbulent environments. The concentration emphasizes theory and skills related to leadership and administration and permits flexibility in tailoring a program to fit the student’s individual interests, capabilities, and career goals.

Required courses:
• 541 Leadership and Management in Human Services (3 hours)
• 543 Financial Management and Resource Development (3 hours)
• 547 Evaluation Research (3 hours)
• 582-583 Field Practice (12 hours)
Minimum of three (total of 9 hours) advanced course electives as follows:
• One course in advanced policy (3 hours)
• Two courses from a pool of advanced general courses (6 hours)

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.

REQUIREMENTS

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

(a) Completion of 27 hours of required coursework.
(b) Completion of 15 credits of advanced electives, at least 12 of which are taken outside the department, and 9 of those 12 related to the dissertation
(c) Completion of at least 24 credit hours of dissertation research.
(d) Successful completion of qualifying and comprehensive examinations.
(e) 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, and 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.

Gerontology Minor

Graduate students in the College of Social Work, at the Knoxville location, may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

Graduate Certificate in Management and Community Practice

The College of Social Work offers a 15-credit hour graduate certificate designed for social workers desiring supervisory, management, administration and community practice training and education to enhance career advancement or career redirection. A master’s degree in social work or a closely related field is required for admission.

Course requirements are 541, 543, 547, and two courses selected from 550, 551, 552, 555.

GRADUATE COURSES

Social Work (905)

Graduate students majoring in fields other than social work are admitted to certain social work courses with the approval of the College of Social Work and the student’s major professor.

500 Thesis (1-15) P/NP only.

501 Foundations of Social Work Practice I (3) Survey of history, mission, and identity of profession. Basic theory, professional values and ethics, and methods generic to social work practice at various systems levels. Assessment, planning, communication, intervention, and evaluation skills.

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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

503 Foundations of Social Work Practice II (3) Generalist practice with family and small group systems. Ecological theory to frame understanding of such systems and their adaptation to environments. Various social work roles and intervention strategies pertaining to client systems.

504 Foundations of Social Work Practice III (3) Basic theory, methods, problems, and strategies in implementing planned change within and among larger social systems; task groups, human service organizations, and community systems. Various practice roles: planner, program developer, supervisor, administrator, advocate and task group leader.

506 Social Work Research (3) Research methodologies with respect to evolution and application to social work theory and practice. History and philosophies of science; problem formulation; research design; ethics; instrument use and construction; data collection; analysis and reporting; and evaluation and utilization of research.

508 Practicum in Social Work Research (3-6) Supervised practice in application of research methods to social work. May be repeated. Maximum 6 hours. Satisfactory/No Credit grading only.

509 Graduate Seminar in Public Health (1) (Same as Exercise Science 509; Nursing 509; Nutrition 509; Public Health 509.)
514-515 Human Behavior in the Social Environment I, II (3,3) Major social science theories that inform social work profession’s understanding of human behavior and social systems from ecological perspective. Interactions among biological, social, psychological, and cultural systems on development across life cycle. Effects of ethnic, racial, economic, gender, and sexual orientation variables. 514—Life cycle from infancy through adolescence. 515—From young adulthood through senescence.

516 Social Welfare Policy and Services (3) Development of contemporary social policy at local, state, national, and international levels. Contribution of social work professionals to formal policy-making process through which macrosocial change is effected and through which aggregate social welfare services are proposed, authorized, financed, and programmed. Theories of complete applied to social welfare service delivery settings.

518 Social Work and Oppression (3) Sources, dynamics, and impact of oppression in U.S. society as manifested in both social/ecological/economic systems and personal experience. Connections among various forms of oppression: racism, sexism, classism, and heterosexism, and forces that perpetuate such conditions.

521 Clinical Social Work Practice with Individuals (3) Theories, knowledge, and skills for clinical practice with individuals from ecologic perspective. Therapeutic process and intervention strategies, incorporating content from psychodynamic and cognitive practice models, and specific client problems.

523 Clinical Social Work Practice with Families (3) Concepts related to understanding and analyzing family dynamics and interactional patterns from perspective of major family therapy models. Techniques of intervention in terms of application to families with varied system and individual problems and to families from varied social and cultural backgrounds.

524 Psychopathology and Social Deviance (3) Assessment of psycho social functioning of individuals. Examination of mental disorders: clinical presentation, problems, causes, and processes. Ecological perspective. Prereq: Foundation or consent of instructor.

525 Clinical Social Work Practice with Groups (3) Theoretical and historical approaches to social work with groups and clinical principles supporting specific types of group work used in clinical practice and associated leader interventions.

526 Evaluating Clinical Practice (3) History and philosophies, conceptual approaches, techniques and methods in the practice and use of practice research as applied to implementation and evaluation of direct services to clients.

530 Seminar in Clinical Social Work (2-3) Topics in theory and practice of clinical social work with individuals, couples, families and groups. May be repeated. Maximum 6 hours.

532 Short-Term Interventions (3) Theory and practice of planned short term, emergency, and crisis interventions.

534 Social Work Interventions with Children and Adolescents (3) Various practice modalities for assessing and intervening with children and adolescents.

535 School Social Work (3) Place of school as community institution and resource. Methods, processes, and techniques employed in school social work.

540 General Topics in Social Work (3) Current topics in advanced social work. May be repeated. Maximum 6 hours.

541 Leadership and Management in Human Services (3) Management and leadership skills required in development and management of human services delivery systems. Issues regarding human resources management, resource allocation, strategic planning, and organizational dynamics.

543 Financial Management and Resource Development (3) Administrative decision-making related to financial planning and resource allocation in human service organizations. Knowledge and skills in budgeting, allocating, expenditure control, fundraising, grant writing, marketing, and evaluation.

547 Evaluation Research (3) History and philosophies, conceptual approaches, techniques and methods, and issues in practice and utilization of evaluation research as applied to development and evaluation of social work programs and policies. Issues pertaining to strengths and limitation of various evaluation methods, microcomputer application of data, and measurement of program goals and objectives.

550 Seminar in Management and Community Practice (2-3) Topics in theory and practice of management and community practice. May be repeated. Maximum 6 hours.


552 Community Organization (3) Locality development, social planning and social action as practice models for development of resources to meet human needs.

564 Substance Abuse (3) Survey and analysis of social, cultural, medical and psychological factors underlying alcoholism and drug abuse and addiction; recent research and practice innovations.

566 Social Gerontology (3) Physical, psychological and social aspects of aging, and major social policies and programs.

580 Field Practice (3) Instruction and supervision in social work practice. Satisfactory/No Credit grading only.

581 Field Practice (3) Instruction and supervision in social work practice. Satisfactory/No Credit grading only.

582 Field Practice (6) Instruction and supervision in clinical social work practice or management and community practice. Satisfactory/No Credit grading only.

583 Field Practice (6) Instruction and supervision in clinical social work practice or management and community practice. Satisfactory/No Credit grading only.

584 Field Practice (2-6) Instruction and supervision in social work practice. May be repeated. Satisfactory/No Credit grading only.

585 Seminar in Gerontology (1) (Same as Counselor Education 585; Educational Psychology 585; Exercise Science 585; Health 585; Nursing 585; Public Health 585; Sociology 585.)

593 Independent Study (1-6) Individualized study, student selects, designs, and completes examination of special issue or problem. May be repeated. Maximum 6 hours.

600 Doctoral Research and Dissertation (3-15) P/NP only.

601 Research for Social Work Practice I (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice.

602 Research for Social Work Practice II (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice.

604 Research in Social Service Settings (3) Advanced research, under faculty supervision, of practice issues in community agency. Prereq: First year required PhD courses or consent of instructor. May be repeated. Maximum 9 hours.

605-606 Analysis of Social Work Data I, II (3,3) Techniques for quantitative analysis of social work data: unique data analysis problems encountered in social work research.

608 Evaluative Research for Social Work Practice, Programs and Policy (3) Techniques and strategies for quantitative and qualitative analysis for social policy’s impact on individuals and groups and for evaluating processes and outcomes of social work practice.


640 History of American Social Work (3) Social, cultural, economic and political contexts for development of social work profession, development of education for profession, and modern welfare system.

650 Programs and Legislation for Children and Families (3) Background, purposes, and current issues surrounding major social welfare and health programs serving disadvantaged children and their families: Social Security Act (Title IV, Child Welfare and AFDC; Title V, the Maternal and Child Health Block Grant; Title XIX, Medicaid), Head Start, WIC and other nutrition programs, and Healthy Start. Current issues and controversy; legislative changes.

660 Issues in Social Work Knowledge Building (3) Advanced seminar in theory and model building in direct intervention, administration and planning. Prereq: First year required PhD courses or consent of instructor. May be repeated. Maximum 9 hours.

670 Critical Literature Reviews (3) Techniques and methods for conducting critical reviews of literature: conceptual and methodological critiques of existing research. Satisfactory/No Credit grading only.

693 Directed Study in Social Work Research (3) Advanced individual study, under faculty guidance, of social work practice issues. Prereq: First year required PhD courses or consent of instructor. May be repeated. Maximum 9 hours.
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 number of veterinarians are employed by the U.S. Department 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 which 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 interdisciplinatory 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), 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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<tbody>
<tr>
<td>English</td>
<td>6</td>
</tr>
<tr>
<td>Humanities and Social Sciences</td>
<td>18</td>
</tr>
<tr>
<td>General Chemistry</td>
<td>8</td>
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<tr>
<td>Organic Chemistry</td>
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<tr>
<td>Biochemistry</td>
<td>4</td>
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<td>General Biology</td>
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<td>Genetics</td>
<td>3</td>
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<tr>
<td>Cellular Biology</td>
<td>3</td>
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<td>Total</td>
<td>66</td>
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1May include, for example, courses in English literature, speech, music, art, philosophy, religion, language, history, economics, anthropology, political science, psychology, sociology, and geography.
2Exclusive of laboratory.
3It 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. Forms and instructions for making application for admission may be obtained beginning June 1, 2002, from the Office of the Associate Dean, the University of Tennessee, College of Veterinary Medicine, 2407 River Drive, Room A102, Knoxville, Tennessee 37996-4550.

The deadline for receipt of the completed application materials is November 1. Non-Tennessee applicants must have a minimum cumulative grade-point average of 3.2 on a 4.0 scale for application 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, five and six which allow students to focus on individual educational/career goals. Students enrolled in the DVM program may register for up to 10 credit hours of graduate courses and these hours will be credited toward the DVM degree. Elective study offers a unique educational alternative for students in the CVM 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 (MPH) degree in the College of Education, Health and Human Sciences. For more information, see Public Health in the Graduate Catalog. The College of Veterinary Medicine (CVM) shares governance of the concentration through the Public Health Academic Program Committee and student advisors within this concentration are faculty in the CVM. This concentration requires a separate application to the MPH Program.

COURSES

Veterinary Medicine (987)

801-902 Application Based Learning Exercise (ABLE) I, II (1,2) Small group, student-centered learning sessions with faculty facilitator for self discovery of new information. Week-long sessions based on specific clinical case or problem, and integration of basic science and clinical material. Satisfactory/No Credit grading only.

804-905-906 Application Based Learning Exercise (ABLE) and Clinical Exposure I, II, III (2,2,2) Week-long small group, student-centered learning sessions with faculty facilitator for self discovery of new information; based on specific clinical case or problem; integration of basic science and clinical material. One week of clinical experience through participation in specific clinical rotations in Veterinary Teaching Hospital. Satisfactory/No Credit grading only.

811 Infection and Immunity II — Bacteriology and Mycology (3) Fundamental aspects of microbiology and cell biology relative to pathogenesis of bacterial and fungal diseases of animals; antimicrobial actions and mechanisms of bacterial resistance. General approaches to diagnosis, treatment and prevention.

813 Infection and Immunity I — Immunology (2) Basic biology and practical aspects of immunology: cells of immune system, immune function and dysfunction, immunoprophylaxis, diagnostic testing and specific diseases involving immune system.
81-826 Clinical Correlations and Ethics I, II (1,2) Correlations between basic science material from concurrent courses and practice of veterinary medicine. Thoughts on wide spectrum of current veterinary ethical issues. 816 — Student-led discussions follow faculty presentations.


821-822 Veterinary Anatomy I, II (4,4) Lectures, laboratories, and demonstrations are used in an integrated approach to the study of macroscopic (gross) clinically relevant anatomy, including neuroanatomy, and embryology of common domestic animals. Dissections of embalmed specimens, prosections, plastinated specimens, and radiographs of common domestic species are examined for comparative purposes.

823-824 Physiology I, II (4,4) Introduction to concepts and problems in physiology which form basis for clinical applications and for formal training in pharmacology, medicine, pathology, and surgery. Cellular, neural, cardiovascular, renal, respiratory, digestive, endocrine, and reproductive physiology.

825-826 Veterinary Microscopic Anatomy I, II (2,2) Lectures, laboratories, and demonstrations are used in the study of the cell, embryology, and microscopic anatomy of organ systems in common domestic animals to relate structure with function.

827 Special Problems in Animal Science (1-8) Extramural and specially designed study for students interested in select topics in anatomy, histology, and physiology.

831 Physical Diagnosis (1) Basic care, feeding, restraint, and handling domestic animals. Introduction to physical examination and diagnostic techniques used by veterinarian.

832 Anesthesiology (2) Principles of anesthesiology: pharmacology of anesthetic agents, and introduction to anesthetic techniques in veterinary medicine.

833 Epidemiology and Evidence Based Medicine (2) Study of distribution and detriments of disease in animal populations. Use of knowledge (evidence) gained from management of clinical patients in past to improve future clinical decision making processes.

834 Hematopoietic System (2) Pathophysiology and diagnosis of disorders involving bone marrow and blood cells, platelets, and blood coagulation in domestic animals; interpretation of laboratory test results using illustrative clinical cases.


836 Toxicology (2) Principles of toxicology, molecular mechanisms, pathologic processes and clinical features of animal diseases caused by common toxic agents.

837 Food Hygiene and Zoonoses (2) Host-agent relationships, public health aspects of veterinary medicine and role of veterinarians in ecology and food hygiene.

840 Integumentary System (3) Pathophysiology, special pathology, medicine and surgery of diseases of integumentary system. Laboratory examination, pathology, diagnosis and treatment.

841 Reproductive System (3) Pathophysiology, special pathology, medicine and surgery of diseases of male and female reproductive systems and mammary glands.

842 Alimentary System (4) Pathophysiology, special pathology, medicine and surgery of diseases of alimentary systems.

843 Musculoskeletal System I (3) Pathophysiology, clinical description and basic treatment modalities of common diseases and conditions of skeletal system of small animals: development of basic diagnostic and treatment skills.

844 Musculoskeletal System II (3) Pathophysiology, special pathology, medicine and surgery of diseases of muscular and skeletal systems. Advanced principles, radiographic interpretation and surgical procedures.

845 Veterinary Nutrition (2) Principles of nutrition, and nutrition of animals in health and disease. Applied nutrition appropriate to individual small or large animal patient or to herd situations.

846 Multispecies Medicine (3) Anatomy, pathophysiology, medicine, and surgery of avian species, laboratory and zoo animals and reptiles. Species and diseases seen by practicing veterinarian. Current topics on foreign animal diseases.

851 Urinary System (3) Pathophysiology, special pathology, medicine and surgery of diseases of urinary system. Urinary system in health and disease.
886-889 Clinical Rotation in Radiology and Pathology I, II (4,4) Two weeks in each discipline. Clinical training in radiographic techniques and interpretation, including ultrasonography. Post-mortem examination and laboratory diagnostics: clinical pathology and introductory histopathology of biopsy specimens.

887 Special Problems in Small Animal Clinical Sciences (1-8) Extramural and specially designed study for students interested in select topics in medicine, surgery, anesthesiology, radiology and medical specialties of small (companion) animals.

890 Transition and Accreditation Seminars (2) Discussion of USDA, state, and local animal laws and regulations; preparation of animal movement forms, veterinary ethics, jurisprudence, basic practice management, and other topics involved in practice of veterinary medicine.

891 Clinical Rotations in Large Animal Clinical Sciences I (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

892 Clinical Rotations in Large Animal Clinical Sciences II (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

893 Clinical Rotations in Large Animal Clinical Sciences III (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

897 Special Problems in Large Animal Clinical Sciences (1-8) Extramural and specially designed study for students interested in select topics in medicine, surgery, herd health, reproduction, radiology and medical specialties of large animals.

898-899 Externship I, II (2,2) Educational experiences in private practice, research facility, zoological preserve, aquarium, or other veterinary-related facility outside Veterinary Teaching Hospital; to provide experiences not frequently available in large referral veterinary teaching hospitals.
The University of Tennessee Space Institute offers a program leading to the Master of Science degree with a major in aviation systems. 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. Current emphases include flight testing, aircraft design, aviation meteorology, air traffic control, and airport management.

**AVIATION SYSTEMS**

**UT Space Institute**

[http://www.utsi.edu/Academic/AvSys/index.html](http://www.utsi.edu/Academic/AvSys/index.html)

*Ralph D. Kimberlin, Chairman*

**Professor**

Kimberlin, R. D., PhD ....................................................... RWTH (Germany)

**Associate Professors**

Richards, R.B., MS .............................................................. New Jersey
Solies, U. P., (Liaison), PhD ...................................................... Tennessee

**Research Assistant Professor**

Ranaudo, R.J., MS ................................................................. Ohio

**Emeriti Faculty**

Collins, F. G., PhD ............................................................... California
Mason, A. A., PhD .............................................................. Tennessee
Paludan, C. T., PhD ............................................................... Denver
Wu, J. M., PhD ................................................................. Cal Tech
Young, R. L., PhD ............................................................... Northwestern

**MAJOR**

Aviation Systems ............................................................. MS

**DEGREE**

**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 a basic knowledge of computer utilization and statistics; an understanding of aerodynamic fundamentals, aircraft propulsion, and performance; and some understanding of economics.

**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 credit. 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**
  - Twelve hours of 500-level courses in the major field of aviation systems
  - Six hours in industrial engineering (engineering management)
  - Six hours of electives from the major field, mathematics or engineering
• Six 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
• Twelve hours of 500-level courses in the major field of aviation systems
• Three hours in industrial engineering (engineering management)
• Three hours in economics or finance
• Six 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
• Twelve hours of 500-level courses in the major field of aviation systems
• Six hours in industrial engineering (engineering management)
• Twelve hours of electives in the major field, mathematics or engineering
• Three 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
• Twelve hours of 500-level courses in the major field of aviation systems
• Three hours in industrial engineering (engineering management)
• Three hours in economics or finance
• Twelve hours of electives in the major field, mathematics or engineering
• Three 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

GRADUATE COURSES

Aviation Systems (169)

500 Thesis (1-15) P/NP only.

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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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. Prereq: 501.


505 Governmental Policies for Aviation (3) Theoretical and legal basis for economic and governmental regulation of aviation. Historical and legislative development of aviation regulatory agencies, organizational structure, administrative and enforcement procedures. Prereq: 501.

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

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: light-weight and modern materials used for aircraft structures. Topics: load determination and aviation regulations, airworthiness, ultimate loads, load limits, 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, fuselages and frames, wings and ribs; laminated composite structures; elementary aeroelasticity.

510 Special Topics in Aviation Systems (3) Current problems. Prereq: Consent of instructor. May be repeated with consent.

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, anthropometry, 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.
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
Ichiki, A.T., PhD, Medical Biology
Lawler, J. E., PhD, Psychology
Lawlor, C., M.D., 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 experimental pathobiology, infectious diseases, pharmacokinetics, epidemiology, clinical medicine, immunopathology, hematology, aberrant metabolism, oncology, and genetic disorders. 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, the Oak Ridge National Laboratory, and departments of life sciences.

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

Admission requirements of the Graduate Council of the University of Tennessee, Knoxville, apply. In addition, all applicants must furnish three letters of recommendation from individuals who are familiar with their scholastic or professional records.

Applications 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 background 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

Core courses are required for the program. A basic science and/or applied science concentration must be selected at the first meeting of the student's master’s committee.

- Basic science concentration: Students must take at least 4 credit hours in 500- or 600-level courses in basic mechanisms of disease and at least 6 credit hours of 500-level biochemistry or cell biology. See listings under the Biochemistry and Cellular and Molecular Biology program for information on these courses.

- Applied science concentration: Students must take at least 6 credit hours of 600-level epidemiology and at least 5 credit hours of 500- or 600-level statistics.

In addition, students must complete a minimum of 8 hours of coursework in a specified discipline, 5 or more hours of electives, and 6 hours of Thesis 500. 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 3 members) is chosen after the first 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 is given at the end of the program.

Doctor of Philosophy
Comparative and Experimental Medicine Major

Admission

Admission requirements of the Graduate Council of the University of Tennessee, Knoxville, apply. In addition, all applicants must furnish three letters of recommendation from individuals who are familiar with their scholastic or professional records.

Applicants generally will be expected to have a professional degree in one of the medical sciences (e.g., MD, DDS, DVM) or a master’s degree in one of the biomedical sciences and a Graduate Record Examination score of at least 1000 for the quantitative and verbal sections.

An individual having a baccalaureate degree with a strong background in the physical and biological sciences may be admitted upon presenting evidence of exemplary performance on the Graduate Record Examination.

Exceptional veterinary students at the University of Tennessee, Knoxville, may be admitted to the comparative and experimental medicine graduate program but will be enrolled officially as veterinary students. During summers such students may take advantage of registering for graduate courses to be counted as elective courses in the veterinary program.
REQUIREMENTS

Core courses are required for the program. A basic science and/or applied science concentration must be selected at the first meeting of the student’s doctoral committee.

- **Basic science concentration:** Students must take at least 4 credit hours in 500- or 600-level courses in basic mechanisms of disease and at least 6 credit hours of 500-level biochemistry or cell biology. See listings under the Biochemistry and Cellular and Molecular Biology program for information on these courses.

- **Applied science concentration:** Students must take at least 6 credit hours of 600-level epidemiology and at least 5 credit hours of 500- or 600-level statistics.

In addition, students must complete a minimum of 8 hours of coursework in a specified discipline. Exceptions to accommodate students with specific interests must be approved by the Joint Graduate Coordinating Committee after application, in writing, to the director. Areas of emphasis may include hematology, oncology, comparative pathology, comparative pharmacology, toxicology, immunology, genetics, infectious disease or biochemistry of diseases.

At least 24 hours of coursework, including a minimum of 6 hours at the 600 level, and 24 hours of Dissertation 600 are required for a total of 48 hours. For students with professional degrees, a minimum of 18 hours of coursework beyond the professional degree is required for a total of 42 hours.

The doctoral committee (at least 4 members) is chosen during the first year. Three of the four members, including the chair, must be approved by the Graduate Council to direct doctoral research. 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 is given at the completion of coursework. A seminar and final oral defense of the dissertation culminate the program.

GRADUATE COURSES

**Comparative and Experimental Medicine—Veterinary School of Medicine (262)**

Participating departments include: Anesthesia, Medicine, Medical Genetics, Obstetrics and Gynecology, Pathology, Pediatrics, Radiology, and Surgery.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

500 Thesis (1-15) 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. May not be used toward degree requirements. May be repeated. Satisfactory/No Credit grading only.

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500 Thesis (1-15) P/NP only.
Bureau of Evaluation, Research, and Service  
(College of Education, Health, and Human Sciences)

The Bureau is responsible for the coordination of research and evaluation activities and for the development of college research and service activities based in external funding. In addition, it may be called upon to provide brokering services to connect faculty expertise with needs for consultant services, technical assistance, and possible professional development activities. The Bureau directly coordinates select development of research proposals, as well as college grant and contract review, administration, and fiscal processes. The Bureau also provides the administrative home for the Appalachian Rural Systemic Initiative, Center for Literary Studies, Southeastern High School Equivalency Program (Migrant Education).

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 in Suite 100 of the Glocker Business Administration Building. CBER currently has three research faculty, seven graduate students, and an extensive support staff in the areas of research, data analysis, project management, 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)

Alex Miller, Associate Dean

http://TheCentercutk.edu

The College of Business Administration’s executive/management education efforts are facilitated through the Center for Executive Education, 708 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)

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 401K Student Services 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 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 leading a sedentary existence.

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

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**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 Office of Research at the University of Tennessee, Knoxville. The center’s multidisciplinary staff includes over 120 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.

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**Center of Excellence for Materials Processing**

The Center for Materials Processing is one of the Centers of Excellence created by the State of Tennessee. It has an interdisciplinary program designed to bring together individuals with appropriate expertise to solve important materials processing problems. It emphasizes the development of desirable materials properties through the control of composition, molecular structure and microstructure; measurement of process variables; and control of those variables to ensure proper processing. The center conducts basic research and teaching in materials processing and carries out research to improve existing processing technologies and transfer of research results to private industry. A major aspect of the center is student participation in industry-sponsored research programs.

The center is located in 513 East Stadium Hall, 974-0816. For further information, contact Dr. C. J. McHargue, 974-7680.

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**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:

**Knoxville**
- Benard Blasingame Chair of Excellence in Agricultural Policy
- 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 in Environmental Studies
- The University of Tennessee Willis Lincoln Chair of Excellence in Physics
- Pilot Chair of Excellence in Management
- Ivan Racheff Chair of Excellence in Ornamental Horticulture
- Ivan Racheff Chair of Excellence in Materials Science and Engineering
- 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 Chair of Excellence in Biomedical Engineering
- 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 Muithead Chair in Pathology
- Le Bonheur Chair of Excellence in Pediatrics
- Mark S. Soloway Chair of Excellence in Urology
- Harriet S. Van Vleet 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. Narendra Dahotre, Chairman
  - Space Institute
  - B. H. Goethert Pkwy
  - Tullahoma, Tennessee 37388-8897
  - (931) 393-7474
  - (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
  - 513 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
  - 875 Monroe Avenue
  - 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)

**Center of Excellence for Science and Mathematics Education**
- Dr. Geraldine Farmer, Interim Director
  - UT Martin
  - 145 Gooch Hall
  - Martin, Tennessee 38238
  - (731) 587-7166
  - (jgfarmer@utm.edu)

**Molecular Resource Center of Excellence**
- Dr. Michael E. Dockter, Director
  - The University of Tennessee Health Science Center
  - 62 S. Dunlap, Suite 400
  - Memphis, Tennessee 38163
  - (901) 448-7105
  - (mdockter@tennessee.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)

Child Development Laboratories
(College of Education, Health, and Human Sciences)
http://web.utk.edu/~utkcdl/
Kathy Fitzgerald, Director
The Child Development Laboratories, operated by the Department of Child and Family Studies since 1927, currently offer 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 Child Development Laboratories serve three purposes: to promote the research and scholarship activities of the department and other university faculty and students through the 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 CDL 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, emergent literacy, making children’s and teachers’ learning visible) are ongoing at any time. Graduate assistants in the laboratories participate in teaching, assessment, administrative, supervisory and research activities while working with children and families under the guidance of faculty and staff. The Child Development Laboratories are accredited by the National Academy of Early Childhood Programs, a division of the National Association for the Education of Young Children.

For more information, check Web site at http://web.utk.edu/~utkcdl/.

Energy, Environment, and Resources Center
(Office of Research)
Jack N. Bakenbus, Executive Director
The Energy, Environment, and Resources Center, 600 Henley Street, Suite 311, was created in 1973 to encourage interdisciplinary research directed at solutions to problems related to energy and the environment. The center involves faculty and students in research and public service projects, manages research and development projects that involve several disciplines, and assists government and industry in specific problems related to energy, environmental, resource, and technology policy issues. The center has a close working relationship with the Joint Institute for Energy and Environment, and Oak Ridge organizations. Sponsors include federal and state agencies, industry, and foundations.

Current research includes sustainable development, solid and hazardous waste management, information systems, environmental education, global environmental problems, water, and cleaner production. The center operates the Waste Management Research and Education Institute, the Center for Clean Products and Clean Technologies, the Water Resource Research Center, the Center for Geography and Environmental Education, and the Technology Research and Development Program. Grants and contracts bring approximately $4 million in research to the university each year.

Institute of Agriculture
Jack H. Britt, Vice President
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, the Agricultural Extension Service, the College of Agricultural Sciences and Natural Resources, and the College of Veterinary Medicine.

AGRICULTURAL EXPERIMENT STATION
Jack H. Britt, Acting 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 the branch experiment stations located across Tennessee and operated by the Experiment Station. The Experiment Station also supports graduate student assistantships.

AGRICULTURAL EXTENSION SERVICE
Charles L. Norman, Dean
The Agricultural Extension Service 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, Knoxville, 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.

The Agricultural Extension Service operates as one of the four units in the Institute of Agriculture. The state is divided into four districts with directors located in their respective districts. District headquarters are maintained in Knoxville, Crossville, Nashville and Jackson. The Agricultural Extension Service 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
http://www.lib.utk.edu/

Barbara J. Dowey, Dean
Audrey H. Mitchell, Associate Dean

Professors
Baker, G., MLS .......................................................... Alabama
Bayne, P., MSL .......................................................... Claron
Crowther, K., MLn .................................................... Emory
Dewey (Dean) B., MAL .............................................. Minnesota
Felder-Hoehne, F., MSL .............................................. Atlanta
Leach, S., ML ............................................................ Emory
Phillips, L., MLS .......................................................... Rutgers

Associate Professors
Atkins, D., MALS ......................................................... Wisconsin
Bridgewood, L., MLS ................................................. Rhode Island
Deeken, J., MSL .......................................................... Texas State
Dixon, L., MLS.............................................................. Tennessee
Garrett, M., MLS .......................................................... Vanderbilt
Harris, S., MALS .......................................................... Arizona
Johnson, K., MLS .......................................................... Pittsburgh
Kaus, M., MLS .............................................................. Indiana
Keally, J., MSL ............................................................. Tennessee
Mack, T., MSL ............................................................. Tennessee
Mitchell, A., ALS .......................................................... Tennessee
Prescod, J., MSL .......................................................... Michigan
Row, J., MLS .............................................................. Tennessee
Royse, M., MSL .......................................................... North Carolina
Smith, R., MSL ............................................................ Illinois
Thomas, D., MLS ......................................................... George Peabody
Thomas, S., MSL ......................................................... Tennessee
Viera, A., MLS ............................................................ UCLA
Wallace, A., MLn .......................................................... Washington
Williams, S., MSL ........................................................ Simmons
Wise, N., MLS .............................................................. Tennessee

Assistant Professors
Beals, J., MLS ............................................................ Kent State
Behrendt, L., MLS .......................................................... Tennessee
Berry, T., ML ............................................................... Tennessee
Braquet, D., MSL ......................................................... Louisiana State University
Casado, M., MLS .......................................................... Tennessee
Davis, T., MLIS .......................................................... North Carolina
Dolence, T., MSL .......................................................... Illinois
Gilmore, R., MSL ......................................................... North Carolina
Hristov, N., MSL .......................................................... Louisiana State University
Hutt, A., MLS .............................................................. Indiana
Manoff, M., ML ........................................................... South Carolina
Parcell, A., MLS .......................................................... Maryland
Ratledge, D., MSL ........................................................ Tennessee
Read, E., MS .............................................................. Tennessee
Smith, A., MS ............................................................. Tennessee
Starmer, M., MLIS ........................................................... Kentucky
Walker, T., MLS .......................................................... Tennessee
Williamson, J., PhD ...................................................... North Carolina

The University of Tennessee Libraries own approximately 2.2 million volumes and subscribe to more than 14,000 periodicals and serial titles.* A growing collection of electronic resources are available through the Libraries’ Web page at www.lib.utk.edu. 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.

Friendly experts at the reference desk in each library offer help and assistance in using the library. AskUs.Now (www.lib.utk.edu/refs/askusnow/) provides chat, e-mail, 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. The services and facilities of the University Libraries are accessible to persons with disabilities.

The John C. Hodges Main Library (1015 Volunteer Boulevard) is a 350,000 square-foot building housing collections in all subject areas. The Hodges Library can accommodate more than 3,500 people, with space for group and individual study. The second floor CyberCafe is open for late night study, with networked computers, reading tables, and a coffee shop. Students may check out laptop computers equipped for connection to the Library’s wireless network. The Studio (located in the second floor Media Center) offers students a hands-on lab for creating and manipulating digital media. Workshops and classes are offered throughout the semester to help students learn how to get the most out of the Libraries’ services.

The Agriculture and Veterinary Medicine Library (Room A113, 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, Cumberland Avenue and 15th Street) houses a large collection of sheet maps, atlases, journals, and books related to cartography. Materials in print, film, and digital formats are gathered from commercial sources as well as the Government Depository program.

The Music Library (301 Music Building) 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 a repository of rare books, manuscripts (including the papers of James Agee and Alex Haley), and historical ephemera. 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 (Suite 292, 193-E Polk Avenue, 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.

*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 25 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.

The Maintenance and Reliability Center involves all departments in the College of Engineering. Interested and qualified students may affiliate as interns with the MRC program while pursuing a degree in any of the engineering departments. Maintenance and reliability engineering courses are available. Research opportunities and graduate assistantships are also available for qualified students.

**Measurement and Control Engineering Center**
*(College of Engineering)*

Kelsey Cook, Director

The Measurement and Control Engineering Center, 512 East Stadium Hall, is sponsored by the College of Engineering, the Oak Ridge National Laboratory, and the National Science Foundation. The center’s program combines education, research, and technology transfer. Graduate assistantships are available through individual faculty research projects for qualified students. The research is funded by major U.S. industrial companies and focuses on theoretical and practical developments in measurement and control, concentrating on areas that will significantly improve the productivity, reliability, and safety of industrial systems and processes.

Center-sponsored research is carried out in the fields of process control, signal and image processing, and sensor development. Research in process control concentrates in the areas of process modeling, control system design, and real-time expert systems. Measurement research includes development of rheological, optical, and other sensors, and mass spectrometry, as tools for monitoring and control of chemical processes.

**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. These accounts may be used for e-mail, coursework, research, and personal Web pages. Information and on-line registration for computer accounts are available at http://oit.utk.edu/accounts.html. 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 direct Ethernet, dial-up, or wireless connections. All students can take advantage of UT Knoxville’s, new wireless infrastructure, which is now available in most of the academic and administrative buildings on the Knoxville campus.

To provide access to computing facilities on campus, OIT maintains seven staffed computing labs, several unstaffed labs, and supports computing installations in residence halls. The
FACILITIES FOR RESEARCH AND SERVICE

computing labs are equipped with more than 300 microcomputers including current models of Apple, Dell, and Gateway machines. In addition, laser printers, wireless printers, scanners, CD writers and zip drives are available. A variety of industry standard software applications are available for use on the machines in the computing laboratories. Please refer to http://oit.utk.edu/labs.html 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, please dial 974-9900 or e-mail helpdesk@utk.edu. For more information, please visit our 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 our Customer Service Center. These services include installing academic software free of charge on personally owned computers and helping students diagnose problems with their computers. We will also help clean up virus infected machines and reload/upgrade operating systems. The Customer Service Center is located on the corner of Cumberland and Volunteer in Rooms 103/104 Aconda Court and is open Monday through Friday, 9 a.m. until 4 p.m.

Technology Training: Several courses offered are aimed at improving skills with the technology available at UT Knoxville. Life Preserver: An Introduction to University of Tennessee Computing is offered several times each semester on supported operating 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 500 courses available. This training is free to University of Tennessee students. For registration and access to the CBT courses on the Web, go to http://oit.utk.edu/cbt/.

Statistical Consulting Center. Our mission is to help UT Knoxville students, faculty, and staff enhance the quality of their research by working together to effectively apply analytical methods, especially statistics. We 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 graphics, and interpreting the results. The costs for most of our services are often centrally funded for the first ten hours of assistance each semester. Assistance is available by appointment via the Help Desk at 974-9900, by walk-in at 200 Stokely Management Center and by e-mail at StatHelp@utk.edu. For details, see http://oit.utk.edu/scc/.

The Innovative Technology Center: The Innovative Technology Center (http://itc.utk.edu) provides the leadership, support, resources, and training necessary to help UT Knoxville faculty, graduate teaching assistants, and academic teaching staff make effective use of technology in their teaching, both online and in the classroom. The ITC offers a wide selection of workshops, supports a resource-rich faculty development lab, awards grants for instructional technology projects, and maintains 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)

Leonard Handler, 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 Centers of Excellence
http://www.utk.edu/research/coe.shtml

In 2000, the University of Tennessee, Knoxville, created nine Research Centers of Excellence in a competitive process that sought to emphasize some of the strongest, most promising research taking place at the university. With financial support from the state of Tennessee, the nine centers have created vital research programs that promise to enhance the university’s teaching and research and to contribute positively to the state economy.

The five centers in Knoxville are in environmental biology, food safety, materials science, information technology, and structural biology. Memphis has four centers: genomics, neurology of brain diseases, diseases of connective tissue, and vascular biology. Several of the programs involve activities on the various university campuses and collaboration with Oak Ridge National Laboratory.

Center for Genomics and Bioinformatics
Daniel Goldowitz, Director

The Center for Genomics and Bioinformatics, located at the University of Tennessee Health Science Center in Memphis, is committed to fostering an atmosphere conducive to scientific research and collaboration in the area of functional genomics, involving both basic science and clinical departments across the campuses of the University of Tennessee.

Center for Information Technology Research (CITR)
Jack Dongarra, Director

The Center for Information Technology Research (CITR) was established in the spring of 2001 to drive the growth and development of leading-edge information technology research (ITR) at the University of Tennessee, Knoxville. The mission of CITR is to build a thriving, well-funded community in basic and applied ITR at the University of Tennessee, Knoxville, in order to help the university capitalize on the rich supply of research opportunities that exist in this area.

Center of Excellence for the Neurobiology of Brain Disease
William Pulsinelli, Director

The Center for the Neurobiology of Brain Disease works to improve the diagnosis, treatment, and prevention of neurological and psychiatric disorders. The center combines state-of-the-art
technologies for brain disease research and molecular biology to improve understanding of brain function and the underlying reasons for neurological disorders ranging from Parkinson’s and Huntington’s diseases to schizophrenia and drug addiction.

Center for Environmental Biotechnology
Gary Sayler, Director

The Center for Environmental Biotechnology (CEB) was established in 1986 to foster a multidisciplinary approach toward training the next generation of environmental scientists and solving environmental problems through biotechnology. The CEB was given Research-Center-of-Excellence status by the University of Tennessee, Knoxville, in order to catalyze and advance a new research agenda that pushes the envelope of creative and pioneering research. This fundamental new research will revolutionize the ability to dissect, monitor and control processes at the molecular level to achieve real-time information and computational analysis in complex bioenvironmental systems.

Food Safety Center
Ann Draughon and Stephen Oliver, Directors

The Food Safety Center of Excellence was established in December 2000. The center develops and evaluates strategies to destroy or control food-borne pathogens and reduce the occurrence of food-borne illnesses. Contributing to this work is a multidisciplinary team of researchers, consisting of members of UT’s Institute of Agriculture’s Department of Food Science and Technology as well as researchers from departments outside the institute. Specialists include scientists with expertise in biochemistry, reproductive biology, food service management, parasitology, infectious diseases and risk assessment.

Vascular Biology Center of Excellence
Lisa K. Jennings, Director

The Vascular Biology Center of Excellence at the University of Tennessee Health Science Center (UTHSC) in Memphis was initiated in January 1999. The study of cellular and integrated vascular function under normal and pathologic conditions is the major research and clinical focus of the UT Vascular Biology Center of Excellence. The major collaborations formed by the participating faculty and trainees, along with the TAM (Tennessee, Arkansas, Mississippi) Cardiovascular Network of more than 70 cardiologists, creates an innovative and powerful research consortium.

Center of Excellence for Diseases of Connective Tissue
Andrew Kang, Director

The Center for Diseases of Connective Tissue is located at the University of Tennessee Health Science Center in Memphis. Scientists at the center conduct basic research in five areas: autoimmune diseases, such as rheumatoid arthritis and lupus; degenerative diseases, such as osteoarthritis; inflammation and the basic science of how the body reacts to injury; fibrotic diseases, such as heart failure and emphysema; and clinical research. The center also educates and trains pre-and postdoctoral fellows and conducts outreach programs.

Tennessee Advanced Materials Laboratory (TAML)
Ward Plummer, Director

The Tennessee Advanced Materials Laboratory (TAML) calls on experts in materials science and engineering, chemistry, chemical engineering, and physics at the University of Tennessee, Knoxville, and the Oak Ridge National Laboratory to explore the creation of new materials through computer-intensive modeling and experimental research.

Center of Excellence for Structural Biology
Engin Serpersu, Director

The mission of the University of Tennessee Center of Excellence for Structural Biology (CESB) is to expand the frontiers of knowledge in biomolecular structural and functional research. The center brings together a large group of structural molecular biologists working on a wide range of biological molecules, biomolecular assemblies and complexes. Its participants represent specialties in all of the current major techniques for high-resolution structure determination of large molecules, including X-ray crystallography, NMR spectroscopy and a battery of sophisticated biophysical tools including mass spectrometry and other spectroscopic techniques.

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).

1. 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 88 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.orise.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 Dr. Lee Magid, Acting Director, Joint Institute for Neutron Sciences and ORAU Councilor for the University of Tennessee,
Nonwovens products loom large in a number of markets.

The Textiles and Nonwovens Development Center (TANDEC) was officially dedicated in October 1990. TANDEC was made possible through a grant from ExxonMobil Chemical Company.

Nonwovens research programs at the University of Tennessee, Knoxville, include structure-property-process relationships in melt blowing polyolefins, polyesters, nylon, elastomeric polymers, engineering thermoplastics and recycled plastics; mechanism of melt blown web formation; modeling of melt blowing and spunbonding processes; development of on-line optical measurements for control of the critical properties of melt blown webs; electrical measurement of fiber alignment and bonding in nonwoven webs; thermal bonding and characterization of cotton/synthetic fiber nonwovens; computational analysis of heat transfer behavior in thermal calendering; study of protective apparel for agricultural, industrial and medical uses; and finishing of nonwovens. In addition to the basic research, technology transfer has been accomplished during the past several years by assisting companies in applied projects, primarily in the melt blowing area. Collaboration is ongoing with faculty in the colleges of Engineering and Arts and Sciences.

TANDEC’s mission is to bring together academics and industry to provide leadership in research, education, and industry services, fostering new developments in melted processed nonwovens. The TANDEC facilities further allow production of nonwovens by industrial companies. The nonwovens laboratory hosts numerous guests from industry and other institutions, and the facilities are planned to meet their needs, while safeguarding research confidentiality.

Tourism Institute
(Office of Education, Health, and Human Sciences)
John Salazar, Director

The Tourism Institute at the University of Tennessee, Knoxville, uses a systems approach to enhance economic development in Tennessee and the Southeast Region. Centered in the Department of Consumer and Industry Services Management, the institute integrates faculty expertise from the hotel and restaurant administration program, the recreation and tourism management program, and the retail and consumer sciences program to address emerging issues and needs. The institute is also supported by the Department of Urban and Regional Planning and the College of Agricultural Sciences and Natural Resources.

Successful tourism requires attractions to draw tourists and supporting businesses that provide high quality food, lodging and related consumer goods and services. The mission is to deliver research, development, and training projects that will promote sustainable tourism in Tennessee and the southeast region. The institute pursues research studies to better understand the needs of the state’s and region’s tourist customers to enable the industry to provide the goods and services that will increase and diversify the tourist base. It works with agencies and businesses to develop strategies for creating and expanding tourism enterprises. It also provides management level personnel to the tourism industry through the degree programs in the department and assists the industry in workforce training.

The University of Tennessee Space Institute
John E. Caruthers, 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. UTSI was established in 1964 and has evolved into an internationally recognized institution for graduate study and research in engineering, physics, and mathematics. The accredited academic programs and educational policies of the Space Institute have their origins in appropriate departments of the University of Tennessee. The more than 30 faculty members of the Institute carry out these accredited 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 MS and PhD degrees, those interested in continuing education for updating and broadening knowledge, and those who wish to pursue post-doctoral research.
Graduate degree programs are available with majors in aerospace engineering, aviation systems, chemical engineering, electrical engineering, engineering science, Industrial engineering (engineering management concentration), mathematics, mechanical engineering, and physics. In addition to the fundamental studies characteristic of each discipline, research opportunities are available in many areas including aerodynamics, fluid mechanics, advanced space propulsion, energy conversion processes, thermal sciences, coal combustion, magnetohydrodynamics, plasma physics, space systems, propulsion, computational fluid dynamics, and other aspects of atmospheric and space flight.

The Institute has an established Center of Excellence in Laser Applications and offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, pico-second processes, and coherent and non-linear optics, and biophysical applications.

The Institute was established in part to increase the research and engineering resources of Tennessee through education and practice 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. Students who enroll at UT are admitted to graduate study at the University of Tennessee. 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

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
1534 White Avenue
Knoxville, Tennessee 37996-1526
Phone: (865) 974-3181, fax: (865) 974-6629
E-mail: outreach@tennessee.edu
Web site: www.outreach.tennessee.edu

Graduate Research Assistantships are available for qualified students. Additional information may be obtained from:

University Outreach and Continuing Education
Norval Burkett, Associate Dean and Director
Robert Gibbs, Assistant 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. Arrangements can also be made to receive (downlink) programming or transmit (uplink) programming via satellite. The University Conference Center is located at 600 Henley Street in downtown Knoxville.

Additional information may be obtained from:
University Conference Center
Norval Burkett, Associate Dean and Director
Robert Gibbs, Assistant Director

The School of Engineering at the University of Tennessee has established a number of Centers of Excellence, including the Center for Space and Atmospheric Systems. The Center has an established Center of Excellence in Laser Applications and offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, pico-second processes, and coherent and non-linear optics, and biophysical applications.

The School of Engineering at the University of Tennessee has established a number of Centers of Excellence, including the Center for Space and Atmospheric Systems. The Center has an established Center of Excellence in Laser Applications and offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, pico-second processes, and coherent and non-linear optics, and biophysical applications.

Department of Conferences
Norval Burkett, Associate Dean and Director
Robert Gibbs, Assistant 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.

For more information, contact:
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

University Conference Center
Norval Burkett, Associate Dean and Director
Robert Gibbs, Assistant 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. Arrangements can also be made to receive (downlink) programming or transmit (uplink) programming via satellite. The University Conference Center is located at 600 Henley Street in downtown Knoxville.

Additional information may be obtained from:
University Conference Center
Norval Burkett, Associate Dean and Director
Robert Gibbs, Assistant 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, with varying proficiency in English.

The curriculum consists of eight proficiency levels: 101-108, Introductory through Pre-Academic.
Classes meet three to five periods 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. 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 Professional and Personal Development**

*Mary F. Jerger, Interim Director*

The Department of Professional and Personal Development provides a comprehensive array of non-credit courses, certificates, and seminars designed to serve the needs of individuals and businesses in Knoxville and surrounding communities. Courses are offered on the university campus, at off-campus locations (including two Oak Ridge classrooms), and online.

Classes are taught by university faculty, staff, and community experts. Courses also are delivered on-site for business clients, with instructional services tailored to the needs of each group.

Business topics include professional development, career planning, computer training, and several specialized certificate programs. Personal interest topics range from creative writing to art, dance, gardening, music, and sports. There are also courses 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 co-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
- 1534 White Avenue
- Knoxville, Tennessee 37996-1526
- Phone: (865) 974-0150
- Fax: (865) 974-0154
- E-mail: ProfessionalPgms@utk.edu
- Web site: www.outreach.utk.edu/ppd

**Water Resources Research Center**

*(Office of Research)*

http://eerc.ra.utk.edu/divisions/wrrc

*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 of interest to the state, region, and nation; (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.

Courses are offered on the university campus, at locations (including two Oak Ridge classrooms), and online. Courses meet three to five periods 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. Additional information may be obtained from:

- English Language Institute
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- 907 Mountcastle Street
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- 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
- 1534 White Avenue
- Knoxville, Tennessee 37996-1525
- Phone: (865) 974-1534 or (800) 670-8657
- Fax: (865) 974-4684
- E-mail: DistEducation@tennessee.edu
- Web site: anywhere.tennessee.edu
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