5210 Government and the Press (3) Historic and current problems in the relations of executive, judicial, legislative, and regulatory segments of governmental and press. Prereq: 3110 or consent of instructor.

5250 Public Opinion and Mass Media (3) Nature of public opinion with emphasis on role of press in its formation and how the press in turn is influenced by public opinion. Prereq: 4410 or consent of instructor.

5510-30 Writing and Editing Projects (3, 3) Specialized writing or editing interests, such as agriculture-politics, labor, finance, science, for technical as well as general publications. Prereq: 2220 or 2230.

5560 Magazine Article Writing (3) Techniques of writing in-depth articles for mass circulation magazines. Organizing and presenting material. Problems in specialized areas, such as business, science, agriculture, the humanities. Prereq: 3120 or consent of instructor.

5710 Studies in Public Relations Communications (3) Problems of communication between institutions and organizations and their publics. Case histories and evaluations of programs. Prereq: 2710 or consent of instructor.

5810 Magazine Editing and Production (3) Analysis of editorial and production problems of general, regional, and specialized publications. Reader interest evaluation, individual editorial projects. Prereq: Consent of instructor.

5910 Communications and International Development (3) Seminar emphasizing mass media in national and international development. Case studies and evaluation of communication techniques in developing countries. Problems in international and cross-cultural communications. Prereq: 4550 or consent of instructor.

5970 Independent Study (3)

5980 Internship (3)
The College of Education is committed to performing three major functions: (1) to provide professional preparation for teachers, administrators, school service personnel, and selected other professionals such as health and recreation personnel at the undergraduate and graduate levels, (2) to collaborate with school personnel, educational agencies, professional groups, and others interested in the evaluation and improvement of educational opportunities, programs, and services; and (3) to promote and conduct research and development in education and other areas of responsibility.

The College of Education holds membership in the American Association of Colleges for Teacher Education. All certification and degree programs through the doctoral level are fully accredited by the National Council for Accreditation of Teacher Education, the Southern Association of Colleges and Schools, and the Tennessee State Department of Education.

The College of Education, through the Graduate School, offers programs leading to the Master of Science degree, the Specialist in Education degree, the Doctor of Education degree, and the Doctor of Philosophy degrees.

MAJOR SCIENCE
The Master's level professional study may be planned (1) in one of the areas listed on page 8; (2) in appropriate combinations of these areas, or (3) in combinations of one or more of these areas with appropriate subjects or areas in other colleges.

SPECIALIST IN EDUCATION DEGREE
This degree may be earned in Educational Administration and Supervision, in Educational Psychology and Guidance, in Curriculum and Instruction, in Safety Education and Service, or in Vocational-Technical Education.

DOCTORAL DEGREES
The College of Education offers programs of advanced study leading to the Doctor of Education degree in the major areas listed on page 8. The Ph. D. program with a major in Education provides six options for study in the departments of Curriculum and Instruction, Educational Administration and Supervision, Educational and Counseling Psychology, Special Education and Rehabilitation, and Vocational-Technical Education and the divisions of Health and Safety, and Physical Education. The program requirements and the concentrations and emphases are:

The Program

<table>
<thead>
<tr>
<th>Research Area</th>
<th>21 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign or Computer Language</td>
<td>0-9 Hours</td>
</tr>
<tr>
<td>General Core Requirements</td>
<td></td>
</tr>
<tr>
<td>Courses in history of education, philosophy of education (two areas must be represented)</td>
<td>6 Hours Minimum</td>
</tr>
<tr>
<td>Courses in learning theory, curriculum theory, and administrative theory (three areas must be represented)</td>
<td>9 Hours Minimum</td>
</tr>
<tr>
<td>Trans-college seminar—four consecutive quarters</td>
<td>4 Hours Minimum</td>
</tr>
<tr>
<td>Alternative Core Requirements</td>
<td></td>
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<tr>
<td>Courses in philosophy of science</td>
<td>4 Hours Minimum</td>
</tr>
<tr>
<td>Transcollege Seminar—four consecutive quarters</td>
<td>4 Hours</td>
</tr>
<tr>
<td>Seminar in area of emphasis</td>
<td>4 hours minimum</td>
</tr>
<tr>
<td>Courses in learning theory/group or independent study</td>
<td>3 hours minimum</td>
</tr>
<tr>
<td>Specialization - A minimum of 24 hours normally selected from one or two emphases within the major option</td>
<td>24 Hours Minimum</td>
</tr>
<tr>
<td>Supporting Emphasis - A minimum of 12 hours selected from an emphasis other than those emphases selected in the major option. (May be selected from any one of the five options but not a combination of options.)</td>
<td></td>
</tr>
<tr>
<td>Cognate - A minimum of 9 hours selected from outside the College in addition to the designated research courses.</td>
<td>9 Hours Minimum</td>
</tr>
<tr>
<td>Dissertation</td>
<td>36 Hours Minimum</td>
</tr>
</tbody>
</table>

Concentrations and Emphases
I. Administrative Theory and Practice
   The Administration of Higher Education
   Contemporary Economics and Educational Finance
   Educational Planning
   Faculty Planning
   Maintenance of School Plants
   Organizational Theory
   Personnel Administration
   The Politics of Education
   The Principalship
   School Law
   The Superintendent
   Supervision
II. Theories of Curriculum Development and Foundations of Education
   Anthropological, Historical, Philosophical, and Sociological Bases for Educational Planning and Curriculum
   Principles and Models for Planning, Developing, and Evaluating Educational Programs
   Research Design for Educational Programs
   III. Instructional Theory and Practice
   Principles and Models for Instructional Improvement
   Subject Areas of Instruction and Practice, i.e., English, Foreign Languages, Mathematics, Science, Social Studies, etc.
   Elementary and Early Childhood Instruction and Practice
   Learning Media Services
   Physical Education Instruction and Practice
   Adapted Physical Education
Art and Music Education

Bureau of Educational Research and Service

Art Education

MAJOR

DEGREE

Art Education

M.S.

Professor: J. W. Robertson, Ed.D. Columbus, Uxes Coordinator, R. N. Hall, B.S.S. Peabody, Associate Professor: J. P. Watkins, M.S. Tennessee.

The Master of Science degree in Art Education is offered for art teachers, supervisors, and art-trained persons holding the baccalaureate degree. The program provides both thesis and non-thesis options. Moreover, it is possible to achieve Tennessee certification in art while pursuing the Master's degree program.

The thesis option requires 45 quarter hours as follows:

Quarter hours
1. Art Education 5310, 5320 and electives. 16
2. Curriculum and Instruction 5710, and electives. 9
3. Minor (selected with committee) 9
4. Thesis (Art Education 5000). 9

The non-thesis option requires 45 quarter hours as follows:

Quarter hours
1. Art Education 5210, 5310, 5320, and electives. 21
2. Curriculum and Instruction 5800, and electives. 9
3. Minor (selected with committee) 9
4. Comprehensive examination. 3

The thesis option requires satisfactory completion of an oral examination prior to awarding the degree, while the non-thesis option requires satisfactory completion of a final written comprehensive examination. Both the oral and written exams are conducted by the student's Master's degree committee.

All courses in art education are offered regularly each quarter, so the student should plan his or her program carefully with a faculty advisor.

4530-60-70 Problems in Art Teaching (3, 3, 3, 3) Prereq: Consent of instructor. E

5000 Thesis (1-15) Prereq: only. E

5003 Non-Thesis Graduation Comprehensive (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree completion. May not be used toward degree requirements. May be repeated. S/N/C only. E

5310 Organization, Administration, and Supervision of Art in the School Program (3) W

5310 Art in Education (3) Historical background, current philosophy, theory, and trends; nature and function of aesthetic behavior in visual arts; relationships to psychology, sociology, and anthropology. F

5350 Program Development in Art Education (3) Objectives: information, content selection, facilities, and equipment; supervision; evaluation; professional growth; leadership and community relationships; art for special student. Sp

5450-60-70 Problems in Art Education (3, 3, 3, 3) Prereq: Consent of instructor. E

Music Education

MAJOR

DEGREE

Music Education

M.S.


The Associate of Arts degree in Music Education is offered for educators in music education. All graduate students in music education must pass proficiency examinations in music theory and applied music.

Quarter hours
1. Music Education 5210, 5220, 5230 and electives. 18
2. Music electives. 9
3. Professional education courses including Curriculum and Instruction 5170. 9
4. Music Education 5000. 9

Total 45

Non-Thesis Option:

Quarter hours
1. Music Education 5210, 5240, 5250, 5710, one seminar, and electives numbered above. 27
2. Music electives at 3000, 4000, and 5000 levels. 9
3. Professional education electives including Curriculum and Instruction 5150, Educational Counseling and Psychology 4760, and Educational Counseling and Psychology 5050, 5200, or other appropriate course. 9

Total 51

1. Examination (in addition to routine examinations in courses): a. Written comprehensive examination in major and minor fields.
2. The student shall elect one of the evaluation procedures below (with approval of advisor and committee):
   a. Oral examinations in major and minor fields.
   b. A public recital in principal instrument, piano, or voice.
   c. The presentation in public performance of an original music composition(s) accepted by the committee as music suitable for scholastic performing groups.

4. Plan, rehearse, and conduct a full public performance of music by junior or senior high school music groups. This shall be worked out as a long-term project under the supervision of the student's committee.

3. Student's Committee: A minimum of three faculty members—the advisor from music education, one member from music; one member from education.

CollegioE. of Education/Art and Music Education 53

Departments of Instruction

Art and Music Education

C. H. Stall, Head
54 Art And Music Education/College Of Education


4580 Marching Band Techniques (3) Functions, organization, and practices of prior marching band. Prereq: Consent of instructor. Coreq: 3151; P.

5000 The Ed.D.  (1-15)  (Same as Sociology 3150) Ph.D.  Candidates and Assistant Professors:

5005 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/U only. E

5130 Studies in Secondary School Music (3) Development of understanding regarding growth patterns and processes through music experiences; cultural and community functions on secondary school music; problems in administration and teaching of music in secondary school; relationships of music with humanities in curriculum. Sequed to 5150. Su.


5220 The Administration and Supervision of School Music (3) Improvement of teaching-learning, development of administration of instruction, and in various areas of music education. Prereq: Consent of instructor and in various specialized areas of music education. Su. A

5230 Comparative Teaching Procedures in Music Education (3) Modern teaching theories and their applications. A, Su.


5250 Music for Early Childhood (3) Prereq. 3120 or 3130 or consent of instructor. Su.

5720 Studies of Music for Children in the Primary Grades (3) Study of musical development of Grades 1-3, and musical experiences for Grades 1-3. Prerequisite: 3100. May be repeated. S/U only. E

5320 Advanced Choral Literature and Conducting (3) Reading, discussing, and interpreting advanced choral scores suitable for school, college, church, and community choirs. Emphasis on contemporary and standard major works in all fields of major or music education. 4450, 4510 and equivalent. Gr.

5350-60-70 Special Problems in Music Education (3, 5, 7) Current problems in music education at all levels of instruction and in all areas of music education. Prereq: 5710 or equivalent and consent of instructor. S/U.

6410 Advanced Band Literature and conducting (2) Reading, conducting, and interpreting band scores suitable for school, college, and community bands; emphasis on contemporary and standard band literature. Prereq. Undergraduate degree with a major in music or music education. 4130 or equivalent. W.


5710 Research in Music Education (3) Prereq. Consent of instructor. Su.


5820 Seminar (3) Music teaching in vocal and general music, emphasis on preparation of junior and senior high music curricula. Survey of research, professional literature and development of bibliography. Laboratory activities. Projects. Prereq. Admission to M.S. program. Su.

5830 Seminar (3) Music teaching in instrumental areas of the elementary and junior high, and senior high curricula. Survey of research, professional literature and development of bibliography. Laboratory activities. Projects. Prereq. Admission to M.S. program. Su.


Curriculum and Instruction

MAJORS

DEGREES

Curriculum Mathematics M.S.
Elementary Education M.S.
English Education M.S.
Instrumental Music and Technology M.S.
Mathematics M.S.
Reading Education M.S.
Science Education M.S.
Social Science Education M.S.

Professors:


Associate Professors:


Assistant Professors:


Graduate programs are designed to improve scholarship and educational competence in a number of areas leading to the Master of Science degree, the Specialist in Education degree, the Doctor of Education degree, and the Doctor of Philosophy in Education degree.

THE MASTER'S PROGRAM

The Master of Science degree, thesis and non-thesis options are available in the following majors: Curriculum, Elementary Education, English Education, Foreign Language Education, Instructional Media and Technology, Mathematics Education, Reading Education, Science Education, and Social Science Education. The non-thesis option requires the completion of 51 quarter hours of course work.

THE SPECIALIST PROGRAM

The Educational Specialist degree program with a major in Curriculum and Instruction encompasses concentrations in the following fields: curriculum, elementary education, English education, foreign language education, instructional media and technology, mathematics education, social science education, and social science education. The Doctor of Philosophy degree with a major in Education includes concentrations and emphases as listed on page 52.

For further information, write the Department of Curriculum and Instruction.

5150 School Library Administration (3) (Same as Library and Information Science 4150)

4240 Classroom Instructional Organization (3) Developing understandings and skills relating to grouping, individualization, supply utilization, organization, grading, integrating, and achieving a social effective environment. For elementary classroom teacher. Prereq. Senior status.

4300 Developmental Reading in Secondary School and Community College (3) Approaches and materials for teaching basic reading skills and organizing reading instruction and/or administration at middle school, secondary school, and community college level. Prereq. Concurrent enrollment.

4301 Developing Reading Skills in Content Fields (3) Approaches and materials for teaching reading skills in content areas of school programs. Emphasis on techniques and materials for elementary school programs. Prereq. Consent of instructor.

4307 Problems in Improvement of Instruction (1-3) Special conferences, workshops, or in-service programs designed for improvement of instruction. May be repeated. Maximum 9 hrs. S/U only.

4310 Educational Sociology (3) (Same as Sociology 4310)

4320 Teaching in Kindergarten: Overview (3) Relationship of kindergarten to total elementary program; goals, historical settings and current developments. Prereq. Senior standing.

4400 Problems in Improvement of Instruction (1-3) Special conferences, workshops, or in-service programs designed for improvement of instruction. May be repeated. Maximum 9 hrs. S/U only.

4430 Educational Sociology (3) (Same as Sociology 4430)


4640 Methods and Materials in Environmental and Science Education (3) Instructional methods, materials, technology, and classroom techniques for teaching science and environmental science for classroom teachers. Middle/upper high, senior high school level. Prereq. Admission to Teacher Education.

4750 Utilization of Instructional Media (3) Introduces the basic communications processes, media for instruction, and the nature and role of media in educational processes. Prereq. Utilization of media, and basic software production techniques. (Same as Library and Information Science 4750 and Vocational-Technical Education 4750). Su.

4800 Programming Learning (3) Theories of learning as related to technology of programmed instruction; techniques and applications of programming. Prereq. Consent of instructor. (Same as Psychology 4880) 2 hrs and 1 lab.
5410 The High School Curriculum (3) Identification of problems, and correction of reading problems or consent of instructor. May be repeated. Maximum 6 hrs.

5400 Problems in Improvement of Instruction (1-3) Special conferences, workshops, and reserve programs. May be repeated. Maximum 12 hrs. S/NC only.

5410 The High School Curriculum (3) Identification of problems, and correction of reading problems or consent of instructor. May be repeated. Maximum 6 hrs.

5430 Psychology of Reading (3) The reading act, influences on reading, and characteristics of reading in children. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

5440 Educational Technology and Materials for Teaching Critical Reading (3) Instructional techniques, methods, and procedures for development of higher-level comprehension skills, concepts, and attitudes for critical (or productive) and critical (or evaluative) reading. Prereq. Course in reading education or consent of instructor.

5300 Principles of Language Learning (3) Special topics in language learning and teaching, including current classroom uses of computers. Prereq. 3030 or consent of instructor.

4870 Applications of Computers for Instructional Purposes (3) Computer concepts for teachers at all grade levels, computer operations, application of computers to lesson planning and delivery of instruction. Prereq. 3030 or consent of instructor. May be repeated. Maximum 6 hrs. S/NC only.

5305 Curriculum Development and Evaluation (3) Examination of alternative approaches to improve current practice. Prereq. 5580 or consent or instructor.

5306 Mathematics Laboratories in Elementary School (3-6) Construction and development of curricula and materials for laboratory mathematics. Theoretical considerations and development of curricula and materials for laboratory mathematics. Prereq. Consent of instructor. Sp, Su

5220 Mathematics Laboratories in Elementary School (3) Theoretical and practical applications of specific reading diagnostic instruments; testing of elementary school students; preparation of diagnostic test materials and study guides. Prereq: Consent of instructor. Sp, Su

5210 Teaching Language Arts in the Elementary School (3) Trends in methods, materials, and content. Not available for credit to persons completing recent elementary language arts methods course. Prereq: 12 hrs English or related courses or consent of instructor.

5291 Programs and Materials in Elementary School Social Studies (3) TRENDS in methods, materials, and content. Available for credit to persons completing recent elementary social studies course. Prereq: 12 hrs science or consent of instructor.

5265 Mathematics Laboratories in Elementary School (3) Analysis of new and innovative science teaching methods for organizing social studies activity-oriented laboratory materials and development of curricula and materials for laboratory science. Prereq. Consent of instructor. Sp, Su

5260 Teaching Language Arts in the Elementary School (3) Theoretical and practical applications of specific reading diagnostic instruments; testing of elementary school students. Prereq. Consent of instructor. Sp, Su

5250 Secondary School Instruction (3) Persistent instructional problems in secondary schools. Prereq: 3720 or equivalent, or consent of instructor.

5240 Comparative Philosopshes of Education (3) Educational policy and theory proposals of the major philosophies of thought. Prereq. Consent of instructor.

5230 Advanced Study and Practicum in Diagnosis of Reading Problems (3) Application of principles of learning and teaching methodology in working with elementary and/or secondary school students. Theoretical considerations and development of curricula and materials for laboratory and reserve programs. Prereq. Consent of instructor. Sp, Su

5212 Programs and Materials in Teaching Elementary School Social Studies (3) Recent trends in methods, materials, and content. Available for credit to persons completing recent elementary social studies course. Prereq: Consent of instructor. Sp, Su

5201 Teaching Social Studies in the Elementary School (3) Recent trends in methods, materials, and content. Available for credit to persons completing recent elementary social studies course. Prereq: Consent of instructor. Sp, Su

5200 Teaching Language Arts in the Elementary School (3) Recent trends in methods, materials, and content. Available for credit to persons completing recent elementary language arts methods course. Prereq: 12 hrs English or related courses or consent of instructor.

5190-90-200 Seminar in Educational, Social, and Psychological Sociology (3) Examination of alternative approaches to improve current practice. Prereq. 5580 or consent or instructor. May be repeated. Maximum 6 hrs.

5180 Educational Goals and Curriculum (3) Analysis of selected problems of educational goals: the role of education in our society and others. (Same as Anthropology 5510)

5170 Educational Policy and Social Stratification (3) The role of education in our society and others. (Same as Anthropology 5511)
5820 The Junior High and Middle School Curriculum (3) Curriculum design and appropriate patterns of instruction to middle grade students.

5830 Curriculum Planning and Development (2) Introduction to curriculum theory and basic principles. Prereq: 5470 or 5270 or consent of instructor. E

5840 Educational Statistics (3)

5840 Direction and Supervision of Student Teaching (3) Role and responsibilities of cooperating teachers and student teachers; objectives and policies of student teaching programs; elements of clinical supervision; overview of research.

5850 Individualization of Instruction (3) Practical experience in designing individualized activities and materials. Prereq: 5580 and 5909 or consent of instructor.

5860 Newer Trends in Elementary Education (3) Trends in classroom procedures, equipment, and materials of instruction; problems involving improvement of instruction. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

5870 Curriculum for Early Childhood (K-3) (3) Sp. Pr

5880 Teacher-Parent Communication (2) Development of techniques for effective relationships between parents and teachers. Roles and expectations of parents and teachers, parent involvement, and influence of community on educational processes.

5890 Design of Instructional Media (3) Design and implementation of instructional development models to arrive at solutions to instructional problems. Development and design of a learning sequence or module, using appropriate media in actual learning setting. Prereq: 4720 or consent of instructor.

5891 Advanced Production of Audiovisual Software (3) Lettering, overhead projectuals, mounting, projection, editing, sound, nonsound, nonphonographic data, and videotaping for producing classroom educational software. Prereq: 5680 or consent of instructor. (Same as Library and Information Science 5691.)

5892 Evaluation of Instructional Media (3) Evaluation and analysis of media to meet needs of learners. Prereq: 5891 or consent of instructor.

5893 Administering Instructional Media Programs (3) Programs, functions, professional developing and administering media programs in various organizational and learning settings. Prereq: 5681, 5845, or consent of instructor.

5894 Utilization of Educational Television and Radio (3) Use of commercial educational TV and radio in schools and colleges. Prereq: Consent of instructor.

5896 Research in Instructional Media (3) Media research and its application toward improvement of instruction and learning. Prereq: Consent of instructor.

5898 Practicum Experience in Instructional Media (3) Practicum experience in the fields of instructional management and learning settings. Prereq: Consent of instructor.

5897 Application of Instructional Media (3) Media techniques and their application to meet the needs of learners. Prereq: Consent of instructor.

5710 Techniques of Research in Education (3) Study of research in education and educational experimentation.

5720 Observation and Analysis of Instruction (3) Classroom observation and analysis procedures, development of the observational data base, examination of existing observation systems.

5730 Contemporary Issues in Education and Social Change (1-6) Elective (Same as Educational Psychology 5740).

5800 Seminar in Cooperative Curriculum Research (3) Action research procedures and their application in programs. E

5810 Introduction to Data Processing in Education (3) Analysis of the instructional role of four educational data processing. Emphasis on curricular, administrative, and research opportunities in education, using modern electronic data processing methods and techniques. Prereq: Consent of instructor. Consent of instructor. Consent of instructor. Consent of instructor.

5820 Seminar in the Teaching of Mathematics (3) Current methods and materials for grades 7-12 for a supervised placement. Prereq: First year teaching experience (mathematics grades 7-12) or consent of instructor. Sp.

5825 Teaching Mathematics in the Middle and Junior High School (3) Problems related to teaching mathematics in middle and junior high schools. Understanding structure of mathematical concepts, strategies, methods, and materials for teaching. Materials suitable for individualized instruction; mathematical laboratory techniques, and independent study. Opportunities for individual projects. Prereq: 5350 or 3151-E or equivalent. Sp.


5840 Techniques in Instruction (3) Use of noncommercial educational TV and radio programs in various organizational and learning settings. (Same as Library and Information Science 5691.)


5855 Workshops and in-service programs to improve instruction of teachers. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

5860 Newer Trends in Elementary Education (3) Trends in classroom procedures, equipment, and materials of instruction; problems involving improvement of instruction. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

5863 Problems and materials for teacher education. Prereq: 5862 or consent of instructor. Consent of instructor. Consent of instructor.

5869 Teaching Reading in Grades 7-12 (3) Strategies and materials for teaching reading of secondary students. Prereq: Consent of instructor. Consent of instructor. Consent of instructor.

5870 Teaching Poetry in Grades 7-12 (3) Materials and strategies for teaching poetry in secondary schools. Prereq: Consent of instructor. Consent of instructor. Consent of instructor.

5876 The Function of the Thinking Process in Education (3) Analysis of thinking process for purpose of tracing its implications for education theory and practice.

5879 The Teaching of Natural Science (3) Strategies, laboratory techniques, testing and evaluation, professional guidelines for middle, junior and senior high schools, community colleges. Prereq: Consent of instructor.

5895 Seminar in Social and Environmental Education (3) Recent developments in science education; interrelationships of major environmental factors on science education; role of media, print, and periodical in schools, community colleges. Prereq. Consent of instructor. Consent of instructor. Consent of instructor.

5896 Studies in Energy Education (3) Major and alternative energy sources with applications for development of educational programs and materials; special emphasis on science taught in schools including community colleges. Prereq: 5681 or consent of instructor. Consent of instructor. Consent of instructor.


5902 Teaching in Social Studies (3) Research and theoretical applications to teaching of social science. Prereq: 5991 Seminar in Social and Environmental Education. S/NC only.

5905 Teaching English in the Community/Junior College (3) Projects and aids associated with English language arts or consent of instructor. S/NC only.

5906 Teaching Poetry in Grades 7-12 (3) Materials and strategies for teaching poetry in secondary schools. Prereq: Consent of instructor. Consent of instructor. Consent of instructor.

5907 Teaching Drama in Grades 7-12 (3) Strategies and materials for teaching drama. W

5909 Instructional Theory and Design (3) Instructional process and relationship to curriculum and learning. Prereq. Consent of instructor.

5910-20 Problem in Literacy (3, 3, 3, S/NC only)

5911 Directing the Performing Program (4) (Same as Speech 5911.)

5912 Play Production in Secondary Schools (4) (Same as Theatre 5912.)

5904 The Function of the Thinking Process in Education (3) Analysis of thinking process for purpose of tracing its implications for education theory and practice.

5904 The Teaching of Natural Science (3) Strategies, laboratory techniques, testing and evaluation, professional guidelines for middle, junior and senior high schools, community colleges. Prereq: Consent of instructor.

5905 Seminar in Social and Environmental Education (3) Recent developments in science education; interrelationships of major environmental factors on science education; role of media, print, and periodical in schools, community colleges. Prereq. Consent of instructor. Consent of instructor. Consent of instructor.

5906 Studies in Energy Education (3) Major and alternative energy sources with applications for development of educational programs and materials; special emphasis on science taught in schools including community colleges. Prereq: 5681 or consent of instructor. Consent of instructor. Consent of instructor.

5910 The Teaching of the Social Studies (3) Problems associated with instruction in history and social studies.

5980 Projects, Programs, and Materials in Social Studies (3) Projects and aids associated with social science discipline. W

5902 Teaching in Social Studies (3)

5905 Teaching English in the Community/Junior College (3)

5912 Play Production in Secondary Schools (4) (Same as Theatre 5912.)

5904 The Function of the Thinking Process in Education (3) Analysis of thinking process for purpose of tracing its implications for education theory and practice.

5904 The Teaching of Natural Science (3) Strategies, laboratory techniques, testing and evaluation, professional guidelines for middle, junior and senior high schools, community colleges. Prereq: Consent of instructor.

5910 Seminar in Social and Environmental Education (3) Recent developments in science education; interrelationships of major environmental factors on science education; role of media, print, and periodical in schools, community colleges. Prereq. Consent of instructor. Consent of instructor. Consent of instructor.

5906 Studies in Energy Education (3) Major and alternative energy sources with applications for development of educational programs and materials; special emphasis on science taught in schools including community colleges. Prereq: 5681 or consent of instructor. Consent of instructor. Consent of instructor.

5910 The Teaching of the Social Studies (3) Problems associated with instruction in history and social studies.

5980 Projects, Programs, and Materials in Social Studies (3) Projects and aids associated with social science discipline. W

5902 Teaching in Social Studies (3)

5905 Teaching English in the Community/Junior College (3)

5912 Play Production in Secondary Schools (4) (Same as Theatre 5912.)

5904 The Function of the Thinking Process in Education (3) Analysis of thinking process for purpose of tracing its implications for education theory and practice.

5904 The Teaching of Natural Science (3) Strategies, laboratory techniques, testing and evaluation, professional guidelines for middle, junior and senior high schools, community colleges. Prereq: Consent of instructor.

5910 Seminar in Social and Environmental Education (3) Recent developments in science education; interrelationships of major environmental factors on science education; role of media, print, and periodical in schools, community colleges. Prereq. Consent of instructor. Consent of instructor. Consent of instructor.

5906 Studies in Energy Education (3) Major and alternative energy sources with applications for development of educational programs and materials; special emphasis on science taught in schools including community colleges. Prereq: 5681 or consent of instructor. Consent of instructor. Consent of instructor.

5910 The Teaching of the Social Studies (3) Problems associated with instruction in history and social studies.

5980 Projects, Programs, and Materials in Social Studies (3) Projects and aids associated with social science discipline. W

5902 Teaching in Social Studies (3)

5905 Teaching English in the Community/Junior College (3)

5912 Play Production in Secondary Schools (4) (Same as Theatre 5912.)

5904 The Function of the Thinking Process in Education (3) Analysis of thinking process for purpose of tracing its implications for education theory and practice.
6050 Advanced Studies in Elementary Education (3) Critical analysis of research as it applies to class-
room practice. Prereq: 391 or 5600. 12 hrs at graduate level, or consent of instructor. W
6060 Advanced Seminar in Philosophy of Education (3) Some selected philosophical issues in education. Prereq: At least 2 courses in history or philosophy of education.
6081 Phonemogenesis and Education (3) Theory and applications to selective educational issues. Prereq: 2 courses in history or philosophy of education.
6095 Special Topics (1-10) Topics to be assigned. May be repeated. May be offered for letter grade or S/NC. E
6098 Independent Study (1-10) Topics to be assigned. May be repeated. May be offered for letter grade or S/NC. E
6200 Supervised Readings (1-12) Topics to be assigned. May be repeated. May be offered for letter grade or S/NC. E
6100 Education as Social Policy (3) Education as instrument of national policy, topical problems faced by society in shaping educational problems. Prereq: Consent of instructor.
6210 Seminar in Elementary School Social Studies Research (3) Current research in elementary school studies, status of research in field, needed research-related research from other fields. Prereq: Undergraduate course and one graduate course in social studies, or equivalent. S
6230 Programs for Curriculum Improvement (3) N
6234 Interpretaion of Research in Curriculum and Instruction (3) Research studies and relative value of research to professional assignments. Prereq: 5800 or 5710 or equivalent.
6235 Interperetion of History in Education (3) May be repeated with consent of instructor.
5283 Advanced Studies in Elementary School Sci-
cence (3) Critical analysis of research as applied in elementary school science. Prereq: Undergraduate course and one graduate course in science, or equiv-
alent.
5350 The Professional Education of Teachers (3) Principles and practices of preparation of teachers for American elementary and secondary schools; current and historical trends and issues; inno-
vation and directions for future.
6400 The Dynamics of Educational Change (3) Interdisciplinary approach to change in process educ-
ation. May be repeated. Maximum 8 hrs. S/NC only.
6600 Advanced Studies in Early Childhood Edu-
cation (3) Prereq: 2 graduate level courses in early child-
hood education and consent of instructor. May be repeated. Maximum 6 hrs. S/NC only.
6510 Advanced Studies in Elementary School Lan-
guage Arts (3) Critical research analysis of selected issues in language arts education. Prereq: 2 courses in language arts education and consent of instructor.
*6515-30 Seminar in Dissertation Proposal W-
ning (2, 2) Preparation and evaluation of dissertation prop-
osals. Prereq: Completion of at least one research competency or consent of instructor. S/NC only.
6710 Advanced Educational Statistics (3)
6720 Interpretation of Data (3) Types of data in puz-
zel-solving mathematics; principle of sound interpretation.
6730 Evaluation in Curriculum Planning: Theory and Applica-
tion (3) Trends, issues, and theoretical framework in specific educational settings. Prereq: 5680 and 5320 or equivalent.
5721 Advanced Studies in Curriculum (3) Analysis of influential curriculum theories and approaches, struct-
ure and design of educational programs. Prereq 5580 and 5320 or equivalent.
5839 Studies in Mathematics Education (3) Reading and study related to historical trends and issues in mathematics education in United States providing pres-
ted trends on current curriculum problems and future trends. Prereq 5300 or consent of instructor.
5850 Principles of Educational Leadership (3) Conflicting concepts, with application to major prob-
lems in instruction, supervision, and administration. E
5859 Internship (1-4) Advanced level experiences in application of principles and practices of curriculum development and instructional improvement. Pr-
rents approved must be met and consent of instructor required. May be repeated. Maximum 12 hrs. S/NC only.
6900 Advanced Studies in Secondary Science and Environ-
emental Education (3) Programs, materials, and research and research for middle, junior high and high schools; current and historical trends and issues in science, or consent of instructor.
6001 Trans-College Seminar (1) Minimum of four con-
tiguous quarters required of all Ph.D. students. Prereq: Admission to Ph.D. program. May be repeat-
ed. May not be used to meet 5000 requirements. S/NC only.
5600 Major DEGREES
5600 Education
Ph.D.
6601 Trans-College Seminar (1) Minimum of four con-
tiguous quarters required of all Ph.D. students. Prereq: Admission to Ph.D. program. May be repeat-
ed. May not be used to meet 5000 requirements. S/NC only.
5600 Major DEGREES
5600 Educational and Counseling Psychology
MAJORS
DEGREES
Guidance MAJORS
M.S.
Educational Psychology
Ed.S.
Education
Ph.D.
Professors:
M. J. Patton (Byrd), Ph.D. Ohio State; K. L. Davis,
Ed.D. Georgia; J. M. Defelice, Ph.D. Michigan,
D. J. Decker, Ed.D. Oklahoma State; S. D. Derz,
Ed.S. Arizona State; M. A. Hector; Ph.D. Michigan State,
W. H. Wrice, Ph.D. Northwestern; E. A. McClellan (Emilson), Ph.D. Illinois,
J. R. Kelley; Ph.D. Michigan; T. E. Logan (Henderson), Ph.D. Ohio State,
C. L. Thompson, Ph.D. Ohio State; D. L. Anderes,
S. L. Hallam; W. A. Poppen, Ph.D. Florida.
Associate Professors:
L. M. Koffid, Ed.S. Tennessee; M. P. Peterson,
Ph.D. Nebraska; A. S. K. Kilpatrick, Ph.D. Florida.
Assistant Professor:
J. A. Matsui, Ph.D. Texas.
Counseling Psychology
MAJORS
DEGREES
Guidance MAJORS
M.S.
Educational Psychology
Ed.S.
Education
Ph.D.
Professors:
J. R. B. Caskey, Ph.D. Ohio State; S. W. Huck, Ph.D. Northwestern;
L. M. DeRidder, Ph.D. Michigan; G. Donaldson,
Ph.D. Ohio State; C. L. Thompson, Ph.D. Ohio State;
R. L. Williams, Ph.D. Pennsylvania,
K. R. Wood, Ph.D. Louisiana.
Associate Professors:
D. G. Wickel (Byrd) Ed.D. Tennessee; L. M. Peterson,
Ph.D. Nebraska; J. W. Trumbull, Ph.D. Florida.
Graduate programs: thesis or non-thesis opti-
ion. Required courses vary according to program. Prereq: 3430 or equivalent.
Ph.D. Psychology of the Disadvantaged Child (3) Significant behavioral differences and atti-
tude intervention approaches. E
5000 Thesis (1-15) Ph.D. only.
5001 Masters Graduation Completion (3-15) Requi-
ted for the non-thesis student not otherwise
registered during the graduation quarter or quarters.
Ph.D. Psychology of the Disadvantaged Child (3) Significant behavioral differences and atti-
tude intervention approaches. E
5000 Thesis (1-15) Ph.D. only.
5001 Masters Graduation Completion (3-15) Requi-
ted for the non-thesis student not otherwise
registered during the graduation quarter or quarters.
Ph.D. Psychology of the Disadvantaged Child (3) Significant behavioral differences and atti-
tude intervention approaches. E
5000 Thesis (1-15) Ph.D. only.
5001 Masters Graduation Completion (3-15) Requi-
ted for the non-thesis student not otherwise
registered during the graduation quarter or quarters.
Ph.D. Psychology of the Disadvantaged Child (3) Significant behavioral differences and atti-
tude intervention approaches. E
5000 Thesis (1-15) Ph.D. only.
5001 Masters Graduation Completion (3-15) Requi-
ted for the non-thesis student not otherwise
registered during the graduation quarter or quarters.
Ph.D. Psychology of the Disadvantaged Child (3) Significant behavioral differences and atti-
tude intervention approaches. E
5000 Thesis (1-15) Ph.D. only.
5001 Masters Graduation Completion (3-15) Requi-
ted for the non-thesis student not otherwise
registered during the graduation quarter or quarters.
Ph.D. Psychology of the Disadvantaged Child (3) Significant behavioral differences and atti-
tude intervention approaches. E
5000 Thesis (1-15) Ph.D. only.
5001 Masters Graduation Completion (3-15) Requi-
ted for the non-thesis student not otherwise
registered during the graduation quarter or quarters.
Ph.D. Psychology of the Disadvantaged Child (3) Significant behavioral differences and atti-
tude intervention approaches. E
5000 Thesis (1-15) Ph.D. only.
5001 Masters Graduation Completion (3-15) Requi-
ted for the non-thesis student not otherwise
registered during the graduation quarter or quarters.
Ph.D. Psychology of the Disadvantaged Child (3) Significant behavioral differences and atti-
tude intervention approaches. E
5000 Thesis (1-15) Ph.D. only.
5001 Masters Graduation Completion (3-15) Requi-
ted for the non-thesis student not otherwise
registered during the graduation quarter or quarters.
Ph.D. Psychology of the Disadvantaged Child (3) Significant behavioral differences and atti-
tude intervention approaches. E
5000 Thesis (1-15) Ph.D. only.
5001 Masters Graduation Completion (3-15) Requi-
ted for the non-thesis student not otherwise
registered during the graduation quarter or quarters.
The Ed.D. program also offers a concentration in higher education. The instructional program combines theory and practice in an evaluative demonstration of scholarly study and research. A blend of classroom instruc-

tion, individualized advising and supervised practice and internships allows students to
develop an emphasis in academic admin-
istration, community-junior college
administration, student personnel adminis-
tration, financial management and college

Teaching. For additional information, contact
the Department Head.

Admission Requirements: General portion of
the Graduate Record Examination; writing sample if GRE; verbal is below 50th percent-
ile, leadership potential judged by activities in
organizations, and rating forms or letters of
recommendation. The Ed.D. applicant must also
interview with at least 3 faculty members on campus or elsewhere. Applica-
tion deadlines are January 15, March 15, June 15, or August 15.

M.S. IN EDUCATIONAL ADMINISTRATION
AND SUPERVISION

Thesis Option: A minimum of 45 credit
hours including 9 hours of Thesis 5000 is
required. A major consists of a minimum of
24 hours. An internship is highly recom-

mended but not required. A final oral
examination is required with a written exam
at the option of the committee.

Non-Thesis Option: A minimum of 51
credit hours is required with a minimum of
24 hours in supervised practice. An internship is
highly recommended but not required. A final writ-
ten comprehensive examination is given with
an oral exam at the option of the com-
mittee.

M.S. IN COLLEGE STUDENT PERSONNEL

This program is designed for individuals interested in entering the field of student

personnel administration in colleges and

universities and in community or junior
colleges. The program has both a thesis and
non-thesis option. A minimum of 60 hours,
which includes 9 hours of practicum experi-
ence, is required in either option.

THE COLLEGE+CAREER+ SPECIALIST

PROGRAM

Thesis Option: A minimum of 90 credit
hours beyond the baccalaureate degree
including 9 hours of 5910-20-30 is
required. Twelve hours must be in a collateral area,
within the college and 12 hours outside the
college. An internship is highly recom-

mended but not required. A written
comprehensive examination is given as well
as an oral exam over the thesis.

Non-Thesis Option: A minimum of 90 credit
hours beyond the baccalaureate degree
including 9 hours of 5910-20-30 is
required. Twelve hours must be in a collateral
area within the college and 12 hours outside the
college. An internship is highly recom-

mended but not required. A written
comprehensive examination is given as well
as an oral exam over the thesis.

The Ph.D. degree with a major in Educa-
tion, is required ineither option.

The Ph.D. degree in Educational Adminis-
tration/Leadership is required. A foreign
language requirement is at the discretion of
the candidate.

5500 Thesis (1-15) P/NP only. E

5520 Non-Thesis Graduation Examination (3-15)
Required for the non-thesis student not otherwise
registered during any quarter when a student uses
university facilities and/or faculty time before degree
is completed. May not be used toward degree
requirements. May be repeated. E

5591 Internship in Educational Administration (3)
May be repeated with consent of department. Maxi-
mum 6 hrs. E

5510 Introduction to Educational Administration (3)
Tasks, functions, and processes of educational admin-
istration; organization and structure of educational
programs and institutions. E

5160-99-200 Educational Specialist Research and
Thesis (3, 3, 3) P/NP only. E

5220 Philosophy and Theory in Educational Admi-

nistration (3) Historical and theoretical foundations
of educational administration, programs, and institu-
tions, within the framework of American culture. F, Sp, Su

5230 Seminar in the Behavioral Sciences in Educa-
tional Administration (3) May include science courses
and courses in application of administration
such as semantics, communication, leadership,
change process, management, theory and

personnel, motivation, and morale, role, theory. Sp, Su

5390 The Politics of Education (3) Special emphasis
on federal legal and administrative, and com-

parative problems. May be repeated. A

5301 School Administration and Civil Rights Issues (3)
To help school administrators meet responsibility

and resolve problems stemming from court rulings
regarding equal rights legislation. May be repeated.
A

5410 District Level Administration (3) Role of central
administration, board, and relationships, behaviors, and

competencies to develop an effective school organi-

zation. F

5430 Building Level Administration (3) For those

administrators planning to become, or those

operating in rural, elementary, secondary, or consoli-
dated schools. W, Su

5440 Introduction to Law, Finance, and Business
Management at the Building Level (2) Orientation
for beginning principals for basic foundations of the
American legal systems; how legal factually

builds level operations; building level methods of
legal and financial support measures. Sp, Su

5500 Organization of the School Program (3) For

principals and superintendents; conceptual and technical
skills in organizing school program including curricu-

lum, instruction, personnel grouping, staff, schedules, and

space. Sp, Su

5560 Personnel Administration: Local School (3) Plan-
ing personnel needs; job analyses, recruitment, selec-
tion, placement; orientation of new staff; discipline; employment and dismissal; and contract administra-
tion. E

5470 Introduction to School Facility Planning (2) For

school construction; facility planning; skills in build-
ing planning; use and evaluation. Sp, Su

5480 Instructional Supervision—Local School (3)
Developing a concept of supervision; instructional

help, support, and service for teachers, supervision of
curriculum; staff development, and staff evalua-
tion. F, Su

5530 Introduction to Educational Planning (3)
Processes for improving decision-making function through both

quantitative and qualitative planning techniques. Requir-
ed educational policy analysis in educational planning.
W

5430 Tennessee School Law (3) Vol. 49 Tennessee
Code Annotated, relevant State Board of Minimum
Rules, Regulations and Reporting System. F, Sp, Su

560 Research for Educational Administrators (3)
Descriptive, experimental, and survey research in
educational administration. Development of skills

ground to read and understand technical literature.
Priority for non-thesis option. Should be taken early in M.S. or Ed. program. W

5580 Seminar in Communication Skills for Educa-
tional Administrators (2) Identification, development
and use of interpersonal and group related communi-
cation skills. Sp, Su

5711 Problems in Educational Administration and
Supervision: School Operations (5) May be repeated.
E

5712 Problems in Educational Administration and
Supervision: Higher Education (5) May be repeated.
E

5713 Problems in Educational Administration and
Supervision: State School Operations (5) May be
repeated. E

5714 Problems in Educational Administration and
Supervision: Preparation Programs (5) May be re-
peated. E

5715 Problems in Educational Administration and
Supervision: Theory (5) May be repeated. E

5716 Problems in Educational Administration and
Supervision: Finance (5) May be repeated. E

573 Problems in Educational Administration and
Supervision: Transportation (5) May be repeated. E

574 Problems in Educational Administration and
Supervision: Business Management (5) May be
repeated. E

575 Problems in Educational Administration and
Supervision: Personnel (5) May be repeated. E

576 Problems in Educational Administration and
Supervision: School Plant (5) May be repeated. E

577 Problems in Educational Administration and
Supervision: Organization and Structure (5) May be
repeated. E

578 Problems in Educational Administration and
Supervision: School Law (5) May be repeated. E

579 Problems in Educational Administration and
Supervision: Supervision (5) May be repeated. E

5770 Maintenance of School Plants (2) Skills in oper-
ating school custodial and maintenance programs. Sp, Su

571 Survey Research Methods I (2) Overview of descrip-
tive studies, data collection, and analysis, and interpreta-
tion for survey studies and field surveys, strategies for
descriptive research in education. F, Sp

590-590-70 Independent Study in Educational Admin-
istration (3, 3, 3) Preregistration required. F, Sp, Su

599 Special Topics (3) May be repeated. E

591-20-20 Problems in Law of Thesis (3, 3, 3) S/NP
only.

5580 Elementary Administrators Seminar (6) For
in-service training of elementary school administrators.

College Of Education/Educational Leadership 59
MAJORS

6360 State-Federal Relations in Education (2) Pur- poses and functions of federal/administrative educational agencies, organizational control and polit- ical variables. Major education laws and regulations and their application. Non-P policy instruments. F, Su

6360 Legal Foundations of Public Policy (3) Legal framework and theoretical concepts that influence the operation of schools within present legal structure of the United States. A

6360 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su

6380 Administration of Complex Educational Orga- nizations (3) Concepts and theoretical formulations of school administration. W

6400 Advanced Study in School Finance Planning (3) In-depth experiences in development of educational planning concepts and techniques of leadership in crea-

6450 Special Topics in School Personnel Adminis- tration (3) In-depth experiences in development of educational planning concepts and techniques of leadership in crea-

6360 Special Topics (3) May be repeated. E

6435 Specialized Seminar: School Administration (3) E

6480 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su

6550 State-Federal Relations in Education (2) Pur- poses and functions of federal/administrative educational agencies, organizational control and polit- ical variables. Major education laws and regulations and their application. Non-P policy instruments. F, Su

6580 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su

6680 Administration of Complex Educational Orga-

6780 Administration of Complex Educational Orga-

6870 Advanced Study in School Finance Planning (3) In-depth experiences in development of educational planning concepts and techniques of leadership in crea-

6900 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice, preparation for further leadership.

6920 Specialized Seminar: School Business Management (3) E

6996 Specialized Seminar: School Plant (3) Theory and practice in planning and operating educational institutional systems. May be repeated. E

6997 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6998 Specialized Seminar: State School Administration (3) E

6999 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6996 Specialized Seminar: School Plant (3) Theory and practice in planning and operating educational institutional systems. May be repeated. E

6998 Specialized Seminar: State School Administration (3) E

6999 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6190 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice, preparation for further leadership.

6380 Specialized Seminar: School Finance (3) E

6480 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su

6550 State-Federal Relations in Education (2) Pur- poses and functions of federal/administrative educational agencies, organizational control and polit- ical variables. Major education laws and regulations and their application. Non-P policy instruments. F, Su

6580 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su

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6780 Administration of Complex Educational Orga-

6870 Advanced Study in School Finance Planning (3) In-depth experiences in development of educational planning concepts and techniques of leadership in crea-

6900 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice, preparation for further leadership.

6920 Specialized Seminar: School Business Management (3) E

6996 Specialized Seminar: School Plant (3) Theory and practice in planning and operating educational institutional systems. May be repeated. E

6997 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6998 Specialized Seminar: State School Administration (3) E

6999 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6190 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice, preparation for further leadership.

6380 Specialized Seminar: School Finance (3) E

6480 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su

6550 State-Federal Relations in Education (2) Pur- poses and functions of federal/administrative educational agencies, organizational control and polit- ical variables. Major education laws and regulations and their application. Non-P policy instruments. F, Su

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6780 Administration of Complex Educational Orga-

6870 Advanced Study in School Finance Planning (3) In-depth experiences in development of educational planning concepts and techniques of leadership in crea-

6900 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice, preparation for further leadership.

6920 Specialized Seminar: School Business Management (3) E

6996 Specialized Seminar: School Plant (3) Theory and practice in planning and operating educational institutional systems. May be repeated. E

6997 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6998 Specialized Seminar: State School Administration (3) E

6999 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6190 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice, preparation for further leadership.

6380 Specialized Seminar: School Finance (3) E

6480 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su

6550 State-Federal Relations in Education (2) Pur- poses and functions of federal/administrative educational agencies, organizational control and polit- ical variables. Major education laws and regulations and their application. Non-P policy instruments. F, Su

6580 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su

6680 Administration of Complex Educational Orga-

6780 Administration of Complex Educational Orga-

6870 Advanced Study in School Finance Planning (3) In-depth experiences in development of educational planning concepts and techniques of leadership in crea-

6900 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice, preparation for further leadership.

6920 Specialized Seminar: School Business Management (3) E

6996 Specialized Seminar: School Plant (3) Theory and practice in planning and operating educational institutional systems. May be repeated. E

6997 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6998 Specialized Seminar: State School Administration (3) E

6999 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6190 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice, preparation for further leadership.

6380 Specialized Seminar: School Finance (3) E

6480 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su

6550 State-Federal Relations in Education (2) Pur- poses and functions of federal/administrative educational agencies, organizational control and polit- ical variables. Major education laws and regulations and their application. Non-P policy instruments. F, Su

6580 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su

6680 Administration of Complex Educational Orga-

6780 Administration of Complex Educational Orga-

6870 Advanced Study in School Finance Planning (3) In-depth experiences in development of educational planning concepts and techniques of leadership in crea-

6900 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice, preparation for further leadership.

6920 Specialized Seminar: School Business Management (3) E

6996 Specialized Seminar: School Plant (3) Theory and practice in planning and operating educational institutional systems. May be repeated. E

6997 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6998 Specialized Seminar: State School Administration (3) E

6999 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6190 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice, preparation for further leadership.

6380 Specialized Seminar: School Finance (3) E

6480 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su

6550 State-Federal Relations in Education (2) Pur- poses and functions of federal/administrative educational agencies, organizational control and polit- ical variables. Major education laws and regulations and their application. Non-P policy instruments. F, Su

6580 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su

6680 Administration of Complex Educational Orga-

6780 Administration of Complex Educational Orga-

6870 Advanced Study in School Finance Planning (3) In-depth experiences in development of educational planning concepts and techniques of leadership in crea-

6900 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice, preparation for further leadership.

6920 Specialized Seminar: School Business Management (3) E

6996 Specialized Seminar: School Plant (3) Theory and practice in planning and operating educational institutional systems. May be repeated. E

6997 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6998 Specialized Seminar: State School Administration (3) E

6999 Specialized Seminar in Organization and Structure (3) Concepts and theoretical formulations of school administration. W

6190 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice, preparation for further leadership.
The Department of Special Education and Rehabilitation offers graduate programs (thesis and non-thesis options) leading to the Master of Science degree in special education or vocational rehabilitation counseling. These are competency-based programs and experiences to prepare regular, special education, and rehabilitation personnel to work with exceptional persons: children and adults. Specialized courses may be distributed over the several areas of exceptionalism with an emphasis in areas of special interests or needs. Facilities are available for continuous observation and participation in direct relationships with handicapped children and adults who are hospitalized, homebound, or in residential schools, or regular classes.

Course sequences may be planned in special areas to include (1) hearing impaired; (2) gifted; (3) learning disabilities; (4) mentally retarded; (5) multiple disabilities; (6) socially or emotionally disadvantaged; (7) rehabilitation counselor education; (8) disability evaluation of education; (9) general special education and rehabilitation.

Programs lead to the Master of Science degree in Special Education with an emphasis in one of the specialized areas. The Doctor of Philosophy degree with a major in Education includes concentrations and emphases as listed on page 52.

Under the sponsorship of the Office of Special Education and Rehabilitation Services (O.S.E.R.S.), a specialized institute for the preparation of professionals to adapt their skills toward services to hearing impaired and deaf people is provided.

For further information, contact the department head.

EDUCATION OF THE HEARING IMPAIRED


4190 Speech Development of Hearing Impaired (3) Auditory and speech development: auditory-processing in hearing impaired children; Perceptual-training of hearing impaired children. Prereq: Audiology and Speech Pathology 4190. F

4230 Practicum in Speech Development of Hearing Impaired (3) Observation and participation: to observe and participate as a speech therapist. Prereq: Audiology and Speech Pathology 4190. F

4210 Language Development of Hearing Impaired (3) Stages in language development: speech, language, and thought development for hearing impaired children. Prereq: 4190 and consent of instructor. Prereq: Audiology and Speech Pathology 4200. W

4240 Language Development of Hearing Impaired II (3) Techniques necessary for development of formal language is presented. Prereq: 4190 or consent of instructor; admission to Teacher Education. (Same as Audiology and Speech Pathology 4230) F

4320 Communication Processes for the Hearing Impaired (3) Communication processes with retarded by hearing impaired persons: speech and language development, auditory training, speech training, manual language and its relation to other forms of communication. Prereq: Audiology and Speech Pathology 4190. F

4213 Communication Processes for Hearing Impaired II (3) Intermediate course in manual communications skills and techniques with emphasis on vocabulary, grammar, and expressive and receptive language. Prereq: 4320 or consent of instructor. A

4240 Nature of Hearing Impairments (3) Basic principles of audiologic anatomy and physiology: hearing impairments: criteria and causes of hearing loss; methods and instrumentation for assessment of hearing impairment; interpretation of audiograms; selection and use of hearing aids; relation of audiological services to medical and other rehabilitation disciplines. Observations and practicum. F, Sp

4230 Introduction to the Psychology and Education of the Hearing Impaired (3) For those planning to teach of fielding of teaching hard-of-hearing and deaf. Review of history of education of deaf children: social psychology and social adjustment. Prereq: Admission to Teacher Education. W

4871 Practicum with Hearing Impaired Children (1) Observation and supervised practicum. (Students must be admitted to Teacher Education). Prereq: Consent of instructor. E

5220 Linguistics in the Education of the Hearing Impaired (3) Recent research and developments in the field of linguistics related to hearing impaired children. Prereq: 4871. F

5240 Seminar in Language Remediation for the Hearing Impaired (3) Recent developments in speech education methodologies and to research pertaining to language development for the hearing impaired and hearing normal children. Prereq: Consent of instructor. Prereq: 4240. F

5230 Seminar on Emotional Implications of Language Development (3) Recent developments in our understanding of impact of language deficiency on educational program organization of the classroom. Prereq: 5240. F

5200 Seminar on Emotional Implications of Language Development (3) Recent developments in our understanding of the relationship of language development with related educational, community, and social behaviors. To perform in a tutorial capacity. Prereq: Consent of instructor. A

5250 Seminar on Emotional Implications of Language Development (3) Recent developments in our understanding of the relationship of language development with related educational, community, and social behaviors. To perform in a tutorial capacity. Prereq: Consent of instructor. A

5490 Educational and Vocational Guidance of the Hearing Impaired (3) Application of techniques and materials, and teacher-pupil-family relationships, to the guidance of hearing impaired children in regular classrooms. Prereq: Consent of instructor, admission to Teacher Education. A

4630 Reading and Language Development (3) Reading and language development of hearing impaired children in regular classrooms. Prereq: Consent of instructor. A

5950 Educational Problems of the Child with Severe Multiple Disabilities (3) Identification, assessment, planning for educational programs for children with severe multiple disabilities. Prereq: Consent of instructor. A

5960 Educational Administration for the Severely Handicapped (3) Identification, assessment, planning for educational programs for children with severe multiple disabilities. Prereq: Consent of instructor. A

5970 Educational Problems of the Child with Severe Multiple Disabilities (3) Identification, assessment, planning for educational programs for children with severe multiple disabilities. Prereq: Consent of instructor. A

5980 Educational Problems of the Child with Severe Multiple Disabilities (3) Identification, assessment, planning for educational programs for children with severe multiple disabilities. Prereq: Consent of instructor. A
discussion and evaluation of relevant academic curricula and remediation strategies. Prereq: 4140 and 4140 of consent of instructor.

5430 Practicum in Public School Systems Serving Children with Learning and Behavior Problems (6) Academic tutoring in a teacher aide capacity within regular classrooms. Particular emphasis and prac-
tice individualizing in function for learning and behavior problems. Prereq: 4140 or 4140 of con-
tent supervisor's counseling skills. Problem-solving techniques and utilization of alternative modes of counsel-
4230 Introduction to Clinical Practice in Speech Pathology (4) (Same as Audiology and Speech Pathology 4230) F, Sp, Su
4300 Clinical Practice in Speech Pathology (4-6) (Same as Audiology and Speech Pathology 4300) F, Sp, Su
5450 Auditory Rehabilitation:Speechreading and Auditory Training (3) (Same as Audiology and Speech Pathology 4540) Su
4940 Introduction to the Verbal-Textual System (4) (Same as Audiology and Speech Pathology 4940)
5450 Advanced Clinical Practice in Audiology and Speech Practice (2-4) (Same as Audiology and Speech Pathology 5450)
5390 Central Nervous System (4) as Audiology and Speech Pathology 5390
5450 Voice Disorders (3) (Same as Audiology and Speech Pathology 5450)
5440 Voice Disorders (4) (Same as Audiology and Speech Pathology 4400)
5410 Auditory Rehabilitation (4) (Same as Audiology and Speech Pathology 4100)
5400 Voice Disorders (3) (Same as Audiology and Speech Pathology 4000)
4520 Language-Speech Handicapped Child in the Classroom (3) (Same as Audiology and Speech Pathology 4520)
4350-60-70 Problems in the Education of Exceptional Children (3) (Same as Audiology and Speech Pathology 4350)
4220 Introduction to Clinical Practice in Speech Pathology (3) (Same as Audiology and Speech Pathology 4220)
4850 Eye Problems Encountered by the Teacher (3) Eye anatomy and hygiene, common disorders and their treatment, care of special eyes, emotional factors and problems of visual and ophthalmic conditions. W, Su
4390 Vision Disorders (3) (Same as Audiology and Speech Pathology 4390)
4342 Seminar in Communication Disorders in Schools (3-2) (Same as Audiology and Speech Pathology 4342)
4720 Audiology 11 (4) (Same as Audiology and Speech Pathology 4720)
5040 Advanced Clinical Practice in Audiology Study and Practice (1-4) (Same as Audiology and Speech Pathology 5040)
4330 Education of the Exceptional Child (3) Principles, techniques and special needs, local and state programs for diagnosis and care, educational provisions in regular or special classes, home teaching and mental hygiene, and school-vocational guidance.
4300 Professional Aspects of Speech/Language/ Hearing Programs in Schools (3) Organization and administration ofschool program. Other settings, hospitals, institutions, private practice, professional level, legislation, consultation, court appearances. Prereq: 4140, 4140 of consent of instructor. W, Sp, Su
4210 Auditory Rehabilitation: Speechreading and Auditory Training (3) (Same as Audiology and Speech Pathology 4210)
4310 Slowing (5) (Same as Audiology and Speech Pathology 4310)
4250 Practicum in Rehabilitation (3) (Same as Audiology and Speech Pathology 4250) F, Sp, Su
5150-59 Internship in Rehabilitation (5, 9) Vocational, referral, recording, budgeting, and staff of vocational evaluation programs. Effectiveness of supervision, type of equipment, type and number of staff, attention to specialization in disability categories such as mental or emotional retardation, and deaf. F
5141 Diagnostic Vocational Evaluation in Rehabilitation (3) Identification and management of case load of state rehabilitation agencies and private rehabilitation facilities; utilization of industrial rehabilitation programs, modern trends in industrial rehabilitation related to rehabilitation programs, and simulated experiences in work planning, decision making, and case selection. Sp
5129 Psychosocial Aspects of Disability (3) Medical aspects and psychological impact of chronic disabilities; rehabilitation procedures including implications of psychosocial counseling and psychoeducational data of biological and data of image evaluation. W
5141 Prognostic Vocational Evaluation in Rehabilitation (3) Procedures, principles and techniques used to determine and predict work behavior and vocational potential. Includes reassessment under selection and use of occupational exploration programs, work samples, situational tasks, current work experiences, and work experience counseling. Prereq: 5141 of content of instructor, W, Sp
5142 Interpretation of Vocational Evaluation Data in Rehabilitation (3) Procedures, principles, and techniques used in the interpretation of vocational evaluation data to handicapped adults, to referral agency, and to facility staff. Determination of data through the normal staff conference, vocational counseling report writing, and follow-up. Prereq: 5141 and 5142 of content of instructor, W
5144 Development and Supervision of Client Evaluation Procedures (3) Procedures, principles, and techniques used in the interpretation of vocational evaluation data and maintenance of effective vocational evaluation programs. Determining and planning amount of vacant space, type of equipment, number and type of staff, and flow of communication essential to maintenance of vocational evaluation programs. Effective supervi-
sion, recording, budgeting, and utilization of data in vocational evaluation. Prereq: 5141, 5142 and 5143, or consent of instructor. W, Sp, Su
5145-46-47 Practicum in Rehabilitation (3, 3, 3) Supervision in the classroom in the interpretation of vocational evaluation data. Emphasis on application of concepts, principles, and skills acquired in previous or concurrent coursework. Prereq: Con-
tent of instructor. W, Sp, Su
5110 Orientation to Rehabilitation (3) History, philosophy, and legal bases for rehabilitation; vocational, educational, and social aspects of rehabilitation. Prereq: 5144 Development and Supervision of Client Evaluation Procedures (3) or consent of instructor. Su
5700 Vocational Assessment in Disability Evaluation (3) Vocational assessment; resources; rationale for vocational assessment of disability insurance. Emphasis on assessment techniques. Capacity of the individual to perform work in a vocational setting. Prevention and accommodation of disabilities. Prereq: 5141 of instructor, W
5710 Medical Aspects of Disability (2) (Same as Audiology and Speech Pathology 5710) Call the possibility. Vocational assessment: resource allocation. Emphasis on assessment techniques. Capacity of the individual to perform work in a vocational setting. Prevention and accommodation of disabilities. Prereq: 5141 or consent of instructor, W
5740 Disability and Work in Society (2) Relationship of work to social, psychological, and economic environments and to the role of individuals. Process and techniques of vocational evaluation, work adjust-
ment services in rehabilitation. F
5750 Principles and Problems of Disability Evaluation (3) Individual identification and analysis of principles and procedures of disability evaluation process or structures; emphasis on problems of disability evaluation process and structures. Workshop in evaluation program or in disability evaluation or con-
tent of instructor. Sp
5760 Seminar: Functional Capacity Assessment (3) Seminar: functional capacity assessment process or structures; emphasis in rehabilitation process; functional capacity assessment. Prereq: 5710-20 or consent of instructor.
5770 Current Problems in Disability Claims Evaluation (3) Current problems in disability claims evaluation; process in rehabilitation program or in functional capacity assessment. Prereq: 5710-20 or consent of instructor.
5002 Non-Thesis Graduation Completion (3-15) Certification levels, legislation, careers.
providing programs to the Master's degree. Both thesis and non-thesis options are avail-
able. Details regarding the Master's programs of each of the service areas may be obtained from the coordinators of the service areas.

THE SPECIALIST PROGRAM

The Ed.S. degree program is a coopera-
tive undertaking involving all vocational service areas. Options are available in agri-
cultural, business, constructive, home economics, and industrial education and in general vocational technical education.

THE DOCTORAL PROGRAM

The Comprehensive Ed.D. program in Vocational-Technical Education is designed to provide for achieving professional objec-
tives, developing needed competencies, and gaining desirable experiences and under-
standing of vocational-technical areas.

The vocational-technical education doctoral curriculum consists of the following: professional education core, 9 hours; service area, 18 hours; vocational-technical educa-
tion, 18-27 hours; cognate fields, 5-18 hours; research techniques, 15 hours (con-
sult advisor for details); and dissertation, 26 hours. A minimum of 120 hours above the baccalaureate is required.

The Doctor of Philosophy degree with a major in Education includes concentrations and emphases as listed on page 52.

GENERAL

4910 Development and Utilization of Advisory Com-
mittees (3) Craft advisory committees, selection, organization, implementation, and utilization.

4750 Utilization of Instructional Media (3) Same as Curriculum and Instruction 4750 and Library and Infor-
mation Resources 4750.

5000 Thesis (1-15) P/NP only. E

5062 Non-Thesis Graduate Enrollment (3-15) Fee paid by student in any degree program registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5995 Problems in Lieu of Thesis (3) May be repeat-
ed, S/NC only.

5910 History and Organization of Vocational-Technical Education (3) Vocational and technical education in public schools through 1975, legislation, and organization models.


5920 Placement, Follow-up and Evaluation Proce-
dures in Occupational Education (3) Methods and procedures in establishing placement programs, cur-
riculum review.

5930 Organization and Area of Vocational-Technical Education (5) Area and vocational-technical school con-
text; administration and supervision of vocational-
and technical education programs in area schools.

5940 Guidance and Pupil Personnel Services in Edu-
cation (3) Same as Educational Psychology 5046.

5950 Supervision of Vocational-Technical Education (3) Program planning, coordination, instruction, rules and regulations of supervisors.

5955 Vocational School Administration and Man-
agement (3)

5960 Competency Based Vocational Education (3) Introductory, comparative, and practical approach.

5960 Continuing Education in Vocational-Technical Education (3) Importance, objectives, historical devel-

5100 Occupational Program Development for Dis-
advantaged Persons (3) Academic, socioeconomic, cultural and/or other handicaps that prevent individu-
als from succeeding in regular vocational-technical education.

5110 Principles and Objectives of Vocational-
Technical Education (3) Fundamental principles and contemporary objectives.

5131-32 Problems in Vocational-Technical Educa-
tion (1-6, 6, 6) May be repeated. Maximum 9 hrs.

5140 Individual Study in Vocational-Technical Edu-
(3) Must be approved by supervisor of instructional and service area coordinator or department head. Approval form must be filed in office of department head. May be repeated. Maximum 12 hrs.

5150 Microcomputer Operations and Educa-
tional Application (3) Performance of the operation commercial microcomputer, writing, debugging, and running edu-
cation programs. Prereq: Teaching, administrative, or previous experience in schools or special consent of instruction.

5155 Software Design for Microcomputers in Edu-
cation (3) Advanced BASICS software design operating System-CMP, TRSDOS and OS/2, sequential and random IO, analysis and operation of commercial computer applications, and teacher-designed pro-
grams. Prereq: 5130.

5180-89-90 Educational Specialist Research and Thesis (3, 3, 3) Selection, analysis and completion of problem necessitating original investigation, beneficial to investigator and vocational-technical field. P/NP only.

5210 Research and Dissertation (3-15) P/ NP only. E

5210 Curriculum Planning in Vocational-Technical Educa-
tion (3, 3, 3, 3) Must be approved by supervisory instructor. Prereq: 5150, 5155 or equivalent.

5220 Program Planning and Development in Voca-
tional-Technical Education (3) Fundamental principles and technical force work state, local, and institu-
tional education for program planning in secondary, postsecondary, and service area coordinator or department head.

5225 Advanced Methods of Evaluation (2) Research methods and techniques.

5230-31-32 Special Problems in Vocational Educa-
tion (3, 3, 3) May be repeated. Maximum 18 hrs.

5240 Current Literature in Agricultural Education (1-3) May be repeated. Maximum 6 hrs.

525-60 Agricultural Education in Off-Farm Agricultur-
al Occupations (3, 3) Developing occupational experience programs; course planning; teaching pro-
cedures. Prereq: 4350.

5260 Agricultural Education for First-Year Teacher (3) Adjustment to situation in which employed; group meetings in selected centers, and visits by instructor. Prereq: 4350.

5270 Adult Education in Agriculture (3)

5280 Supervised Occupational Experience in Agri-
culture (3) Prerequisite for VOE programs.

5290 Supervised Occupational Experience in Agri-
culture (3) Prerequisite for VOE programs.

5290 Agricultural Education in Off-Farm Agricul-
tural Occupations (3, 3) Developing occupational experience programs; course planning; teaching pro-
cedures. Prereq: 4350.

5270 Adult Education in Agriculture (3)

5280 Supervised Occupational Experience in Agri-
culture (3) Prerequisite for VOE programs.

5290 Agricultural Education in Off-Farm Agricul-
tural Occupations (3, 3) Developing occupational experience programs; course planning; teaching pro-
cedures. Prereq: 4350.

5270 Adult Education in Agriculture (3)

5280 Supervised Occupational Experience in Agri-
culture (3) Prerequisite for VOE programs.

5290 Agricultural Education in Off-Farm Agricul-
tural Occupations (3, 3) Developing occupational experience programs; course planning; teaching pro-
cedures. Prereq: 4350.

5270 Adult Education in Agriculture (3)

5280 Supervised Occupational Experience in Agri-
culture (3) Prerequisite for VOE programs.

5290 Agricultural Education in Off-Farm Agricul-
tural Occupations (3, 3) Developing occupational experience programs; course planning; teaching pro-
cedures. Prereq: 4350.

5270 Adult Education in Agriculture (3)

5280 Supervised Occupational Experience in Agri-
culture (3) Prerequisite for VOE programs.

5290 Agricultural Education in Off-Farm Agricul-
tural Occupations (3, 3) Developing occupational experience programs; course planning; teaching pro-
cedures. Prereq: 4350.
DISTRIBUTIVE EDUCATION


4440 Supervised Distributive Experience (3-6) Minimum 280 hrs experience for each 3-credit hour in approved distributive business; concurrent analytical project. May be repeated. Maximum 9 hrs.

4480 Areas of Distribution (3) Marketing, product or service technology, social skills, basic skills, and distribution as they affect distributive education curriculum in secondary and postsecondary programs.

4500 Organization and Operation of Distributive Education Programs (3) Background and development of distributive education; techniques for reaching curricular objectives in family relationships and career education; major problems in curriculum design, implementation, and evaluation. May be repeated.

4760 Methods and Materials in Distributive Education (3) Prereq: 4460 or consent of instructor.

4820 Cooperative/Practicum (3) Selecting training agencies; job analysis; selecting and testing training supervisors; advisory committees; adult and other community services. Prereq: 4480. 4470.

5410 Administration and Supervision of Distributive Education (3) Operation of distributive education programs and work at city or county supervisor level and school district office level; planning, organizing, and implementing, distributive education programs; supervisory roles; distributive education leadership. Prereq: 5510 or consent of instructor.

5510 Curriculum in Home Economics (3) Development of home economics educational programs; techniques used in evaluation. Prereq: 3662.

5555 Supervision of Home Economics in the Public Schools (3) For teachers with successful experience in vocational home economics preparing for supervisory positions in high schools and junior and senior high schools; home economics methods, principles, policies, and techniques of implementation. Prereq: Undergraduate degree and 3 yrs teaching experience when taken for graduate credit.

5560 Problems in Home Economics (3) Prereq: B.S. in Industrial Education and consent of instructor.

5580 Economics Related Occupational Programs (3) Advanced study in planning, establishing, implementing and evaluating home economics related occupational programs. Prereq: 4509 or consent of instructor.

5592 Home Economics Adult Education (3) Development and administration of community-based home economics programs for adults. Prereq: Consent of instructor.

5595 Supervision of Home Economics in the Public Schools (3) For teachers with successful experience in teaching home economics preparing for supervisory positions in high schools and junior and senior high schools; adult and other community services. Prereq: Consent of instructor.

5596 Employment in Home Economics (3) Underlying philosophy, skills and techniques. Observation and discussion.

5612 Furthering Good Human Relationships in the Classroom (3) Professional ethics, constructive human relations, basic needs of individuals, techniques of understanding, values and social values in developing more effective teacher education programs.

INDUSTRIAL EDUCATION

3310 History and Philosophy of Industrial Education (3) Underlying philosophy; skills and techniques.

3640-41-42 Part-Time Programs in Cooperative Industrial Training (3, 3, 3) Principles of organization, methods, and evaluation.

3820 Shop Organization and Management (3)

3850-61-62 Materials and Methods for Teachers of Shop and Related Subjects (3, 3)

3870 School Shop Safety (3)

4620 Special Topics in Drafting (3) Technical problems in specialized areas of drafting selected for the individual student. Prereq: 6 hrs drafting.

4682 Construction Processes (3) Construction processes of industry and their relationships to technology and the environment. Prereq: 3662.

4690 Manufacturing Processes (3) The manufacturing processes of industry and their relationship to technology and the environment. Prereq: 2650, 2914, 2990, 3601, or consent of instructor.

4710 Materials and Processes (3) Organic and inorganic materials and processes used to produce finished products. Content, curriculum and techniques of laboratory operation. Prereq: Consent of instructor.

4862 Power and Energy (3) Development, control, operation, conversion, transportation of power sources; content, curriculum, and techniques of laboratory operation. Prereq: Consent of Instructor.

4890-91-92 Seminar in Industrial Technical Education (3, 3, 3) Recent trends in the field of industry as related to increased industrial productivity and prosperity, and the training of personnel for this field. Prereq. Graduate degree and 3 yrs teaching experience when taken for graduate credit.


5470 Family Economics Related Occupational Programs (3) Advanced study in planning, establishing, implementing and evaluating family economics related occupational programs. Prereq: 4509 or consent of instructor.


5486 Organization and Development of Vocational Industrial Clubs of America (VICA) (3) To give industrial education leader experienced understanding of organization and operation of VICA. Prereq. Undergraduate degree and 3 yrs teaching experience when taken for graduate credit.

5540-41-45 New Developments in Industrial Education (3, 3, 3) Problems, pressing problems, and recent trends in field of industrial education as presented by a coordinating instructor in conjunction with knowledgeable resource personnel.

5611-12 Administration and Supervision of Indus- trial Education (3, 3, 3) Principles of vocational education; trends on general education and trade and Labor organizations; administering and supervising schools and classes under federal vocational education acts.

5630-31-32 Special Problems in Industrial Education (3, 3, 3) Review of the special problems of the industrial educator.

5640 Methods of Research in Industrial Education (3)

5650 Improving Teachers in Service (3) Problems of coordination in part-time and apprenticeship training.

5660 Advisory Committees and Apprenticeship Training (3)

5890 Advanced Methods of Teaching Skills and Technical Information (3) Proper selection and effective application of contemporary methods and techniques in teaching of specialized skills and technical related information.

5900-91-92 Seminar in Industrial Technical Education (3, 3, 3) Responsibilities of industrial technician andVocational Education Preparing for the industrial technician.

5920 School of Health, Physical Education, and Recreation

Margie M. Phillips, Director

Graduate programs are available to students preparing for (1) teaching and (2) teaching positions in colleges, high schools and elementary schools; (2) administrative and supervisory work in athletics, health education, physical education, public health, and recreation; (3) recreation specialist positions in various public, voluntary, private and commercial agencies and institutions; (4) public health positions in community health education, health planning and administration, and environmental health, and (5) safety education and service positions.

THE MASTER'S PROGRAM

Four programs leading to the Master of Science degree are available: Physical Education, Recreation, Safety Education and Service, and School Health Education. Students preparing for these programs leading to the Master of Public Health are also available in community health education, health planning, administration, and occupational/ environmental health and safety.

THE SPECIALIST PROGRAM

A Specialist in Education degree with a major in Safety Education and Service is available.
THE MASTER'S PROGRAM
The Doctor of Education degree is offered in Health Education and in Physical Education. See further description under Health Education and Physical Education.

The Doctor of Philosophy degree with a major in Education includes concentrations and emphases as listed on page 52.

GRADUATE ASSISTANTS
A variety of graduate assistantships are offered in health education, physical education, public health, safety education, and recreation to qualified women and men who are graduates of accredited colleges or universities. These assistantships are open to students in the Master's and doctoral programs.

Assistantships are made available by local schools, agencies, and the School of Health, Physical Education, and Recreation in return for part-time services rendered. The services may consist of teaching health, physical education, public health, safety classes and recreation classes, leading recreational activities, supervising public health or recreation field work students, and/or directing or helping to manage extracurricular programs. Students interested in these opportunities should file their applications before February 1. Letters should be addressed to: The School of Health, Physical Education, and Recreation, The University of Tennessee, Knoxville, Tennessee 37996-2700.

MAJORS

Health Education

School of Health, Physical Education, and Recreation/College of Education

DOCTORAL PROGRAM

The Doctor of Philosophy degree with a major in Education includes concentrations and emphases as listed on page 52.

Non-Thesis Option:

Major Research (5000-level courses in research statistics, or computer programming) 27

Collateral General electives 3

Total 45

Total The Special Program

The Educational Specialist degree requires 45 hours beyond the Master's degree.

Major Research (5330 plus minimum of 3 hours in statistics) 21

Collateral Internship and Research (6010-20-30) 6

Total 45

THE DOCTOR OF EDUCATION PROGRAM

Foundations Research Behavioral Sciences 9

Education Health Block 24

Public Health Education 12

Disability Education 18

Total 120

Health

3000 Foundation of Health Science (3) Personal health/wellness and contemporary health problems: mood modifying products, consumer health, international health.

3210 First Aid and Emergency Care (4) Theory and practice, medical assistance, Heartsaver First Aid Certification and First Aid Care. (Applicant must be at least 18 years of age for certification.)


3430 School Health Services (2) Development, maintenance, and protection of health of students including examination, screening, special services, communicable disease control, emergency care, and school health records. 

3510 The School in Community Health (3) Role of public health, health education, and study of innovative K-12 health curricula.

3610 Methods in Elementary Health Instruction (3) Principles and methods of teaching health in grades K-6, including use of educational materials and new technology.

3620 Methods in Secondary Health Instruction (3) Principles and methods of teaching health in grades 7-12, including the use of educational materials and new technology.

3630 Methods in Community Health (3) Principles and methods of teaching health in community settings, including the use of educational materials and new technology.

3640 Methods in Basic Health Education (3) Principles and methods of teaching health in basic health education settings, including the use of educational materials and new technology.

4000 Health Block

Behavioral Sciences 24

Public Health Education 12

Disability Education 18

Total 120

Health and Safety

4120 Suicide and School Violence Intervention (3) Emphasis on factors which make suicide a serious health problem. Instructional and educational interventions.

4140 Death, Dying and Bereavement (3) Theories of death and dying. Education and other programs to mitigate trauma of death and dying.

4180 Consumer Health and Safety Education (3) Major consumer health and safety problems; selecting, pur- chasing, and using good health and safety aids. 

4193 Advanced First Aid and Emergency Care (3) Emphasis on factors which make suicide a serious health problem. Instructional and educational interventions.

4190 Psychological Resuscitation (3) Theories and skills to implement basic cardiac life support following cardiac arrest due to heart attack, drowning, electrocution, suffocation, poisoning, drug intoxication, vehicular and other accidents. Educational and preventive aspects of controlling cardiorespiratory disease.

4200 Drug Abuse Education (3) Problems and solutions, psychopharmacology of drugs and effects on society and methods of drug abuse education.

4500 Women's Health (3) Factors influencing women's health and women as consumers of nation's health service delivery systems.

5000-15-20 Field Practice in Health Education (3-5, 4-6, 3-5) Off-campus health education internship or field practice in educational or other agency with qualified professional.

4710 Special Topics (2-4) For advanced students, teaching, school administrations, nursing, and other health care professionals. May be repeated.

5000 Thesis (1-15) P/NP only.

Note: Thesis Graduation Completion (3-15) Required for the non-thesis student. The thesis may be taken during any quarter for which the student is enrolled. A student is permitted to register and complete only one thesis. The thesis degree is completed. May not be used toward degree requirements. May be repeated. S/U only.

5010 Problems and Practices in Health Education (3) Comprehensive study and analysis of health, physical education, and recreation programs involving safety, illness, chronic diseases, and other factors which influence health and health education.

5020 Education and Human Sexuality (3) Analysis and explanation of theory, methods and materials for planning, organizing and teaching sex education and human sexuality in schools and other community settings.

5100 Curriculum Construction in Health Education (3) Analysis of health instruction curricula. Planning and development of health education curricula.


5600 Health Education Program Evaluation (3) Methodological and practical work covering how, what, when and how much to develop and implement health education surveys in schools and other agencies and program evaluations.

5610 Organization and Administration of Health Educa- tion (3) Principles, practices and procedures of administrative management of health education programs and agencies.

5620 Social Problems and the Health Professional (2-4) Designed for graduate students, inservice teachers and other health professionals.

4120 Alcoholism and Alcohol Education (3) Emphasis on factors which make alcoholism a serious health and safety problem. Instructional and educational interventions.

4140 Death, Dying and Bereavement (3) Theories of death and dying. Education and other programs to mitigate trauma of death and dying.

4180 Consumer Health and Safety Education (3) Major consumer health and safety problems; selecting, pur- chasing, and using good health and safety aids. 

4193 Advanced First Aid and Emergency Care (3) Emphasis on factors which make suicide a serious health problem. Instructional and educational interventions.

4190 Psychological Resuscitation (3) Theories and skills to implement basic cardiac life support following cardiac arrest due to heart attack, drowning, electrocution, suffocation, poisoning, drug intoxication, vehicular and other accidents. Educational and preventive aspects of controlling cardiorespiratory disease.

4200 Drug Abuse Education (3) Problems and solutions, psychopharmacology of drugs and effects on society and methods of drug abuse education.

4500 Women's Health (3) Factors influencing women's health and women as consumers of nation's health service delivery systems.

5000-15-20 Field Practice in Health Education (3-5, 4-6, 3-5) Off-campus health education internship or field practice in educational or other agency with qualified professional.

4710 Special Topics (2-4) For advanced students, teaching, school administrations, nursing, and other health care professionals. May be repeated.

5000 Thesis (1-15) P/NP only.

Note: Thesis Graduation Completion (3-15) Required for the non-thesis student. The thesis may be taken during any quarter for which the student is enrolled. A student is permitted to register and complete only one thesis. The thesis degree is completed. May not be used toward degree requirements. May be repeated. S/U only.

5010 Problems and Practices in Health Education (3) Comprehensive study and analysis of health, physical education, and recreation programs involving safety, illness, chronic diseases, and other factors which influence health and health education.

5020 Education and Human Sexuality (3) Analysis and explanation of theory, methods and materials for planning, organizing and teaching sex education and human sexuality in schools and other community settings.

5100 Curriculum Construction in Health Education (3) Analysis of health instruction curricula. Planning and development of health education curricula.


5600 Health Education Program Evaluation (3) Methodological and practical work covering how, what, when and how much to develop and implement health education surveys in schools and other agencies and program evaluations.

5610 Organization and Administration of Health Educa- tion (3) Principles, practices and procedures of administrative management of health education programs and agencies.

5620 Social Problems and the Health Professional (2-4) Designed for graduate students, inservice teachers and other health professionals.
programs including administrative, instructional, and supervision. Designed especially to explore special health problems in a concentrated period of time. Su

5810 Directed Independent Studies (1-3) Individual investigation of special problems. Specific proposal to instructor before registration may be required. Replaces 5870.

6000 Doctoral Research and Dissertation (2-15) P/NP only. E

6030 Critical Analysis of Writing and Research in Education (3) F

6050-60 Seminar in Health Education (3, 6) W, Sp

6210 Health Aspects of Genetology (3) Biological, psychological, and sociological aspects of health to individual to health of individual. (Same as Public Health 6210.)

6230 Seminar on the Nation's Health (3) Comprehensive overview of status of America's health. (Same as Public Health 6220.)

6230 International Health (3) Status of health in countries throughout the world. (Same as Public Health 6230.)

Safety

5320 Principles of General Safety (3) Deals with principles, practices, and procedures in general safety. Covers safety problems in school, traffic, recreation, industry, home, and other public areas. E

5010-30-50 Problems in Safety (1-3, 1-3, 1-3) Individual identification and study of current problems in safety. E

4410 Driver and Traffic Safety Education (5) Preparation and training of drivers in education and practice of safe driving techniques at least once a year. Valid driver's license required. 3 hrs and 2 hrs. E


4400 Sports Safety (3) Accident prevention and injury control in sports activities; philosophy of sports safety, human-environmental factors and interrelationships in sports injuries and control; risk-taking and decision making strategies; and contributions of sports medicine to safety. 3 hrs and 2 hrs. Sp

4720 Workshop in Safety (5-8) Deals with special safety problems and techniques, individual projects, organizational problems, and administrations. May be repeated. Su

5700 Thesis (1-15) P/NP only. E

5002 Non-Thesis Graduation Completion (3-15) Allows the student opportunities for engaging in field experience so that a significant problem in that experience will be identified, researched, and reported on in acceptable form. E

Division of Physical Education

Major DEGREES

Physical Education


The Physical Education Division offers the Master of Science degree in Physical Education and the non-thesis programs. Both 45-hour programs require a minimum of 27 credit hours of required courses in Physical Education including thesis credits thesis. The master's degree in Physical Education requires an internship credit.

Doctor of Education degree in Physical Education with concentrations in exercise physiology, motor behavior, adaptive physical education, and philosophical and sociological foundations. The Doctor of Philosophy degree with a major in Education includes concentrations arranged as listed in page 52. 3000- and 4000-level courses require a different level of performance for those registered for graduate credit. E

4005 Advanced Ballet Technique (3) Studies and methods of advanced ballet technique with emphasis on multiple pirouettes, ballet, repertory and advanced ballet work. prereq 4000. Available to dance majors and minors or with consent of instructor. May be repeated. Maximum 6 hrs.

4010 Advanced Modern Technique (3) Development of style and technique in modern dance vocabulary, emphasis on advanced sophistication and precision of dance vocabulary, and on discipline of mature technique. Prereq: 3000. Available to dance majors and minors or with consent of instructor. F

4020 Position in Dance Production (2) Consent of instructor. W, A

5080 Rhythmic Analysis (2) Nature and principles of music, rhythm, and rhythmic notation with emphasis on correlation with dance movement and composition. Prereq: Consent of instructor. W, A

4500 Advanced Composition (4) Application of compositional, production and administrative skills culminating in presentation of two complete choreographic works. Prereq: 3002, 4220. A

4300 History of Dance I (3) Survey of dance of various societies and cultures from pre-history through renaissance. E

4300 History of Dance II (3) Survey of dance of dance in theatre, recreation, and education during twelfth century. F

4110 Adapted Physical Education (3) Classification of physical students who require modified programs of instruction and evaluation. Emphasis is directed to the development of equipment and program strategies compatible for special physical education programs. E

4150 Adaptive Physical Education Laboratory (3-15) Practicum, student teaching, supplementing 4110. W

4140 Measurement and Evaluation in Physical Education (3) Relationship of measurement and evaluation in physical education and administration of knowledge and skills in choreography, practical physical times, sports skills and knowledge. W, Sp, Su

4150 The Teaching of Creative Dance (3) Theory, methods, materials, and practical experience in presentation and integration of creative dance in grades K-6. A

5720 Readings in Physical Education (3) Principles and practical application in minor teaching experience. Prereq: Upperdivision or graduate standing and consent of instructor.

5400 Movement Notation (3) Fundamentals with emphasis on notation and recording of creative movement studies. Sp, A

5000 Thesis (1-15) P/NP only. E

5002 Non-Thesis Graduation Completion (3-15) Allows the student opportunities for engaging in field experience so that a significant problem in that experience will be identified, researched, and reported on in acceptable form. E

5130 Methods in Physical Education (3) Characteristic of different school age levels, and applications of learning procedures in physical activities at these levels. E

5140 Advanced Philosophy of Sport (3) Critical examination of metaphysical and historiographic assumptions concerning metaphysical, epistemological, and axiological status of sport. Prereq: Consent of instructor. W

5150 SystematicPhilosophical Analysis of Sport (3) Critical examination of most comprehensible, systematic, and revealing accounts of metaphysical, epistemological, and axiological status of sport. Prereq: 5140 or consent of instructor. Sp

5220 Readings in Physical Education (3) Comprehensive review of literature in physical education and related areas. E

5230 Motor Behavior, A Theoretical Perspective (4) Motor behavior from information processing perspective and current research to support theoretical base. Emphasis is directed to general psychology or consent of instructor.

5290 Motor Behavior Laboratory (2) Beginning experience in teaching and evaluation of movement factors related to or affecting motor learning/ performance. Prereq: 5210, 4420, and 5320 or consent of instructor.
Division of Public Health

MAJOR

Public Health

M.P.H.

Professors:

C. B. Randolph (Chairperson), Dr. P. H. Oklahoma; V. W. Pressly, Ph.D. Tennessee.

Lecturers:


Assistant Professor:

J. Waller, Ed.D. Colorado State.

Graduate study with a major in Public Health leads to the Master of Public Health (M.P.H.) degree. Three professional preparation tracks are available: Environmental Health, Health Administration, and Occupational and Environmental Safety.

Admission Requirements:

A statement of the applicant’s educational and career goals including a description of the student’s interest in public health are required.

Financial aid is available to students through the Office of Financial Aid.

Special/Psychological Dimensions of Physical Activity (3) Examination of social and psychological factors affecting physical activity with emphasis on research. Prerequisite: Psychology 3130.

5900 Graduate Seminar in Public Health (1-2) (Same as Public Health 5000, Nursing 5000, Nutrition and Food Science 5150, and Social Work 5030.) S, NC only.

5910 Directed Independent Study (1-3) Independent study and research in special areas within the field of public health education and administration. Prerequisite: Consent of instructor. May be repeated. Maximum 15 hrs. May be taken for letter grade or S/NC.

6000 Doctoral Research and Dissertation (1-18) P, NC only.

6110 Seminar in Public Health (1) Research topics in literature related to public health education. May be repeated with consent of instructor. NC only. E.

6230 Directed Independent Study (3-4) Initiate and conduct research study. Prerequisite: Doctoral student or consent of instructor. May be repeated. Maximum 9 hrs. May be taken for letter grade or S/NC.

6330 Advanced Motor Behavior (3) Theoretical/Issues of contemporary significance in human motor behavior. Prerequisite: PSY 5340 or consent of instructor.

6410 Practicum in Kinesiology (Electroencephalography and the analysis of sports skills. Prerequisite: PSY 5300, 5500 and Physics 2210 or equivalent. May be repeated with consent of instructor. S, NC only.

6510-20 Issues and Problems in Physical Education (3, 3) Critical examination and evaluation of current issues and problems in physical education. W.

6110 Seminar in Applied Physiology (3) Prerequisite: Consent of instructor. S, NC only.

6530 Research Participation in Applied Physiology (3) Advanced research techniques under supervision of faculty member whose research area coincides with interests of student. Prerequisite: Consent of instructor. S, NC only.

5100 Practicum (1-3) Internship in areas of special interest. May be repeated. Maximum 9 hrs. May be taken for letter grade or S/NC.

Division of Public Health

MAJOR

Public Health

M.P.H.

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5910 Directed Independent Study (1-3) Independent study and research in special areas within the field of public health education and administration. Prerequisite: Consent of instructor. May be repeated. Maximum 15 hrs. May be taken for letter grade or S/NC.

6000 Doctoral Research and Dissertation (1-18) P, NC only.

6110 Seminar in Public Health (1) Research topics in literature related to public health education. May be repeated with consent of instructor. NC only. E.

6230 Directed Independent Study (3-4) Initiate and conduct research study. Prerequisite: Doctoral student or consent of instructor. May be repeated. Maximum 9 hrs. May be taken for letter grade or S/NC.

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6410 Practicum in Kinesiology (Electroencephalography and the analysis of sports skills. Prerequisite: PSY 5300, 5500 and Physics 2210 or equivalent. May be repeated with consent of instructor. S, NC only.

6510-20 Issues and Problems in Physical Education (3, 3) Critical examination and evaluation of current issues and problems in physical education. W.

6110 Seminar in Applied Physiology (3) Prerequisite: Consent of instructor. S, NC only.

6530 Research Participation in Applied Physiology (3) Advanced research techniques under supervision of faculty member whose research area coincides with interests of student. Prerequisite: Consent of instructor. S, NC only.

5100 Practicum (1-3) Internship in areas of special interest. May be repeated. Maximum 9 hrs. May be taken for letter grade or S/NC.

Division of Public Health

MAJOR

Public Health

M.P.H.

Professors:

C. B. Randolph (Chairperson), Dr. P. H. Oklahoma; V. W. Pressly, Ph.D. Tennessee.

Lecturers:


Assistant Professor:

J. Waller, Ed.D. Colorado State.

Graduate study with a major in Public Health leads to the Master of Public Health (M.P.H.) degree. Three professional preparation tracks are available: Environmental Health, Health Administration, and Occupational and Environmental Safety.

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6000 Doctoral Research and Dissertation (1-18) P, NC only.

6110 Seminar in Public Health (1) Research topics in literature related to public health education. May be repeated with consent of instructor. NC only. E.

6230 Directed Independent Study (3-4) Initiate and conduct research study. Prerequisite: Doctoral student or consent of instructor. May be repeated. Maximum 9 hrs. May be taken for letter grade or S/NC.

6330 Advanced Motor Behavior (3) Theoretical/Issues of contemporary significance in human motor behavior. Prerequisite: PSY 5340 or consent of instructor.

6410 Practicum in Kinesiology (Electroencephalography and the analysis of sports skills. Prerequisite: PSY 5300, 5500 and Physics 2210 or equivalent. May be repeated with consent of instructor. S, NC only.

6510-20 Issues and Problems in Physical Education (3, 3) Critical examination and evaluation of current issues and problems in physical education. W.

6110 Seminar in Applied Physiology (3) Prerequisite: Consent of instructor. S, NC only.

6530 Research Participation in Applied Physiology (3) Advanced research techniques under supervision of faculty member whose research area coincides with interests of student. Prerequisite: Consent of instructor. S, NC only.

5100 Practicum (1-3) Internship in areas of special interest. May be repeated. Maximum 9 hrs. May be taken for letter grade or S/NC.
Division of Recreation

Major: Degree

Recreation

Professor: J. Z. Haynie, (Chairperson) Ph.D. North Texas State

Associate Professor: A. L. Ansko, Ph.D. Indiana

Assistant Professor: M. D. Bianco, Ph.D. Indiana

The Recreation Division offers the Master of Science degree in Recreation (thesis and non-thesis programs) with concentrations in general recreation, recreation administration, and therapeutic recreation.

4120 Recreation Administration (3) Introduction to recreation administration, including planning, person

nel, areas and facilities, program services, finances, and public relations. Prereq: 3140, 3350, 3880, or consent of instructor. F

4200 Survey of Recreation for Special Populations (3) Responsibility of recreation profession to minority groups whose basic needs and opportunities may require special servicing. Prereq: 3140, 3200, 3880, or consent of instructor. F

4310 Camp Administration (3) Program planning and organization, personnel management, camp site development and maintenance, camp operation for administrators and supervisors. W

4600 Specialized Study in a Selected Area of Recreation (1-9) Comprehensive study in a selected specialized area within the broad field of recreation. For recreation students only. Prereq: Consent of instructor. May be repeated with consent of division. Maximum 9 hrs. E

5000 Thesis (1-15) P/N only. E

5200 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E

5210 Interpretations of Leisure (3) Concepts of leisure including social, psychological, cultural, and philosophical normative uses of leisure. Prereq: 3140 or consent of instructor. F

5410 Leisure Service Delivery Systems (3) Various systems-public private and commercial-involved in promotion of leisure services for communities at large. Prereq: Consent of instructor. F

5420 Current Issues in Recreation (3) Identification and consideration of broad issues-social, environmental, ethical-which currently have greatest impact on use of leisure and implications for recreation administration. Prereq: Consent of instructor. Sp

5440 Problems and Project in Recreation (1-9) Independent research on problem of special significance to student. May be repeated. Maximum 9 hrs. E

5610 Implementation of Recreation Services for the Ill or Disabled (3) Policies and guidelines for organizing and operating programs of recreation for the disabled. Prereq: Consent of instructor. Sp

5640 Occupational Health Unit (3) Role of recreation in the health of patients, in health planning and development. Prereq: Consent of instructor. F

5650 Health Facilities Administration (3-5) Development and administration of hospital recreation programs. Prereq: 3200, 3880, or consent of instructor. W

5660 Health Services Administration (3-5) F

5680 Physical Activity and Health (3) Same as Physical Education 5680

5700 Health and Medical Care Legislation and Law (3-5) Cu

5705-10-15 Advanced Professional Health Education (3-5) Same as Nursing 5705-10-15 Advanced Professional Health Education (3-5) Theory and practice in selected areas. F, W, Sp

5730 Occupational Health and Safety (3) Same as Health 5730

5740 Management and Operation of Recreation Facilities (3-5) Comprehensive study in selected area of recreation, including planning, person
College of Engineering

W. T. Synder, Dean
W. K. Stair, Associate Dean
W. A. Miller, Associate Dean

Graduate degree programs of the College of Engineering provide opportunities for advanced study leading to the Master of Science degree, the Master of Engineering degree, and the Doctor of Philosophy degree. For a listing, consult majors and degrees available on page 7.

OFF-CAMPUS GRADUATE INSTRUCTION BY VIDEO TAPE

Since 1986, the College of Engineering has made use of electronic communication techniques to reach students beyond the confines of Knoxville classrooms. These remotely-taught classes make the specialized talents of engineering college faculty available to students at off-campus centers and industrial sites. This effort makes use of videotapes prepared from a regular on-campus class in specially-equipped classrooms. The tapes contain a visual and audible record of a professor's lecture and discussions with the on-campus classes and are played back at remote locations. Telephone contact is established periodically between the professor and the off-campus class to allow full discussion and questions. Occasional visits by the professor are made to each remote class and students visit the Knoxville campus at selected times.

Graduate courses have been offered to students at other campuses and established centers of the UT System (Chattanooga, Kingsport, Martin, Nashville, and Tullahoma). Graduate courses have also been made available to engineers in industrial plants. Such courses are offered to students using classroom facilities at Jackson State and Columbia State Community Colleges.

The remotely-taught courses offered by UT carry full graduate credit toward the Master's degree under authorization of the regional accrediting agency, the Southern Association of Colleges and Schools.

YEAR-IN-JAPAN M.S. PROGRAM

This is a unique program allowing American engineering students to develop some understanding, both scientific and cultural, of Japan. It allows an M.S. candidate to obtain a degree from UTK while carrying out research at a Japanese university. The program requires approximately two years, one year being spent in Japan and the remaining period being spent at UTK to fulfill the course requirements and to write the thesis or project report, as appropriate to the particular department. The program is administered in the framework of each department's regular graduate program except that the research is done in Japan.

Although the language of communication in Japan would be English, cultural understanding is one of the important objectives of the program and as such a participant would be asked to begin Japanese language study. At the option of the department, up to 6 hours of graduate credit may be allowed for language study, either at UTK or in Japan.

Financial support for living expenses in Japan and for the roundtrip transportation can usually be arranged through fellowships from the Japanese Ministry of Education.

Engineering Experiment Station

W. K. Stair, Director

The Station is organized to conduct investigations in fundamental engineering sciences and to aid in the development of the state's resources and industries so far as funds available will permit.

The Station may also make special arrangements with any person or company to study any technical question within the capacity of its resources, and to report the results to the company requesting the study. In such cases, the entire expense will be carried by the parties requesting the investigation.

W. T. Synder, Dean
W. K. Stair, Associate Dean
W. A. Miller, Associate Dean

Departments of Instruction

Chemical, Metallurgical and Polymer Engineering

MAJORS

Chemical Engineering  M.S., Ph.D.
Metallurgical Engineering  M.S., Ph.D.
Polymer Engineering  M.S., Ph.D.

Professors:
D. C. Bogus, Ph.D., Delaware; B. S. Bone, Ph.D., Massachusetts Institute of Technology; C. R. Brooks, Ph.D., Tennessee; E. S. Clark, Ph.D., California (Berkeley); L. W. Crawford, Ph.D., Cincinnati; O. C. Culpepper, (Emeritus), Ph.D., Tennessee; J. R. Fellers, Ph.D., Akron; D. E. Frazier, Ph.D., Tennessee; G. M. Hsu, Ph.D., Wisconsin; W. C. Johnson (Emeritus), B. Eng., Yale; C. D. Lomnitz, Ph.D., Brown (Polytechnic); C. J. Marthins, Ph.D., Kentucky; C. F. Moore, Ph.D., Louisiana State; B. F. Ohlen, Ph.D., Pennsylvania State; J. C. Parang (Associate Head), Ph.D., Tennessee; E. S. Perona (Associate Head), Ph.D., Tennessee; E. S. Perona (Emeritus), Ph.D., Tennessee; C. O. Thomas, Ph.D., Tennessee; R. A. Vannin, Ph.D., Brown Institute of Technology; J. S. Watton, Ph.D., Tennessee; J. L. White, Ph.D., Delaware; M. A. Wright, Ph.D., Tennessee.

Associate Professors:
W. T. Beeler, Ph.D., Illinois; D. B. Burns, Ph.D., Houston; A. J. Pedrosa, Ph.D., National University (Argentina);

Assistant Professor:
F. Winter, Ph.D., Minnesota.

Lecturers:

*Space Institute, Tullahoma.

Graduate programs lead to the degrees of Master of Science and Doctor of Philosophy.
in Chemical Engineering with concentrations in chemical bioengineering, advanced control systems, and polymer science and engineering, in Metallurgical Engineering, and in Polymer Engineering.

The MASTER’S PROGRAM
Minimum departmental requirements include the satisfactory completion of:

1. A major consisting of 18 to 27 quarter hours of graduate courses in chemical engineering, metallurgical engineering, or polymer engineering. The polymer engineering major must include Polymer Engineering 5110, 5230, 5310, 5410, and 5120.1
2. One or two minors of related material, 9 to 18 hours total in engineering, chemistry, mathematics, physics, or other related fields.
4. Active participation in graduate seminars in the department. Resident students must register for the appropriate 5010 every quarter offered.
5. Final examination covering thesis, related fields, and graduate course work.

THE DOCTORAL PROGRAM
Students applying for entrance into the doctoral program must display concrete evidence of ability to perform and report independent research to the satisfaction of the department. The Master’s thesis may be offered as such evidence.

Departmental requirements consist essentially of the satisfactory completion of:

1. Graduate courses in chemical engineering, metallurgical engineering, or polymer engineering, in departmental courses totaling at least 36 quarter hours, at least 12 of which must be in 6000 series courses. The polymer engineering major must include Polymer Engineering 5110, 5230, 5310, 5410, and 5120.
2. Supporting courses in related scientific and engineering fields amounting to approximately 36 quarter hours, subject to approval by the student’s faculty committee. These related fields will normally include chemistry, mathematics, physics, and other related fields.
3. The comprehensive examination, usually given in two parts, and covering such materials as chemical, metallurgical, and polymer engineering operations and processes, thermodynamics, technology, mathematics, physics, chemistry, and other related fields.
4. Active participation in graduate seminars conducted by the department. Resident students must register for the appropriate 5010 every quarter offered.
5. Reading ability, by means of a written examination, in one foreign language of technical or commercial significance. Language must be selected from the following list, which is not intended to be comprehensive and may be amended from time to time by vote of the departmental faculty. Chinese, French, German, Japanese, Korean, Russian, Spanish, and Arabic. Foreign students whose native language is one of those on the exam list will not be required to take an examination.

PROGRAM AREAS IN METALLURGICAL ENGINEERING
The metallurgical engineering program is flexible and strongly oriented to industry. Students may be admitted by the department to any of the graduate programs in this field. Students should consult metallurgical engineering faculty concerning development of individual special programs compatible with their backgrounds. Areas of specialization within the program may be physical metallurgy of structure-property relations, chemical thermodynamics, corrosion, weld- ing, metalurgy and materials science, solidification, microscopy (electron and optical), chemical process mettalurgy, failure analysis, mechanical behavior of materials and structure analysis.

UTK-JAPAN COOPERATIVE PROGRAM IN POLYMER ENGINEERING
The UTK-Japan Program provides a means for Japanese research professors to teach part-time in the graduate program, and provides a joint Japanese-UTK program for the admission of Japanese students into the polymer engineering graduate program. A committee of faculty from Japanese universities makes recommendations for students and a UTK committee acts on them.

PROGRAM OPTIONS IN POLYMER SCIENCE AND ENGINEERING
M.S. and Ph.D. degrees with specialization in polymer science and engineering are possible through the Polymer Science and Engineering department (through chemical or metallurgical education). A concentration in polymer science and engineering must be chosen, and a second in a joint program with the Chemistry Department having a chemical emphasis. The specialization program in the department faculty concerning development of individual special programs compatible with their backgrounds. Areas of specialization within the program may be physical metallurgy of structure-property relations, chemical thermodynamics, corrosion, welding, metalurgy and materials science, solidification, microscopy (electron and optical), chemical process mettalurgy, failure analysis, mechanical behavior of materials and structure analysis.

M.S. and Ph.D. degrees with specialization in polymer science and engineering are possible through the Polymer Science and Engineering department (through chemical or metallurgical education). A concentration in polymer science and engineering must be chosen, and a second in a joint program with the Chemistry Department having a chemical emphasis. The specialization program in the department faculty concerning development of individual special programs compatible with their backgrounds. Areas of specialization within the program may be physical metallurgy of structure-property relations, chemical thermodynamics, corrosion, welding, metalurgy and materials science, solidification, microscopy (electron and optical), chemical process mettalurgy, failure analysis, mechanical behavior of materials and structure analysis.

Hydrocarbon Processing (3) Study of special processes and procedures for conversion of fossil fuel raw materials into products, including fractionation of products and process design; unconstrained optimization, equality constrained optimization, inequality constrained optimization, and dynamic programming. Prerequisites: Mathematics 2840.

Process Design and Economic Analysis (3) Development of process information into integrated whole. Product characterization, processing economics, capital investment, operating costs and economic merit. Prerequisite: 4410, 4430.

Special Problems in Design and Economics (4) Extension of 4420 for participation in the American Institute of Chemical Engineers annual conference and other advanced design projects. Prerequisite: 4420.

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Hydrocarbon Processing (3) Study of special processes and procedures for conversion of fossil fuel raw materials into products, including fractionation of products and process design; unconstrained optimization, equality constrained optimization, inequality constrained optimization, and dynamic programming. Prerequisites: Mathematics 2840.
5460 Fluid-Solid Operations (3) Heat and mass transfer in fluid and solid bed: applications include distillation, on exchange crystallization. Prereq: 3440-50.

5493 Advanced Process Dynamics, Simulation and Control (3) Development of process models, experiment design, both for simulation and control processes and control strategies, and analog virtual digital process control. Design, analysis, and application of intelligent control and control-performance exobiology systems. Discussion of Volterra's equation and biological cycles. Prereq: Consent of instructor.

5470 Introduction to Transport Phenomena in Biological Systems (3) Application of principles of transport phenomena to biological systems. Transfer of chemically reacting systems and biological systems. Prereq: Consent of instructor.
Methods to metals and metallurgical reactions. Relation of theory and experiment to structure of liquid and solid solutions, and alloy systems.

6000 Doctoral Research and Dissertation (1-15) P/NP only. E

6100-30-30 Theoretical Metallurgy (3, 3, 3) Phases of solid state physics applicable to metallurgy; stasis, introductive chapter, theory; specific heats, electron theory, electrical and thermal conductivity, magnetic properties, theory of alloy formation. Prereq: 4610 or Physics 3770. Mathematics 4550 and consent of instructor.

6100-70 Phase Transformations I and II (3, 3, 3) Continuation of 5150 with emphasis on more advanced theoretical formulations of nucleation and growth theories. Models and experimental observations relating to martensitic and transformation shapes and memory phenomenon. Prereq: 5150. 6 hrs.

6120-30 Solidification and Growth of Crystals I and II (3, 3, 3) Fundamentals of solidification; growth, nucleation, and morphology; supersaturation, kinetic, thermodynamic, and kinetic analysis of liquid to solid transition, multiphase solidification, epitaxy, nonequilibrium state dendrite phenomena, some nucleation processes. Prereq: 5130.

6150-30 Advanced X-ray Diffraction I and II (3, 3) Generalized crystal structure determination; thermal motion; lattice faults, diffuseness scattering. Prereq: 5560.

5900 Special Topics in Metallurgical Engineering (3) Developments in the science and technology of metals and alloys. May be repeated. Maximum 9 hrs.

Polymer Engineering

4910 Applied Polymer Science (3) First course in the physical properties of polymers. Polymer structure, crystalline and glass transitions, physical properties of amorphous and crystalline polymers, crystallographic methods, order-disorder transformations, and applications to discontinuous in heterogeneous phase transformations. Overall transformations kinetics. Applications to discontinuous precipitation, austenite decomposition and recrystallization.

5120-20-30 Welding Metallurgy (3, 3, 3) Predicting weld properties and the physical mechanism of welding, including power supplies, heat flow, residual stresses, weld solidification, microstructure, and complex alloys. Current theories of crack cracking; mobile elements; intergranular corrosion; diffusional welding. Prereq: Physical metallurgy.


5450-50 Electron Microscopy I and II (3, 5) Kinematical and dynamical diffraction theories are developed and their application to electron diffraction patterns and electron microscopy. Experimental electron microscopy is discussed. Special attention is given to metallurgical applications of this plastic deformation electron microscopy on solids which is a powerful tool for phase identification, and phase transformations kinetics. Prereq: 4510-50.

5580 X-ray Metallurgy (3) Application of X-ray diffraction theory and techniques to metallic systems. Powder and single crystal techniques; reciprocal lattice concept and indexing; electron microscopy; orientation of single crystals; preferred orientation; phase analysis; order-disorder transformations.

5720 Corrosion (3) Analysis of corrosion processes in selected environments and metals. Study of the box diagram, influence of stress, temperature, and localized conditions contributing to pitting, crevice, and stress corrosion.

5840-50 Metallurgy of Deformation and Fracture (3, 5) Theoretical and engineering analysis of effect of processing variables on metal structure and mechanical behavior. Study of mechanisms and mechanical behavior on the microstructural level, and metallurgical structure on mechanical behavior in service, testing, and fabrication.

5900 Special Topics in Metallurgical Engineering (3) Recent advances in metallurgical engineering and metal science, along with current research activities and technological boundaries and radiation effects. May be repeated. Maximum 6 hrs.

5910-30-30 Metallurgical Thermodynamics (3, 3, 3) Application of thermodynamics and physicochemical methods to metals and metallurgical reactions. Relation of theory and experiment to structure of liquid and solid solutions, and alloy systems.

6210 Large Deformation Elasticity (3) Curvilinear tensor analysis, theory of finite strains, Mooney-Rivlin formulation of non-linear viscoelasticity, solution of large homogeneous and nonhomogeneous deformation problems, approximation to revolution of rubber, reinforcement with inreducible cords. Prereq: 5230 or equivalent.


6240 Advanced Industrial Polymer Chemistry (3) Chemical processes of polymerization, physical properties of polymeric materials; highly integrated engineering and chemical engineering research. Prereq: 5210 or equivalent.

6243 Advanced Methods of Polymeric Structures (2) Stress analysis with emphasis on developing constitutive equations for solid polymers. Relation of microscopic properties to macroscopic behavior. Integral, differential, and asymptotic methods for solution of constitutive equations of viscoelastic materials, approximation to revolution of rubber, reinforcement with inreducible cords. Prereq: 5230 or equivalent.


6260 Mechanical Behavior of Polymers (3) Stress analysis with emphasis on developing constitutive equations for solid polymers. Relation of microscopic properties to macroscopic behavior. Integral, differential, and asymptotic methods for solution of constitutive equations of viscoelastic materials, approximation to revolution of rubber, reinforcement with inreducible cords. Prereq: 5230 or equivalent.

6261 Large Deformation Elasticity (3) Curvilinear tensor analysis, theory of finite strains, Mooney-Rivlin formulation of non-linear viscoelasticity, solution of large homogeneous and nonhomogeneous deformation problems, approximation to revolution of rubber, reinforcement with inreducible cords. Prereq: 5230 or equivalent.


6280 Advanced Industrail Polymer Chemistry (3) Chemical processes of polymerization, physical properties of polymeric materials; highly integrated engineering and chemical engineering research. Prereq: 5210 or equivalent.

6290 Advanced Methods of Polymeric Structures (2) Stress analysis with emphasis on developing constitutive equations for solid polymers. Relation of microscopic properties to macroscopic behavior. Integral, differential, and asymptotic methods for solution of constitutive equations of viscoelastic materials, approximation to revolution of rubber, reinforcement with inreducible cords. Prereq: 5230 or equivalent.

6310 Advanced Industrial Polymer Chemistry (3) Chemical processes of polymerization, physical properties of polymeric materials; highly integrated engineering and chemical engineering research. Prereq: 5210 or equivalent.

6320 Mechanical Behavior of Polymers (3) Stress analysis with emphasis on developing constitutive equations for solid polymers. Relation of microscopic properties to macroscopic behavior. Integral, differential, and asymptotic methods for solution of constitutive equations of viscoelastic materials, approximation to revolution of rubber, reinforcement with inreducible cords. Prereq: 5230 or equivalent.

6321 Large Deformation Elasticity (3) Curvilinear tensor analysis, theory of finite strains, Mooney-Rivlin formulation of non-linear viscoelasticity, solution of large homogeneous and nonhomogeneous deformation problems, approximation to revolution of rubber, reinforcement with inreducible cords. Prereq: 5230 or equivalent.


6331 Advanced Methods of Polymeric Structures (2) Stress analysis with emphasis on developing constitutive equations for solid polymers. Relation of microscopic properties to macroscopic behavior. Integral, differential, and asymptotic methods for solution of constitutive equations of viscoelastic materials, approximation to revolution of rubber, reinforcement with inreducible cords. Prereq: 5230 or equivalent.

6340 Mechanical Behavior of Polymers (3) Stress analysis with emphasis on developing constitutive equations for solid polymers. Relation of microscopic properties to macroscopic behavior. Integral, differential, and asymptotic methods for solution of constitutive equations of viscoelastic materials, approximation to revolution of rubber, reinforcement with inreducible cords. Prereq: 5230 or equivalent.

6350 Advanced Industrail Polymer Chemistry (3) Chemical processes of polymerization, physical properties of polymeric materials; highly integrated engineering and chemical engineering research. Prereq: 5210 or equivalent.
4. One foreign language if the student's faculty committee feels that a reading knowledge of a foreign language is crucial to the student's research.
5. Upon completion of at least one-half of all coursework, each student must pass a comprehensive examination.
6. After completion of the dissertation, prior to graduation, each student must pass a final examination administered by a faculty committee.

Civil Engineering
4130 Concrete Design (3) Reinforced concrete con- tinuous beams and floor slabs; footing, retaining and waterwall. Prereq: 4110 and 4120.
4200 Foundations (3) Subsurface investigations; design of shafts and shallow foundations on cohesive and cohesionless soils. Foundations on rock. Prereq: Structural and Concrete Engineering 2610. F.
4240 Structural Design (4) Design of concrete and steel structures; analysis and design of steel and concrete buildings. Prereq: 3320 or 4315. F, W.
4280 Photography (3) Methods of plotting maps from aerial photographs; stereoscopic plotting instruments; applications. Prereq: 2360 or Forestry Summer Camp for forestry majors. F.
4420 Analysis of Framed Structures (3) Bending moments due to moving loads; use of influence lines; analysis of structures subject to variable loads; analysis of buildings, frame structures and frames. Cores: 4410, W.
4430 Construction Methods and Equipment (3) Fundamental operations in construction and selection of equipment; production rates, balancing of equipment and personnel. Prereq: 3170, F, W.
4610-20 Advanced Structural Design (3, 3) Plastic design of structures; design of three-dimensional structures; applications to cold-formed steel. Prereq: 3320 or 4315. F, W, 4610 or 4420. W, Sp.
4640 Computer Utilization (3) Computer use, economic justification, and extent of use by industry. Utilization of computers for solution of civil engineering problems.
4960 Stabilization of Soils (3) Mechanical stabilization of soils for highway construction. Performance of ben- eficial stabilization of soils with additives and/or by mixing with additives. Prereq: 4310. 2 hrs and 1 lab. W.
4630 Airport Planning and Design I (3) Emphasis on airport development planning and design. Methodologies for the airside and landside development. Prereq: on the airside an runway configuration, capacity, geometric design and planning principles. Prereq: 3320 or 4315. F, W.
4640 Traffic Engineering (2) Characteristics of drivers, pedestrians and cyclists; traffic control devices; traffic engineering analysis. Prereq: 4430 or consent of instructor. F.
4650 Airport Planning and Design II (3) Integration and application of principles of airport master plan- ning for purpose of site selection and design of an airport facility through a comprehensive team project; introduction to general principles of design. Prereq: 4640. 2 hr and 2 lab. Sp.
4710 Portland Cement Concrete Mix Design (3) Prop- erties and tests of Portland cement concrete, mix design of normal weight concrete. Prereq: 4730. 2 hrs and 1 lab. F.
4730 Asphalt and Bituminous Concrete (3) Properties and tests of asphalts and asphaltic mixes, mix design ofbituminous concrete. Emphasis on use of asphalt in transportation construction projects. Prereq: 3710. F, 3 hrs and 1 lab. F.
4731-32 Earthquake Resistant Structures I & II (4, 4) (Same as Architecture 4730 & 4731) (4) Seismic design of buildings and structural elements. Prereq: 3730. F, W.
4800 Introduction to Civil Engineering Systems (3) Methods of modeling civil engineering systems and their specific application to problems of transportation, environment, water resources and materials. Prereq: Banner standing or consent of instructor. Sp.
4850 Elementary Structural Stability Methods (3) (Same as Architecture 4850 and Engineering Science and Mechanics 4850) (3) Analysis of structural systems; application of stability criteria. Prereq: 3320.
5300 Thesis (1-15) PNP only. F.
5002 Non-Thesis Graduation Examination (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student is otherwise registered. Prereq: 5000. F.
5110-20 Statistically Indeterminate Structures (3, 3) rigid and flexible analysis of plate girders, beams, and columns. Prereq: 5110 or consent of instructor. F.
5115 Stability Indeterminate Structures (3) Analysis and design of complete frame and planar frames. Prereq: 5110 and 5120.
5140 Stability of Structures (3) Properties of structural materials; design parameters and steel and concrete beams, connections and details, load calculations and analysis. Prereq: 4410 or consent of instructor. F.
5150 Matrix Formulation of Structural Problems (3) Matrix methods; stiffness method of structural analysis. Prereq: 5120 or consent of instructor. W.
5160 Analysis and Design of Plate Structures (3) (Same as Architecture 5160) (3) Structural design of panels and plates. Prereq: 5110 and 5120.
5170 Introduction to Structural Dynamics (3) Analysis, numerical methods, and computer applications of structures. Prereq: 5150. F.
5180 Finite Element Structural Analysis (3) Application of finite element method to structural analysis; plate, stress, plane strain, axisymmetric, and three-dimensional problems. Prereq: 5150 or 4410. F.
5217 Advanced Properties of Materials: Bituminous Soils and Mixes (3) (Same as Civil Engineering 5217) (3) Properties and performance of bituminous soils and mixes, including the use of asphalt. Prereq: 4730. W.
5270 Planning and Transportation (3) Preparation of transportation and land use plans and projects. Prereq: 4710 and 4730. W.
5310 Engineering Practice (3) Valuation and feasibil- ity studies; depreciation and useful life, engineering economics. Prereq: 5300.
5330-36 Engineering Practice Applied to Adminis- tration of Engineering Projects (3) (3) Engineering administration: planning of governmental and industrial projects, and application of techniques, both estimating and methods of financing. Prereq: 5300.
5410 Construction Contract Law and Administration (3) Emphasis on role of engineer in preparation, award, and administration of construction contracts. Case study method of instruction. Prereq: 4230 or consent of instructor.
5460-70 Construction Estimating I, II, III (3, 3, 3) Project costs, estimating methods; market conditions; cost estimating and feasibility of design as it applies to costs. Prereq: 4420 or consent of instructor. W, Sp.
5510 Soil Mechanics—Seepage (3) Saturated flow through embankments, filter design criteria, seepage forces and velocities, subsurface, and embankment failures. Prereq: 4310 or consent of instructor. Sp.
5620 Site Planning and Design I (3) Fixed structures on fixed sites. Fixed structures on variable sites. Design of interchange structures. Prereq: 4730 or consent of instructor. W.
5630 Site Planning and Design II (3) Specialized studies on fixed sites. Fixed structures on variable sites. Design of interchange structures. Prereq: 4730 or consent of instructor. W.
5730 Prestressed Concrete (3) Properties of prestressed concrete and concrete structures; methods of prestressing and posttensioning; analysis and design methods. Prereq: 4730.
5740 Behavior of Reinforced Concrete Members (3) Behavior of structural steel members due to static and fatigue loading; relation between research results and cur- rent specialization for design. Prereq: 3710. W.
5770 Soil Mechanics—Seepage (3) Saturated flow through embankments, filter design criteria, seepage forces and velocities, subsurface, and embankment failures. Prereq: 4310 or consent of instructor. Sp.
5805 Urban Systems: Engineering and Management I (3) Overview of urban systems usually under the control of citizen government. Design, operation, personnel, and personnel administration. Prereq: consent of instructor.
5800 Urban Systems: Engineering and Management I (3) Overview of urban systems usually under the control of public and private agencies. Design, operation, personnel, and personnel administration. Prereq: consent of instructor.
5820 Traffic Engineering—Operations (3) Fixed- time and volume transportation; renewable flow systems; vehicle counting; traffic engineering economics. Prereq: 3450 or 4430. Coreq: 4430.
5830 Traffic Engineering—Operations (3) Fixed- time and volume transportation; renewable flow systems; vehicle counting; traffic engineering economics. Prereq: 3450 or 4430. Coreq: 4430.
The 18 hour course of 5000-level work in electrical engineering must be divided equally between two different electrical engineering areas.

4. Master's thesis, totaling 9 quarter hours or more.

5. A final oral examination covering the thesis and related course work.

DOCTORAL PROGRAM

The Ph.D. degree with a major in Electrical Engineering may be pursued in the areas of communication theory, electromagnetic theory, plasma engineering, power systems, solid-state electronics, and control systems. Specific departmental requirements for the Ph.D. degree include the following:

1. A Master of Science or Master of Engineering degree.

2. A minimum of 12 hours of course work beyond the B.S. degree excluding thesis, research, and dissertation credit.

3. A minimum of 18 hours of mathematics, including Mathematics (or Physics) 5610-20-30 and 30 hours of mathematics at the 4000 level or above.

Courses required in electrical engineering undergraduate curriculum cannot be included in either the M.S. or Ph.D. programs. In addition, 4000-level courses in electrical engineering may not be used if 5000-level courses are available in the same area.

6. A reading program of 36 hours credit in doctoral dissertation.

7. A satisfactory language if the student's faculty committee feels that a reading knowledge of foreign language is crucial to the student's research efforts.

8. Satisfactory performance on both a qualitative examination of computer, electrical-optics, communication theory, electromagnetic theory, plasma engineering, power systems, solid-state electronics, and control systems. Specific departmental requirements for the Ph.D. degree include the following:

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3. A minimum of 18 hours of mathematics, including Mathematics (or Physics) 5610-20-30 and 30 hours of mathematics at the 4000 level or above.
4680 Laser and Maser (3) Introduction of principles of laser and maser operation based on classical concepts and electrical engineering concepts. Consideration of practical devices and applications.

4690 Magneto-hydrodynamics (3) Magnetic flux flows through magnetic field. Induction coils, transformer action, transformer design, acoustically powered systems, radio transmission, laser-electrons, electromagnets, and electromagnetic gongs. Plasma applications concern plasma injectors for thermonuclear fusion machines and study of plasma containment in magnetic fields. Prereq: Senior or graduate standing.

4700 Kinetic Theory (3) Electrons in reactive media. Shock waves, wave propagation, disturbances, and sound. Theoretical development of gas dynamics and development of gas dynamics and extension to resistive media. Plasma applications concern plasma injectors for thermonuclear fusion machines and study of plasma containment in magnetic fields. Prereq: Senior or graduate standing.

4710 Fourier optics - (3) Fourier optics, diffraction, lenses, and coherent and incoherent imaging. Engineering applications, holography, etc.

4720 Electro-optics Detection and Instrumentation (3) Sensitivity, frequency response, and noise of optical and electrical instruments based on the principles of electronics and applied to the detection of light. Prereq: 3090, 3100, 3206, 3740.

4730 Analog Signal Processing Circuits for Elec- tronic Instrumentation (3) Operational amplifiers, instrumentation amplifiers and other integrated circuits in signal processing. Active filters, amplifiers, discriminators, etc. Prereq: 3090, 3740, 3100.

4810 Discrete-Data Systems (3) Introduction to the analysis of digital computer systems using classical control theory. Prereq: 3090, 3100, 3206, 3740.

4850 Control Systems Design I, II, III (3, 3, 3) Consideration of design problems for usual variations of control system. Prereq: 4810, 3850, 3860. 3 hrs including project laboratory.

4890 Communications Electronics (3) Receiver and transmitter circuits for communications. Prereq: 3630, 3850. 3 hrs including project laboratory.

4970 Digital Integrated Circuits (3) Processing and fabricating of active and passive components for monolithic and hybrid circuits. Design techniques for linear and digital circuits. Prereq: 3850. 3 hrs including project laboratory.


5150 Introduction to Logic Design (3) Combinational circuit and sequential network design. Digital multiplexer and memory devices. Asynchronous and synchronous sequential networks; state assignment; state diagrams; state table; flip-flops, flip-flop speed, and flip-flop design. Project-oriented, contract basis.

5160 Advanced Digital Image Processing (3) Fundamentals of image processing and computer vision. Applications to image reconstruction, computer vision, and robotics. Project-oriented, contract basis.

5170 Advanced Network Theory II (3) Controlled sources, linear systems, and linearization of networks. Prereq: 5120, 5130. 3 hrs including project laboratory.

5210 Modern Control Systems Theory I (3) Introduction to modern control theory. Basic concepts, models, and frequency response. Frequency response analysis of control systems. Prereq: Consent of instructor. 3 hrs including project laboratory.

5220 Advanced Electrical Machinery Applications (3) Linear motor and pole-pair analysis and operation. Other speed control techniques. Frequency and speed control.


5250 Advanced Digital Image Processing (3) Fundamentals of image processing and computer vision. Applications to image reconstruction, computer vision, and robotics. Project-oriented, contract basis.

5260 Advanced Network Theory II (3) Controlled sources, linear systems, and linearization of networks. Prereq: 5120, 5130. 3 hrs including project laboratory.

5360 Advanced Electromagnetic Wave Theory (3) Theory, recent devices, and engineering applications for production of electromagnetic energy by gaseous means of thermal, magnetohydrodynamic, and electrodynamic effects. Prereq: 4260 and Mechanical Engineering 4150 or equivalent, or consent of instructor.

5370 Advanced Electromagnetic Wave Theory III (3) Prereq: 5370 and 5380 or equivalent.

5410 Power System Network Analysis (3) Sequence impedances, power networks, and control networks. Formation of system network characteristics such as Zav, Zm, Zc, and others. Computer methods. Prereq: Graduate standing or consent of instructor.

5420 Fault and Load Flow Studies (3) Analysis of power system steady state and control. Load and output power. Computer methods for fault studies. Load flow programs include load flow computer software. Prereq: 4140 or consent of instructor.


5440 Distribution System Theory (3) Electric power distribution with particular reference to utility systems. System stability, planning and operation, and regulations. Prereq: 4410, 4420, 4430 or equivalent.

5450 Selected Topics in Power Systems (3) To meet most special needs of students. Possible topics: power system stability; chaos; power conversion; power plant operation, electrical transients in power systems, and power system control. Questions may be raised with consent of department.

5510-20-30 Advanced Analog Electronics (3, 3, 3) Physical operation of modern electronic devices with emphasis on semiconductor devices such as diodes, bipolar transistors, JFET’s, and MOSFET’s. Small-signal equivalent circuits and noise modes of active devices. Basic concepts of noise theory. Feedback amplifiers and radio-frequency amplifiers using discrete, monolithic, and hybrid devices, with emphasis on design and component selection. Design, layout, testing, and troubleshooting of electronic circuits and systems. Special devices as found in current literature. Prereq: 4570, 4650, and consent of instructor. Prereq: Computers 45 431 or 4710. Project laboratory included.

5520 Thick-Film Hybrid Microcircuits (3) Processing and microelectronic design techniques for production of hybrid thick-film integrated circuits. Theory and design through packaging properties of thick-film pastes, cost-effective design techniques. Project oriented. Includes laboratory work.

5570-90 Advanced Electronic Switching Circuits (3, 3, 3) Switching circuits using active devices in discrete, monolithic, and hybrid configurations. Analysis and design; application of waveforms, comparator timing, to base-generators, switch circuits, clocking, decoding, analog memories, logic families, registers and counters, analog-to-digital and digital-to-analog converters, and digital memories. Prereq: 4700 or consent of instructor. Project laboratory included.

5610-30 Logic Design and VLSI Automata Theory (3, 3) Design considerations for conventional and sequential circuits; iterative networks; fault detection and diagnosis; computer performance; computer arithmetic, and microprocessors. Prereq: instructor. Prereq: 4700 or equivalent. Coreq: Mathematics 4140 or 4710.


5720-30 Prediction, Filtering and Detection Theory (3, 3) Applications to control and signal processing. Theory, applications of random processes, stability, and noise. All modern systems emphasis on digital data processing. Prereq: instructor. Prereq: 4700 or equivalent. Coreq: Mathematics 4140 or 4710.

5750 Radar Systems Analysis (3) Basic radar principles, system design, and system operation. Klystrons, magnetrons, traveling wave amplifiers and detectors. Range-Rate-Ranging and angle determination. Prereq: 4700. Prereq: Consent of instructor. (Same as Computer Science 5940-50.)

5770 System Identification (3) Various identification schemes: deterministic, stochastic, and hierarchical methods; applications to automatic control and engineering science. Prereq: Consent of instructor.


5810-30 Electromagnetic Fields (3, 3) Vector analysis, Maxwell's equations, special relativity, plane waves, reflection and refraction, guided waves, spherical and rectangular cylindrical waveguides, radiation from current-carrying conductors. Coreq: Mathematics 4140 or 4710.

5830 Linear Antennas and Antenna Arrays (3) Hertzian dipole, linear antennas, Impedance to antenna systems. Resonant antennas, linear arrays, isolation. Prereq: 4710.


5850 Microwave Electromagnetics (3) Space charge waves on electron beams, coupling between beams and guided waves, Huygens' principle, waveguides, traveling wave tubes and backward wave oscillators. Prereq: 4710.

5860 Applications of Quantum Electronic Devices (3) Mathematics 4710 or equivalent.


5880 Microwave Electronics (3) Space charge waves on electron beams, coupling between beams and guided waves, Huygens' principle, waveguides, traveling wave tubes and backward wave oscillators. Prereq: 4710.


5960-10-20 Advanced Small Computer Systems (3) Real-time applications, memory and CPU organization, interrupt processing, real-time system design, and hardware design. Prereq: 4710 or equivalent. Coreq: Mathematics 4710 or Computer Science 5940-50.


6250 Advanced Antenna Theory (3) Cylindrical dipole, mathematical treatment of modulation and communication principles. Analysis and design of antennas, microwave devices, and radio-frequency amplifiers. Prereq: 4710. Prereq: Consent of instructor. (Same as Computer Science 5940-50.)

6260 Antenna Arrays (3) Huygens principle, equivalent current theory, radiation patterns, horn, lens, and reflector antennas. Prereq: 4710.
Electrical Engineering

5900 Project in Engineering Administration (3, 5) Prerequisite: 5810-20. Open to graduate students in engineering. Requires a thesis. May be taken for credit the first time or, for a maximum of 5 quarter hours, the second time.

6790-30 Advanced Network Synthesis (3, 3) Synthesis of one-, two-, and n-port networks for prescribed frequency and time domain specifications. Approximation of prescribed network characteristics by functions suitable for synthesis. Recent contributions to topological synthesis. Prerequisite: 5110-20 or consent of instructor.

7870 Coding Theory (3) Mathematical structure of messages and probabilistic codes. Coding theorems and bounds, linear codes, linear feedback shift registers, convolutional codes, burst error correcting codes, and automatic decoding methods. Prerequisite: 5170 or consent of instructor.


6910-30 Advanced Sequential Machines and Automata Theory (3, 3) Finite-state models, algebraic structure of automata machines, and the theory of sequential machines including the theses is required. Option IIa possibilities for thesis are: experimental, theoretical, or analytically oriented. Each applicant will be advised as to the type of research work required for the Ph.D. degree. The names and addresses of four referees must be included with the application. The examination will be of particular interest to prospective students currently employed in research, development, or design activities and whose interests in continuing education are of continuing education for the first time or, for a maximum of 12 quarter hours in Doctoral Research and Dissertation and a minimum of 72 quarter hours in credit courses.

3. A minimum of 36 quarter hours in engineering graduate courses, exclusive of thesis and dissertation courses. These courses will normally be numbered 5000 and above, and at least 12 quarter hours of 6000-level courses, which constitute one or two areas of concentration selected by the student. The number of courses in this option may include courses taken at the undergraduate level which will be selected with the approval of the advisor.

4. A minimum of 9 quarter hours of courses numbered 6000 and above, offered in departments other than mathematics, computer science, and the student's major department and which are not included in the areas of concentration described in item 3.

5. Active participation in departmental colloquia or seminars and colloquia. Two doctoral examinations must be passed to be admitted to candidacy for the Ph.D. in Engineering Science.

6. As being admitted as a potential candidate for the Ph.D. degree or completing 36 quarter hours of graduate credit. The purposes of qualifying examination are:

(a) To determine the qualifications of the student to continue the Ph.D. program, and
(b) To identify the areas of strengths and weaknesses that guide the student's course work and research.

The qualifying examination will be administered by the student's advisory committee and must be completed before the first offering after the student has either completed the Master's degree or completed 36 quarter hours of graduate credit. The purposes of qualifying examination are:

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7 After successfully passing the qualifying and comprehensive examinations, the stu-

dent must present the Ph.D. dissertation research proposal to the student’s advisory

committee and shall consist of both a

written and oral portion.

8 A final examination on the student’s

dissertation and related fields will be taken

by the student after completion of the Ph.D.

dissertation and related fields will be taken

candidacy for the Ph.D. committee and receive committee approval

dent must present the Ph.D. dissertation

of fractureresistance,includingtransitiontempera-
tions;numerical methods of solutions;stress-optic
equations;thermalstresses inbeams, rings,
bars; axisymmetric stress distribution; stress con-
threedimensions; torsion and bending of prismatical

evations of damped and undamped components to applied
dynamic theory-lab based on the solution.

Prereq: 5410 and Mathematics 4540.

5050 Introduction to Continuum Mechanics (2)

Fundamentals of mechanics of solids and fluids. Cartesian
tensions, stress, and deformation, and flow in continuous
medium; constitutive equations; applications to soils
and fluids. Prereq: 3110 and 3311 or equivalents.

Energy Methods (3) Virtual work, minimum poten-
tial energy, and complementary energy. Caughey’s
theorem. Hamilton’s principle, and Lagrange’s equa-
tions of motion; variational methods; examples from
theory of structures, plates and shells, buckling, vibra-
tions, and dynamics. Prereq: BS in engineering or
consent of instructor.

5080 Perturbation Methods in Continuum Mechanics (3)

Regular and singular perturbation methods for solutions of
linear and non-linear second order differential equations.
Prereq: Mathematics 4550.

5110 Fluid Dynamics (3, 3) Kinematics of fluids,
mainstream and streamline flows. Navier-Stokes equation,
mathematical description of turbulence; isentropic
transformations; viscous flow, potential flow, simplified
corresponding equations.

5130 Introduction to Turbulence (5) Microscopic effects,
and turbulence modeling concepts. Application to
computational fluid mechanics, energy spectra,
dissipation in isotropic turbulence; applications to
turbulent pipe flows. Prereq: 5800.

5140 Finite Element Methods (3) Formulation of
computational fluid mechanics using finite element
methods; numerical approaches for solution of Navier-
Stokes equations; boundary layer theory; direct numerical,
low-Reynolds number calculations.

5160 Finite Element Structural Analysis (3) SAME
Civil Engineering 5160.

5220 Mechanics of Viscous Flow (3, 3) Viscous flow
in non-Newtonian fluids, applications of Navier-Stokes equa-
tions, numerical methods of solution, stress-optic
methematics of flow analysis. Prereq: Mathematics 4540,
5110, 5120 and 5220.

5230 Mechanics of Solid Fluid (4) Computational
pressure drops, heat transfer, fluid flow, fluid
response; signal conditioning; oscillators, oscil-
logs, and data acquisition. Prereq: 5160.

5240 Fluid Flow Laboratory (3) Introduction to
computational fluid mechanics using finite element
methods; numerical approaches for solution of Navier-
Stokes equations; boundary layer theory; direct numerical,
low-Reynolds number calculations.

5250 Advanced Fluid Mechanics (5, 3) Additional
topics in mechanics of fluids; elec-
trohydrodynamics; heat transfer, mass trans-
fer, and reaction in fluid flow; applications to
catalysis, chemical engineering, and biological
systems. Prereq: 5160.

5310-30 Advanced Mechanics of Materials (3, 3, 3)
Advanced topics in mechanics of materials; elec-
trohydrodynamics; heat transfer, mass trans-
eries; solution of stress concentration problems;
strain-controlled stress, strain rate effects. Prereq: 5110.

5340 Theory of Elasticity (3) 2. Stress, strain in
three dimensions, torsion and bending of prismatical
beams; energy methods; stress, strain, stress con-
centration; plane stress, plane strain. Prereq: 5800.

5380 Advanced Fluid Mechanics (5) Additional
topics in mechanics of fluids; electrohydrodynamics;
heat transfer, mass transfer, and reaction in fluid flow;
aplications to catalysis, chemical engineering, and biological
systems. Prereq: 5160.

5390 Fluid Flow Laboratory (3) Introduction to
computational fluid mechanics using finite element
methods; numerical approaches for solution of Navier-
Stokes equations; boundary layer theory; direct numerical,
low-Reynolds number calculations.

5410 Advanced Fluid Mechanics (5, 3) Additional
topics in mechanics of fluids; electrohydrodynamics;
heat transfer, mass transfer, and reaction in fluid flow;
aplications to catalysis, chemical engineering, and biological
systems. Prereq: 5160.

5500 Fluid Flow Laboratory (3) Introduction to
computational fluid mechanics using finite element
methods; numerical approaches for solution of Navier-
Stokes equations; boundary layer theory; direct numerical,
low-Reynolds number calculations.

5650 Fluid Flow Laboratory (3) Introduction to
computational fluid mechanics using finite element
methods; numerical approaches for solution of Navier-
Stokes equations; boundary layer theory; direct numerical,
low-Reynolds number calculations.
3630 Analysis and Design of Thin Shell Structures (3) Geometry of surfaces, deformation of the shell theory, equilibrium of stresses, computer analysis for undergraduate and graduate level. Prereq: 3610 or Civil Engineering 1610.


3640 Theory of Plasticity (3) Yield conditions, strain hardening, general consecutive equations, elastic-plastic boundary, finite element and energy methods, limit analysis principles; problems in perfectly plastic solids; finite plastic deformations; plane frictional plastics. Prereq: 5410 and Mathematics 4550.

5010 Photovoltaics (5) Stress-optical law in three dimensions and index ellipsoid, rotation effects in three-dimensional photovoltaic technology, techniques and applications of three-dimensional photovoltaics, photovoltaic materials, photovoltaic subcomponents, recent developments in photovoltaics. Prereq: 4510 and consent of instructor. 2 hrs and 3 labs.

4880 Nonlinear Viscoplasticity (3) (Same as Polymer Engineering 8618).

4910 Special Topics in Engineering Mechanics (3) Advanced problems of interest in mechanics, worked either as group or individually. Prereq: Consent of instructor. May be repeated with consent of department.

NOTE: not all of the above courses will be offered in any one year.

Industrial Engineering

MAJOR DEGREES

Industrial Engineering M.S., M.E.

Professors: J.K. Sridhar (Head), Ph.D., Ohio State; P.E.; W.L. Thornhill, Ph.D., Virginia Polytechnic Institute; P.E.; E.L. DeFerri, Ph.D., Virginia Polytechnic Institute; J.C. Cullum, M.S., M.E., Virginia Polytechnic Institute; J.B. Massachusetts Institute of Technology; P.E.; R.L. Ehrman, Ph.D., University of California, Berkeley; P.E.; A.L. Howard, Ph.E., University of Virginia; P.E.; D.H. Hutchinson, Ph.D., Georgia Institute of Technology, P.E.; J.D. Westbrook, Ph.D., Virginia Polytechnic Institute.

Associate Professors: D.H. Merchant, Ph.D., Georgia Institute of Technology; K.E. Kirby, Ph.D., Pennsylvania State University.

Assistant Professors: M.J. Goodwin, M.S., Tennessee State; P.E.; J.C. Hufferford, Ph.D., Ohio State.

THE MASTER OF SCIENCE PROGRAM

A graduate program leading to the degree of Master of Science is open to graduates of A.B., A.E.T.-accredited undergraduate curricula in industrial engineering or to graduates of other undergraduate curricula who have completed an approved list of prerequisite course work. A non-thESIS option with 45 hours of course work plus a 3-hour design project is available.

Graduate work in Industrial Engineering provides for concentrations in operations research, engineering management, manuf acturing and production systems, human factors engineering, information systems, reliability and quality control, and traditional industrial engineering. Either one or two minors can be elected in Engineering, Mathematics, Psychology, Business, Computer Science, Statistics or Economics.

MASTER OF ENGINEERING

This professional degree program is intended as a culmination year in a five-year baccalaureate-master program which emphasizes engineering design and professional practice. Admission requirements include those presented above plus the requirement of a Bachelor's degree from an A.B.E.T.-accredited industrial engineering program. This 45-quarter hour program requires 18 hours of course work in an industrial engineering core, 9 hours of technical methods electives and 9-hour thesis or design project.

Any 4000-level course required in the Bachelor of Science in Industrial Engineering program at The University of Tennessee may not be used for graduate credit in the M.S. or M.E. graduate program in Industrial Engineering.


4060 Production Systems Planning and Control I (3) Theory and applications of master scheduling, materials requirements planning systems, and inventory control. Prereq: 3510-30. Not available for graduate credit for industrial engineering students.

4060 Production Systems Planning and Control II (3) Theory and application of master scheduling, materials requirements planning systems, and inventory control. Prereq: 3510-30. Not available for graduate credit for industrial engineering students.

4070 Production Systems Planning and Control III (3) Theory and application of master scheduling, materials requirements planning systems, and inventory control. Prereq: 3510-30. Not available for graduate credit for industrial engineering students.

4080 Forecasting Methods in Industrial Engineering (3) Application of technological forecasting techni ques to industrial engineering problems. Includes information system design for forecasting applications and statistical characterization of time series. Prereq: 3510-20, 4060, 4520. Not available for undergraduate credit in Industrial Engineering.

4100 Project Control with CPM and PERT (3) A study of project control methods. Emphasis on both critical-path methods and polynomial regression models, automated linear programming methods, and use of computer programs. Prereq: 4060.

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4100 Project Control with CPM and PERT (3) A study of project control methods. Emphasis on both critical-path methods and polynomial regression models, automated linear programming methods, and use of computer programs. Prereq: 4060.
and interpretation of data collected in application of density functions and their properties. Analysis of data and validation of models. Prereq: 4590 and Computer Science 3150.


5530 Statistical Methods in Industrial Engineering (3) Special problems for students qualified to do individual or group research projects. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/U grade only.


5700 Advanced Topics in Operations Research (3) Topics in operations research. Special methods and techniques. Prereq: 5600.

5418 Linear, Quadratic and Separable Programming (3) Methods of linear, quadratic, and separable programming, and nongradient programming. Mathematical formulation and computer simulation. Prereqs: Computer Science 3150 and Math 2860 or equivalent.

5417 Game Theory and Applications (3) Theory and applications of games in economics and engineering. Application to transportation and military problems. Data analysis and hypothesis testing related to pertinent utility probability density functions. Prereqs: Math 5760, 5860.

5415 Theory and Random Processes (3) Operations research applications to engineering problems. Review of probability theory, including decision making in competitive environment, and random processes. Prereqs: Math 2860 or equivalent, Statistics 3450, and Computer Science 3150 or equivalent.

5360 Dynamic System Simulation (2) Development and use of models for control simulation of dynamic systems. Simulink and MATLAB. Prereqs: Computer Science 3150 and 4590.
engineering and normally 9 quarter hours of course work (4000-level or above) in mathematics. No more than 3 quarter hours of engineering course work may be below the 5000-level.

3. In addition to the departmental seminar program.

4. Passing a comprehensive written final examination on all course work submitted for the degree and an oral examination of all work (including problems) submitted for the degree.

THE DOCTORAL PROGRAM

Admission into the doctoral program will be granted to those applicants who have demonstrated superior achievement in their undergraduate programs. The student must satisfactorily complete an approved program of study which normally includes:

1. A minimum of 72 quarter hours credit beyond the Bachelor's degree, exclusive of dissertation credit. These are exclusive of thesis, problems or oral examination on all course work submitted for the degree.

2. A minimum of 9 quarter hours credit in 5000 level courses, with at least 12 quarter hours of 6000-level courses.

3. Participation in the departmental seminar program.

4. Passing a comprehensive written final examination of all course work submitted for the degree and an oral examination of all work (including problems) submitted for the degree.

GRADUATE CREDIT FOR UNDERGRADUATE COURSES

Junior (3000-level) and senior (4000-level) mechanical and aerospace engineering courses may be taken for graduate credit by non-mechanical or non-aerospace engineering majors, if approved by the student's committee and non-mechanical or non-aerospace engineering graduate students should consult with instructors regarding prerequisites for undergraduate courses.

Mechanical Engineering

3110 Applied Engineering Thermodynamics (3) Energy and laws governing energy transformations; thermodynamic properties; applications to engineering problems.

3311 Engineering Thermodynamics (3) Energy and laws governing energy transformations; thermodynamic properties.

3320 Engineering Thermodynamics (3) Properties of gases and solutions, chemical reactions, equilibrium; applications to mechanical engineering problems.

4101 Fluid Flow (3) Development of continuity, momentum and energy principles for fluid systems; applications of these principles to aerospace engineering problems.

3440 Heat Transfer (3) Analysis of heat transfer processes and structures, heat conduction, thermal radiation.

3520-30-40 Thermal Sciences (3, 3, 3) Fundamental principles of thermodynamics and transport phenomena applied to engineering design. To be taken in sequence.

3610 Mechanics of Machinery - Kinematics (3) Machine motion, graphical and analytical methods, instantaneous centers; velocities; accelerations.

3620 Mechanics of Machinery - Dynamics (3) Applications of Newton's law, work, energy, and impulse to machinery; Force analysis of mechanisms, balancing, gyroscopic effects; Synthesis. Prereq: 3610.


3652 Introduction to Machining Design (3) Ductile- brittle behavior of materials under static and cyclic loading, Stress concentration, design factors and theories of failure. Changes in material behavior in fabrication and processing of materials by turning, milling, grinding, and honing.

3691 Engineering Analysis (3) Advanced analysis techniques for problems of aerospace and mechanical engineering. Emphasis on approximate methods.

4140 Energy Conversion Systems (3) Operating and design characteristics for some including solar energy conversion and chemical engineering. Prerequisite: 3691.


4220 Environmental Noise (3) Basic principles of acoustics; sound generation and propagation; noise control. Prereq: 3110.

4310 Phase Change Heat Transfer (3) Phase change processes in particular product: manufacturing planning, tool and fixturedesign, selection of manufacturing operations, redesign of product to reduce cost.

4330 Manufacturing Processes (3) Product specifications and dimensional analysis of size and form; true position tolerance theory; tolerance analysis; and workplace control for production to tolerances.

4341 Energy Methods in Mechanical Design (3) Application of thermodynamic principles in complex bearings and structures.

4610 Materials and Manufacturing Process (3) Selection of materials in design process, emphasizing relationship between stress and strain analysis, material properties, environment, temperature, manufacturing technology and cost.

4770 Machine Elements (3) Application of strength and properties of materials, design factors, theories of failure to design machine elements, springs and shafting, selection of sleeve and rolling element bearings.

4840 Machine Elements (3) Application of strength and properties of materials, design factors, theories of failure to design machine elements, springs and shafting, selection of sleeve and rolling element bearings.

4710 Thermal Environmental Systems (3) Vapour compression and absorption cycles: heat pump systems; most air properties, psychrometric processes.

4720 Thermal Environmental Systems (3) Design analysis of air washers, cooling towers and extended surface coils; solar radiation; building heat transmission systems; physical properties of materials, design factors, theories of failure to design machine elements, springs and shafting, selection of sleeve and rolling element bearings.

4730 Thermal Environmental Systems (3) Design of zero flow heat exchangers.

4960 Solar Energy Utilization (3) Nature and availability of solar radiation; review of recent research in development of solar energy collection and use; design analysis of solar energy collectors and methods to improve efficiency.

4980 Internal Combustion Engines (3) Thermo- chemical phenomena in internal combustion and propulsion engines. Combustion, detonation, expul- sion, thermal pollution. Analysis of internal combustion engines using real and ideal fluids.

4990-35 Selected Topics in Mechanical Engineering (1-4) Proofs related to pure and applied mathemat- ical engineering.

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise graduating during any quarter when the student uses university facilities and/or faculty time before degree completion. May not be used toward degree requirements. May be repeated. 3-15 credits.

5110 Convection Heat Transfer (3) Analysis of convective heat transfer processes and mechanisms, modeling and prediction of nucleate, transition and film boiling; critical heat flux; forced convection boiling and post dry-out heat transfer; heat exchangers. Prereq: 5130 or equivalent.

5120 Radiation Heat Transfer (3) Equations of viscous fluid flow, energy equations, application of conservation laws to heat transfer processes; heat transfer processes in extended surfaces with emphasis on blackbody radiation, surface temperature, and fluid properties. Prereq: 3910, 4420 and Mathemat- ics 3150.

5130 Convection Heat Transfer (3) Equations of viscous fluid flow, energy equations, application of conservation laws to heat transfer processes in extended surfaces with emphasis on blackbody radiation, surface temperature, and fluid properties. Prereq: 3910 or equivalent.

5150 Radiation Heat Transfer (3) Problems of radiat- ing media, diffus, specular and directional interchange for grey and non-grey surfaces. Prereq: 5130.

5160 Convective Heat Transfer (3) Fundamental mechanisms, modeling and prediction of nucleate, transition and film boiling; critical heat flux; forced convection boiling and post dry-out heat transfer; heat exchangers. Prereq: 5130 or equivalent. Prereq: 5120 or instructor of control.
5510-20-30 Aerospace Mechanics (3,3,3) Principles of mechanics applicable to aerospace vehicles involving equations of motion, multibody systems, and trajectory analysis. Prerequisite: Mathematics 4710.


5520 Aerospace Vehicle Structure and Vibration (3) Aerodynamic and structural operators. Stability criteria for aircraft operating in oscillating stream. Two- and three-dimensional flutter of wings, control surfaces, and upstreams over wide flight speed range. Prerequisites: 4250 and 5530.

5500-30 Aeroelasticity (3,3,3) Dynamic responses of all types of aerospace vehicle through forced response analysis and eigenvalue equation. Aeroelastic phenomena. Structural and aerodynamic interactions. Prerequisite: 5550.

6310 Magnetohydrodynamics 1 (3) Electromagnetic field equations, motion of single charged particle, static and dynamic exact solutions for magnetohydrodynamic channel flows, one-dimensional model of channel flow, magnetohydrodynamic boundary layer transformations. Prerequisites: 6310, Mathematics 5630.

6320 Magnetohydrodynamics II (3) Continuation of 6310. Magnetic field equations, interaction of magnetohydrodynamic Alfven and shock waves, statistical description of plasma, Boltzmann equation, nonequilibrium gasdynamic flows, advanced electroatmospheric flows, propulsion and reaction, propulsion and reaction. Prerequisites: 6310, Mathematics 5630.

6330 Magnetohydrodynamics III (3) Engineering applications of magnetohydrodynamics, propulsion and reaction, propulsion and reaction. Prerequisites: 6320, Mathematics 5630.


5990 Special Topics in Aerospace Science (1-4) Topic selected from current research at The University of Tennessee, Knoxville. May be repeated. S/NC only.

5950 Seminars (1) May be repeated. S/NC only.

5940-50 Aerospace Vehicle Stability and Control (3,3,3) Analysis of fluid flows, including solutions to include compressibility and heat transfer, channel and separated flows, shock-boundary layer interaction. Prerequisite: 5205, Mechanical Engineering 8150, and 8160.

5920 Advanced Topics in Gasdynamics (3) Selection of topics based on the interests of students, covering the thesis and graduate course requirements. May be repeated. Maximum 9 hrs.


5110-15-20 Advanced Dynamics (3,3,3) Multibody system dynamics, including the simulation of multibody systems as constrained dynamics, multibody constrained dynamics, multibody constrained dynamics. Prerequisites: 5110, 5220, and 5240 or consent of instructor.

5220 Aerospace Aerodynamics (3) Special topics and recent research results in the area of aerodynamics, including subsonic, supersonic, and hypersonic flows. Prerequisites: 5110, 5220, and 5240 or consent of instructor.


5000 Selected Engineering Problems (3-9) Selected problems in aerospace engineering related to the Master of Engineering, Master of Science, and Doctor of Philosophy degree requirements. Prerequisite: Consent of advisor. May be repeated. S/NC only.

5810 Selected Engineering Problems (3-9) Selected problems in aerospace engineering related to the Master of Engineering, Master of Science, and Doctor of Philosophy degree requirements. Prerequisite: Consent of advisor. May be repeated. S/NC only.

5610 Senior Design (3) Design project in aerospace engineering, including reports on current research at The University of Tennessee, Knoxville. May be repeated. S/NC only.

5950 Special Topics in Aerospace Science (1-4) Special topics in aerospace science. Prerequisite: Consent of instructor.

6080 Doctoral Research and Dissertation (3-15) Prerequisite: 5990.

6310 Magnetohydrodynamics I (3) Electromagnetic field equations, motion of single charged particle, statistical description of plasma, Boltzmann equation, conduction and diffusion in condensed gases, plasma and corey. Prerequisite: Mathematics 5610, Physics 4220.

6320 Magnetohydrodynamics II (3) Continuation of magnetohydrodynamics I, including magnetohydrodynamic channel flows, one-dimensional model of channel flow, magnetohydrodynamic boundary layer. Prerequisite: 5810, Mathematics 5610.
5110-30-30 Transport Processes in Nuclear Engineering (3, 3, 3) Multicomponent mass transport; development of conservation equations, elementary models and solution methods; applications to heat and mass transfer, conductive; condensation; radiation; reactor core thermal analysis. Prereq: 4720 or equivalent. Mathematics 4710, 4720, F, W, Sp.


5220 Reactor System Dynamics (3) Basic reactor theory to control, reactor core physics models, fusion engineering design criteria, fusion engineering problem area. Prereq: 5820 or equivalent. F, W, Sp.


5410 Nuclear Fuel Cycle Analysis (3) Alternative fuel cycles, cyclic reactor systems and appropriate reactor systems; economic considerations; overview of fuel cycle processes related to solvent extraction of nuclear fuels: reprocessing, siteselection and environmental impacts; nuclear fuel isotopes. Reprocessing of light water reactor and advanced reactor fuels. Disposition of radionuclides and spent fuel from reactor systems. Prereq: 4130 or equivalent. F.


5610 Nuclear Reactor Noise Analysis (3) Modern system theoretical methods for evaluating reactor performance descriptions from operational data. Prereq: 4810 and Electrical Engineering 5740 or equivalent. F.

5710-20-30 Nuclear Design (3, 3, 3) Nuclear reactor design, development of conservation equations, elementary models and solution methods; applications to nuclear reactor fuel elements and heat exchangers. Prereq: 4720. F.

5720 Nuclear Reactor Analysis (3) Hydrodynamics and heat transfer in boiling systems, boiling crisis, fuel element thermal design, steam generator design. Prereq: 4710. W.

5730 Nuclear Reactor Design (3) First order reactor design, integration with non-reactor heat transfer and power conversion systems, economic evaluation, correlation of operating procedures, description of typical system designs. Coreq: 4730. F.

5740 Reactor Kinetics and Control (3) Coreq: Basic concepts of kinetics, fuel cycle kinetics, reactivity control and control and protective systems. Prereq: 4110. F.

5810 Nuclear Reactor Safety (3) Presentation of reactor safety concepts: basic terms, events, probabilities, fission product release and transport; containment systems. Prereq: 4710. F.

5820 Selected Topics in Nuclear Engineering (3) Discussion of problems associated with processing of nuclear materials and cycles, analysis cycle, burnup calculation. Prereq: 4120. W.

5900 Theses (1-15) P/NC only. E

5904 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E


5920 Doctoral Research and Dissertation (3-15) Prereq: Approval of Nuclear Engineering Department. May be repeated. Cons of instructor. E

5930 Nuclear Engineering Practice (3-15) Experience in design and reporting on engineering problems. Prereq: Approval of Nuclear Engineering Department. May be repeated. Only Alternative Plan students may take this course. S/N only. E

5940 Special Research and Dissertation (3-3) P/NC only. E


6210-20-30 Transport Processes in Nuclear Engineering (3, 3, 3) Multicomponent mass transport; development of conservation equations, elementary models and solution methods; applications to heat and mass transfer, conductive; condensation; radiation; reactor core thermal analysis. Prereq: 4720 or equivalent. Mathematics 4710. F, W, Sp.

6210-30-30 Nuclear Reactor Analysis (3) Analysis of methods of general system dynamics to reactor systems. Modeling of nuclear and non-nuclear processes. Dynamics, stability, and control of zero power reactors and nuclear systems. Prereq: 5210, 4130 or equivalent. W.

6230 Experimental Methods in Reactor Dynamics (3) Measuring system dynamic characteristics in time and frequency domain. Applications of computational fluid dynamics; Monte Carlo treatment in slowing down region and Andrade and Nordheim treatment in fast region. Prereq: Consent of instructor. F, W, Sp.


6250 Nuclear Reactor Noise Analysis (3) Modern system theoretical methods for evaluating reactor performance descriptions from operational data. Prereq: 4810 and Electrical Engineering 5740 or equivalent. F.

6260 Fusion Reactor Design (3) Basic plasma performance requirements for fusion power systems; assessment of recent development progress; impact of magnetic, fluid, and thermal boundary conditions; implementation of physics, engineering, and materials; advanced concepts for system design. Prereq: 5610. W


6280 Nuclear Fuel Cycle Analysis (3) Alternative fuel cycles, cyclic reactor systems and appropriate reactor systems; economic considerations; overview of fuel cycle processes related to solvent extraction of nuclear fuels: reprocessing, siteselection and environmental impacts; nuclear fuel isotopes. Reprocessing of light water reactor and advanced reactor fuels. Disposition of radionuclides and spent fuel from reactor systems. Prereq: 4130 or equivalent. F.


6310-20-30 Nuclear Design (3, 3, 3) Nuclear reactor design, development of conservation equations, elementary models and solution methods; applications to nuclear reactor fuel elements and heat exchangers. Prereq: 4720. F.

6320 Nuclear Reactor Analysis (3) Hydrodynamics and heat transfer in boiling systems, boiling crisis, fuel element thermal design, steam generator design. Prereq: 4710. W.

6330 Nuclear Reactor Design (3) First order reactor design, integration with non-reactor heat transfer and power conversion systems, economic evaluation, correlation of operating procedures, description of typical system designs. Coreq: 4730. F.

6340 Reactor Kinetics and Control (3) Coreq: Basic concepts of kinetics, fuel cycle kinetics, reactivity control and control and protective systems. Prereq: 4110. F.

6350 Nuclear Reactor Safety (3) Presentation of reactor safety concepts: basic terms, events, probabilities, fission product release and transport; containment systems. Prereq: 4710. F.

6360 Nuclear Fuel Management (3) Discussion of problems associated with processing of nuclear materials and cycles, analysis cycle, burnup calculation. Prereq: 4120. W.

6370 Theses (1-15) P/NC only. E

6380 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E

6390 Doctoral Research and Dissertation (3-15) Prereq: Approval of Nuclear Engineering Department. May be repeated. Cons of instructor. E

6410 Nuclear Engineering Practice (3-15) Experience in design and reporting on engineering problems. Prereq: Approval of Nuclear Engineering Department. May be repeated. Only Alternative Plan students may take this course. S/N only. E

6420 Special Research and Dissertation (3-3) P/NC only. E

6430 Nuclear Reactor Noise Analysis (3) Modern system theoretical methods for evaluating reactor performance descriptions from operational data. Prereq: 4810 and Electrical Engineering 5740 or equivalent. F.

6440 Fusion Reactor Design (3) Basic plasma performance requirements for fusion power systems; assessment of recent development progress; impact of magnetic, fluid, and thermal boundary conditions; implementation of physics, engineering, and materials; advanced concepts for system design. Prereq: 5610. W

6450 Nuclear Reactor Noise Analysis (3) Modern system theoretical methods for evaluating reactor performance descriptions from operational data. Prereq: 4810 and Electrical Engineering 5740 or equivalent. F.
Admission Requirements: Requirements for admission are a College of Home Economics application, the Graduate Record Examination; and three Graduate School Rating Forms. The forms may be obtained from the Dean’s Office. Interior Design majors should submit a portfolio of their work from studio experience of 15-20 slides which represent their best work. Students planning to enter the Master’s program in Food Systems Administration who are residents of Arkansas, Kentucky, South Carolina, and West Virginia; students entering the Food Science program who are residents of Kentucky; and students planning to enter Nutrition who are residents of Alabama, Arkansas, Georgia, Kentucky, South Carolina, and Virginia are also eligible for in-state tuition.

THE DOCTORAL PROGRAM
Special requirements for the Ph.D. are:
1. Selection of a concentration and fulfillment of the requirements as directed by the major professor and approved committee.
2. A minimum of 96 quarter hours in courses beyond the Bachelor’s degree, exclusive of credit hours for the Master’s thesis, to include a minimum of 12 quarter hours of 6000-level courses.
3. A written comprehensive examination.
4. An original research project, which culminates in a dissertation, 36 hours of which is included in the minimum 96.
5. A final oral examination in defense of the dissertation.

The doctoral committee shall determine whether a reading knowledge of a foreign language is required for an individual student.

Interdisciplinary (Based in the Departments of Child and Family Studies, Nutrition and Food Sciences, or Textiles, Merchandising and Design): The interdisciplinary concentration provides for advanced graduate study in the development, integration and application of knowledge to innovate solutions of the multi-level problems of society. A student in this program has a number of alternatives available: physiological development and well-being, environmental factors, individual and family behavior, and consumer’s economic and social well-being.

Special requirements are (1) 24 hours in two areas within the college; (2) 15-24 hours in collateral or supporting courses from other departments in the University including courses in statistics and research methods to assure competence for the dissertation research; (3) a minimum of 36 and maximum of 48 hours of Dissertation research; (4) $110-20 core courses (prerequisite is 510).

Nancy Belck, Dean
Jay Stauss, Associate Dean, Graduate Studies and Research
Jane Savage, Associate Dean, Undergraduate Studies
Fran Andrews, Assistant Dean, Undergraduate Studies
Karl Weddle, Assistant to the Dean

Graduate studies in Home Economics prepares the student for teaching, research and public service in colleges and universities or managerial positions in government, business and industry. The College of Home Economics offers two graduate degrees: the Master of Science in Child and Family Studies, Interior Design and Housing, Food Science, Food Systems Administration, Nutrition, and Textiles and Clothing (see respective department for specific information); and the Doctor of Philosophy in Home Economics with concentrations in an interdisciplinary curriculum, nutrition, and food science. For additional information, contact Dr. Jay Stauss, Associate Dean for Graduate Studies and Research, College of Home Economics, The University of Tennessee, Knoxville, TN 37996-1900. Phone: (615) 974-5221.

Academic Common Market: The ACM is an interstate agreement among southern states for sharing academic programs. If you are a resident of one of the participating states and qualify for admission, you may enroll in certain programs on an in-state tuition basis. Potential students for the doctoral program in Home Economics who are residents of Alabama, Arkansas, Kentucky, Louisiana, Mississippi, South Carolina, Virginia, or West Virginia are eligible.
The Department of Child and Family Studies encompasses two primary concentrations: child studies and family studies. Integration of these areas creates a unique perspective for the study of individuals and families. Each graduate student’s program of study is carefully planned in conjunction with a faculty committee to establish a program consistent with the individual goals of the student. All programs are characterized by a broad array of coursework, varied research experiences, and opportunities for experiences in applied settings. Students at the doctoral level receive substantial preparation in research statistics and social research methodology. Interested students should contact the Department Head.

Admission Requirements: Admission to the program is contingent upon satisfactory GRE scores, undergraduate graduate GPA, rating forms, and work experience.

THE MASTER’S PROGRAM

**Thesis Option:** A minimum of 45 hours, 30 at the 5000 level or above, are required, distributed as 18 hours in the major (at least 9 at the 5000 level), 9 hours of Thesis 5000, and 18 hours in a minor (at least 12 at the 5000 level). A field experience is available but not required. An oral examination on the thesis and coursework is given at the end of the program.

**Non-Thesis Option:** A minimum of 45 hours, 30 at the 5000 level or above, are required, distributed as 21 hours in the major (at least 9 at the 5000 level), 6 hours of field placements, and 18 hours in a minor (at least 12 at the 5000 level). Field experience is required. A final written and comprehensive examination is given at the end of the program.

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4390 Advanced Child Development (3) Survey of selected theories relevant to child development with emphasis on research literature and research methodology. Prereq: 4 hrs psychology and 6 hrs child development or equivalent.

4401 Learning Experiences with Parents (3) Dynamics of parent-teacher interaction. Emphasis on a variety of techniques for developing communication and working relationships between parents and teachers through experiences in a variety of settings. Prereq: 3010 or Home Economics 1516. W

4530 Family Interaction (3) Dynamics of family interaction at different points in the life cycle. Includes dynamics ofawanet-child relationships and the marital dyad, with family and as family interacts within complex interest and value systems within community. Prereq: 3815.

4610 Child in the Community (3) Needs of children; community agencies meeting these needs; visits to various community agencies. Prereq: 3515 or consent of instructor. May be repeated for departmental approval. No more than 9 hrs.

4620 Administration of Programs for Young Children (3) Planning for staffing, housing, teaching, scheduling, and balancing for day care infants and young children, nursery school programs, and specialized programs for deprived pre-school children. Prereq: 3536 or 4110.

4710 Contemporary Developments (1-3) Students and staff-initiated course for study of topical issues pertinent to the field; topics selected to be determined by students and instructor with departmental approval. Elective credit only. Prereq: Consent of instructor. May be repeated with departmental approval. No more than 9 hrs.

4810 African-American Families (3) Historical background, contemporary family structure and relationships, emerging family needs and programs. Prereq. 4110 or social work 5180.

4920 Families, Economics, and Demographic Change (3) Economic analysis of family demographic change. Developing families, family size, costs of raising children, family structure, economic stress, economics of marriage, increased divorce rate. Prereq: 3815, or consent of instructor.

4930 Consumers and the Market (3) Analysis of elements of concrete examples of the consumer market. Special attention is given to consumer decision-making for food, housing, and personal items. Emphasis on family needs and lifestyles and consumer-oriented controversies. Prereq: 3536 or 4110 or consent of instructor.

5000 Thesis (1-5) P/NP only. E

5001 Thesis, Graduate-Continuation (1-15) Required for the non-thesis student who is otherwise enrolled in the program and who is prepared for research work in the major field. May be repeated. Prereq: 3515 or 4430 or consent of instructor.

5110 Field Work in Family Life (3) School and community programs concerned with education for family living. Prereq. Consent of instructor. May be repeated. Prereq: 3536 or 4110 or consent of instructor.

5190 Standards in Consumer Protection (3) Product standards: analysis of various laws and regulations. Prereq: 4110 or consent of instructor.

5180 Family Financial Consultation (3) Analysis of family expenditure patterns, common financial difficulties, avenues by which families are assisted. Prereq. Consent of instructor. Prereq: 3536 or 4110 or consent of instructor.

5170 Conceptual Frameworks for the Family (3) Theoretical perspectives for understanding families. May be repeated. Prereq: 3515 or consent of instructor.

5210 Theories of Child Development (3) Prereq: 3420, 3515, or consent of instructor.

5220 Family Life Programs (3) School and community programs for family life survey and evaluation; student concentrate on topic best suited to their own experiences and field professional orientation. Prereq: 3 hrs child development, 3 hrs family relationships, 3 hrs social work. 2 hrs and 1 lab.

5301 Theory and Research on Human Sexuality (3) Cultural, social, and psychological dimensions of human sexuality. Major contributions from anthropological, sociological, and psychological theory and research.

5410 Advanced Family Relationships (3) Problems in modern family life; individual adjustments, group relationships. Prereq. 3515, 4430, or consent of instructor.

5500 Child in the Community (3) Problems of young children faced by parents and families. Emphasis on methods available to modify problem behavior.

5640 Child Development (3) Planning for staffing, housing, teaching, and balancing for day care infants and young children, nursery school programs, and specialized programs for deprived preschool children. Prereq: 3536 or 4110.

5610 Theories of Management in the Family Environment (3) Cultural, social, and psychological dimensions of human sexuality. Major contributions from anthropological, sociological, and psychological theory and research.

5700 Conceptual Frameworks for the Family (3) Theoretical perspectives for understanding families. May be repeated. Prereq: 3515 or consent of instructor.

5810 Survey of Research in Child and Family Studies (3) Research literature, locating, abstracting, and evaluating research literature. Prereq: 3536 or 4430 or consent of instructor.

5900 Research Methods in Child and Family Studies (3) Research procedures in child and family behavior; basic methodology of behavioral sciences. Recommended as prerequisite to beginning these work in advanced family and child care studies. Prereq: 5450 or consent of instructor.

5910 Family Education (3) Interpersonal transactions in disorderly family function. Prereq: 5410 or consent of instructor.

5920 Supervision in Child and Family Studies (3) Supervision and management of child and family studies. Exploration and applications of frameworks on theoretical and research levels. Historical to contemporary development of family studies. Prereq: 5410 or consent of instructor.

5930 Supervision in Child and Family Studies (3) Supervision and management of child and family studies. Exploration and applications of frameworks on theoretical and research levels. Historical to contemporary development of family studies. Prereq: 5410 or consent of instructor.

5940 Survey of Research in Child and Family Studies (3) Research literature, locating, abstracting, and evaluating research literature. Prereq: 3536 or 4430 or consent of instructor.

5960 Supervision in Child and Family Studies (3) Supervision and management of child and family studies. Exploration and applications of frameworks on theoretical and research levels. Historical to contemporary development of family studies. Prereq: 5410 or consent of instructor.

5970 Family Education (3) Interpersonal transactions in disorderly family function. Prereq: 5410 or consent of instructor.

5980 Supervision in Child and Family Studies (3) Supervision and management of child and family studies. Exploration and applications of frameworks on theoretical and research levels. Historical to contemporary development of family studies. Prereq: 5410 or consent of instructor.

5990 Supervision in Child and Family Studies (3) Supervision and management of child and family studies. Exploration and applications of frameworks on theoretical and research levels. Historical to contemporary development of family studies. Prereq: 5410 or consent of instructor.

6190 Conceptual Frameworks for the Family (3) Theoretical perspectives for understanding families. May be repeated. Prereq: 3515 or consent of instructor.

6210 Theories of Child Development (3) Prereq: 3420, 3515, or consent of instructor.

6220 Family Life Programs (3) School and community programs for family life survey and evaluation; student concentrate on topic best suited to their own experiences and field professional orientation. Prereq: 3 hrs child development, 3 hrs family relationships, 3 hrs social work. 2 hrs and 1 lab.

6301 Theory and Research on Human Sexuality (3) Cultural, social, and psychological dimensions of human sexuality. Major contributions from anthropological, sociological, and psychological theory and research.

6410 Advanced Family Relationships (3) Problems in modern family life; individual adjustments, group relationships. Prereq. 3515, 4430, or consent of instructor.

6500 Conceptual Frameworks for the Family (3) Theoretical perspectives for understanding families. May be repeated. Prereq: 3515 or consent of instructor.

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6550 Family Education (3) Interpersonal transactions in disorderly family function. Prereq: 5410 or consent of instructor.

6610 Theories of Child Development (3) Prereq: 3420, 3515, or consent of instructor.

6620 Family Life Programs (3) School and community programs for family life survey and evaluation; student concentrate on topic best suited to their own experiences and field professional orientation. Prereq: 3 hrs child development, 3 hrs family relationships, 3 hrs social work. 2 hrs and 1 lab.

6701 Theory and Research on Human Sexuality (3) Cultural, social, and psychological dimensions of human sexuality. Major contributions from anthropological, sociological, and psychological theory and research.
DEGREES

Nutrition and Food Sciences

MAJOR

DEGREES

Food Science
Nutrition
Food Systems Administration
Home Economics

Ph.D.
M.S.
M.S.

Food Science

R. E. Blechaume, Ph.D. Kansas State; D. B. Carruth (Memphis), Ph.D. Mississippi State (Associate Dean for Undergraduate Studies). Ph.D. Wisconsin; J. S. Smith, Ph.D. Missouri; M. A. Smith (Memphis), Ph.D. Tennessee.

Associate Professors:


Assistant Professors:

J. R. Biddle (Memphis), Ph.D. Tennessee; M. M. Mather, M.S.; M. M. M. Mather, M.S. Clemson; D. D. Columbus, D. J. Skinner, Ph.D. Oregon State.

Four quarters of internship at the Center for Health Sciences in Memphis are required for the dietetic internship and residency program prior to completion of the Master's degree program in Nutrition. Students studying public health nutrition will not have to complete one quarter of supervised field experience in a health agency.

For further information, contact the Department Head.

A minimum of 30 credit hours at or above the 5000 courses) is required. A minimum of 24 hours in the major field, with 18 hours at or above the 6000-level, is required.

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For further information, contact the Department Head.

A minimum of 30 hours at or above the 5000-level is required. A minimum of 30 credit hours at or above the 6000-level, is required. A minimum of 24 hours in the major field, with 18 hours at or above the 6000-level, is required.

A minimum of 30 hours at or above the 6000-level is required. An oral examination over the thesis and course offerings is given at the end of the program. Four quarters of internship at the Center for Health Sciences in Memphis are required for the dietetic internship and residency program prior to completion of the Master's degree program in Nutrition. Students studying public health nutrition will not have to complete one quarter of supervised field experience in a health agency.

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For further information, contact the Department Head.

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equivalent.\nsaccharides in Relation to Food Science (3) Physical and chemical character-istics of natural and purified \nbeverages: behavior in food. Prereq: 4010, 3418-50 or equivalent. Fix
101 Advanced Physical Chemical (4) \nNitrates;жу
101 Community Nutrition (3) Nutrition\nproblems and practices in community; supervised field work. Prereq: 3140 or equivalent. Fix
110 Community Nutrition (3) Nutrition programs of state and federal agencies; preparation of
nursing; consent of instructor. 3 hrs. Su
130 Mental Retardation or Other Developmental Disorders (3) Multidisciplinary care approach:\nspecialized services, home, school, and community settings. Prereq: 5150 or
consent of instructor. 5 hrs. Su
130 Nutrition in Mental Retardation and Developmental Disorders (3-12) Interdisciplinary diagnosis and
treatment of developmentally-handicapped child. Psychosocial, occupational, clinical experience and
works at Children's Center for the Health Sciences, Memphis. Prereq: consent of department head. E,
140 Experimental Methods in Nutrition (3) Use of statistical methods in nutritional research. Prereq: 3410-
50, 3415. 2 hrs and 1 lab. Fix
145 Human Metabolic Research (3) Basic principles of \ndevelopmental research in nutrition. Prereq: 5150 or
consent of instructor. 3 hrs. Fix
150-55 Human Nutrition (3, 3) Functions of carbo-
hydrates, proteins, fats, minerals and vitamins. Prereq: 5105-50, 5110. 2 hrs and 1 lab.
150-55-59 Human Nutrition (3) Observations and par-
ticipations; field experience rotations. Prereq: 5150-55. 2 hrs and 1 lab.
1510-55 Human Nutrition (3) Observations and par-
ticipations; field experience rotations. Prereq: 5150-55. 2 hrs and 1 lab.
1510-55 Human Nutrition (3) Observations and par-
ticipations; field experience rotations. Prereq: 5150-55. 2 hrs and 1 lab.
1511 Community Nutrition (3) Nutrition programs of state and federal agencies; preparation of
nursing; consent of instructor. 3 hrs. Su
155 Nutrition and Food Sciences (1-3) Recent advances in nutritional research and practice. Prereq: Consent of
instructor. May be repeated. Maximum 3 hrs. INC only.
1590 Graduate Seminar in Public Health (1-3) Recent advances in nutritional research and practice. Prereq: Consent of
instructor. May be repeated. Maximum 3 hrs. INC only.

5000 Seminar (1-3) May be repeated. S/NC only. E
6900 Seminar (1) May be repeated. S/NC only. E
6000-7000 Seminar (1-3) Special topics in nutrition and food sciences. Prereq: consent of
instructor. 1 to 3 hrs. E
6800 Seminar (1-3) Special topics in nutrition and food sciences. Prereq: consent of
instructor. 1 to 3 hrs. E
7110 Community Nutrition (3) Observations and par-
ticipations; field experience rotations. Prereq: 5150-55. 2 hrs and 1 lab.
7140 Community Nutrition (3) Observations and par-
ticipations; field experience rotations. Prereq: 5150-55. 2 hrs and 1 lab.
7170 Survey Methods in Human Nutrition (3) Food consumption, food practices and nutritional
status of various population groups. Prereq: 5110-55. 2 hrs and 1 lab.
7190 Food Survey and Human Nutrition (3) Food supplies and food practices as related to national
nutrition throughout world. Regional, national and international agencies concerned with food and nutrition
problems. Prereq: 5150 or consent of instructor. 3 hrs. Fix
7200 Agriculture and Human Nutrition (3) Nutritional problems and practices related to agricultural
nutrition and food production. Prereq: 5105-50. 2 hrs and 1 lab.
7201-10 Experimental Quality Food Study (3, 5) Analy-
sis of food production, handling environment, and packaging practices relative to quality of food prepared in
volume. Management resources. Prereq: 3210, 3220, 3290; consent of instructor. 5 hrs and 1 lab.
7300 Methods of Food Systems Research (3) Research methodologies;\napplicability to local food systems administration. Prereq: 3210 or equivalent. W, A
5840 Experimental Design of Food System Facili-
ties (3) Environment in which food is prepared, served and consumed. Prereq: 4120.
5900 Food Systems Evaluation (3) Management techniques for food systems. Standards for eval-
uation. Prereq: Consent of instructor.
5902 Financial Management of Food Systems (3) Analysis and control of food systems income and\nexpenses. Forecasting business cycle. Processing of data. Prereq: Consent of instructor.
5910 Administration of Food Service Delivery Sys-
tems (3) Role and responsibilities of administrator in maintaining\nsmooth and quantitative standards in food service delivery systems. Prereq: 3202 or
consent of instructor. W, A
5912 Financial Management of Food Systems (3) Analysis and control of food systems income and
expenses. Forecasting business cycle. Processing of data. Prereq: Consent of instructor.
5913 Financial Management of Food Systems (3) Analysis and control of food systems income and
expenses. Forecasting business cycle. Processing of data. Prereq: Consent of instructor.
5914 Financial Management of Food Systems (3) Analysis and control of food systems income and
expenses. Forecasting business cycle. Processing of data. Prereq: Consent of instructor.
5915 Financial Management of Food Systems (3) Analysis and control of food systems income and
expenses. Forecasting business cycle. Processing of data. Prereq: Consent of instructor.
Textiles, Merchandising, and Design

DEGREES

MAJORS

Textiles and Clothing

Interior Design and Housing

Minor

Arts and Sciences

Textiles, Merchandising, and Design

MAJORS

Textiles, Merchandising, and Design

Minor

Arts and Sciences

THE MASTER'S PROGRAM

Head for more information.

Consumers

Associate Professors:

Assistant Professors:

STATE UNIVERSITY

THE MASTER'S PROGRAM

Arts and Sciences

Consumers

Associate Professors:

Assistant Professors:

THE MASTER'S PROGRAM

Arts and Sciences

Consumers

Associate Professors:

Assistant Professors:

THE MASTER'S PROGRAM

Arts and Sciences

Consumers

Associate Professors:

Assistant Professors:

THE MASTER'S PROGRAM

Arts and Sciences

Consumers

Associate Professors:

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Assistant Professors:

THE MASTER'S PROGRAM

Arts and Sciences

Consumers

Associate Professors:

Assistant Professors:

THE MASTER'S PROGRAM

Arts and Sciences

Consumers

Associate Professors:

Assistant Professors:

THE MASTER'S PROGRAM

Arts and Sciences

Consumers

Associate Professors:

Assistant Professors:
Non-Thesis Option:
Major (minimum of 9 hours of 5000 courses)
24 hrs
Problem: 3 hrs
Minor (minimum of 12 hours of 5000 courses)
18 hrs
TOTAL
48 hrs

Required courses are 5160, 5170, 5180, and 5120 or 5250. A minor is chosen in an area other than Home Economics with the approval of the major professor.

A written comprehensive examination is required plus an oral defense of the research problem.

4110 Elementary Textile Microscopy (3) Microscopic techniques are applied to the study of textile fibers and fabrics. Prereq. 4010, 1 hr and 2 labs, W, A


4410 Apparel Production Management (3) Management principles of apparel production: inventory control, production planning, process, and management of human resources. Plant tours and case studies on production problems. Field trips required. S

4590 Principles of Retail Management (3) Analysis of retail sector of economy from management perspective. Approach to decision-making in retail operations: promotion, pricing, financial planning and control, product mix strategy. Prereq. Marketing 3110, 3120 or equivalent, F, W, Sp

5000 Thesis (1-15) P/NP only. E

5002 Non-Thesis Graduation Seminar (3-16) Required for the non-thesis student not otherwise registered during any quarter when such a student enters university facilities and/or faculty time before degree completion. May not be used toward degree requirements. May be repeated. SNC only. E

5100 Textile Testing and Methods of Research in Textiles (3) Physical and chemical testing. Research methods. 3 labs. Sp


5150 Principles of Design Analysis (3) Application of flat pattern theory to garment design incorporating relationships of fabric, form, textile, and surface design to garment design. Prereq. Consent of instructor. 1 hr and 2 labs. W

5190 Review of Literature (3) Intensive survey and evaluation of recent literature, implications for further research. Departmental approval required. W

6150 Social-Psychological Theories of Clothing (3) Clothing as it relates to human behavior. Prereq. 6 hrs or equivalent from sociology and psychology. W

6100 Advanced Textile and Apparel Economics (3) Analysis of current importance of textiles and apparel: production, consumption, and governmental policy. Prereq. 6 hrs economics or consent of instructor. E

5220 Textile Testing and Methods of Research in Textiles (3) Physical and chemical testing. Research methods. 3 labs. Sp


5610 Textile Processing (3) Mechanics of deformation of staple and continuous filament yarns; behavior of cloth, woven and non-woven fabrics. Prereq. Engineering Science and Mechanics 3311, Mathematics 2840. (Same as Polymer Engineering 5620)

5700 Current Topics in Textiles and Apparel (1-3) Lecture, group discussion, and study on specialized topics: apparel production management, functional design development, textile finishing, finishing, and surface ornamentation to design. Prereq. Consent of instructor. 1 hr and 2 labs. W

6160 Textile Flammability (3) Factors affecting textile flammability as consumer issue. Standards, testing, regulations, test methods, economic impact. Prereq: 6 hrs each of sociology and economics. Consent of instructor. Sp

6170 Physical Performance Behavior of Textile Structures (3) Fundamentals of yarn and fabric structures; relationship of structure to physical characteristics of textile materials. Prereq. 5150, or consent of instructor.
Aviation Systems
MAJOR \ DEGREE
Aviation Systems M.S.

Lead Professor: R. D. Kimberlin, M.S. Tennessee.

Instructor: J. M. Wu, Ph.D. California Technology.

Assistant professors: P. D. Collins, Ph.D. Georgia Institute Technology; A. M. Moslen, Ph.D. Tennessee; W. R. Young, Ph.D. Georgia Institute Technology.

The University of Tennessee Aerospace Institute offers a program leading to the Master of Science 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 who wish to study under a "systems philosophy" toward careers in research and development or administration in various phases pertinent to aviation. To qualify for admission to this program, the applicant must possess a Bachelor's degree in engineering or science from a recognized institution, show evidence of ability to pursue and benefit from the program, and fulfill the University of Tennessee Graduate School admission procedures and grade point standards. Subject matter prerequisite to the program includes basic knowledge of computer utilization, a background in statistics, a basic understanding of aerodynamics, aircraft propulsion and performance, a background in accounting and a basic knowledge of economics. Both thesis and non-thesis programs are available. The thesis program involves satisfactory completion of the following minimum requirements:

1. 18 hours in the major field of aviation systems.
2. For the research and development area, Industrial Engineering 5700, 5710, and 5720; for the administration area, in Economics 5030; and Finance 5010-20.
3. 6 hours of electives in one of the areas in item 2.
4. 6 hours of electives in the major field, engineering and/or the areas in item 2.
5. Satisfactory completion of Aviation Systems 5100.
6. Satisfactory completion of a comprehensive final written examination on all course work submitted for the degree and defense of the project course paper. The thesis program involves 45 quarter-hour credits while the non-thesis program involves 51 quarter-hour credits minimum.

5000 Thesis (1-15) P/NP only, E
5070 Airports and the Community (3) Structure of airports and their communities. Technology and economics of cargo, baggage, ticket and passenger handling, airport management, economics and logistics. Interfaces with the community; collection and distribution, demand for transportation, and types of developments and their projections. Prereq: Aerospace Engineering 5810.
5080 Collection and Distribution (3) Capabilities, technology, plans, programs and developments for collecting and distributing passengers and freight to and from various types of airports. Ground, water, air, and mixed transportation modes, present and future; requirements analysis, and model analysis of the system. Prereq: Aerospace Engineering 5810.
5090 Governmental Policies for Aviation (3) Theoretical and legal basis for economic and governmental policies on aviation and airport operations. Impact of aviation regulations on airport plans and programs and the impact of airport plans and programs on the operation of aviation regulatory agencies, organizational structure and administration, and enforcement procedures. Prereq: Aerospace Engineering 5810.

5270 Special Topics in Aviation Systems (3) Current problems in aviation systems. Prereq: Consent of instructor. May be repeated with consent. See also course descriptions for Aerospace Engineering 5810, 5820, and Industrial Engineering 5840.

Comparative and Experimental Medicine
DEGREES
Comparative and Experimental Medicine M.S., Ph.D.

Joint Graduate Coordinating Committee: W. Kitchen (Chairperson); J. E. Fuhr; R. A. Greener; J. E. Lauter; L. Millar.

The Comparative and Experimental Medicine degree program (M.S. and Ph.D.) is a jointly administered graduate program intended to prepare students for teaching and/or research careers in the health sciences. This program emphasizes the comparison of diseases, their development, and the study of pathology, immunopathology, aberrant mechanisms, oncology, and genetic disorders. The Ph.D. 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 an 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
ADMISSION REQUIREMENTS

General Requirements: Admission requirements of The Graduate School of UTK may be fulfilled in accordance with the Office of Research and Graduate Programs.

Requirements for Admission to the Master of Science Degree Program: Applicants will be required to have a professional degree in one of the medical sciences (M.D., D.D.S., D.V.M.) or a baccalaureate degree with coursework including chemistry through organic, mathematics through calculus, one year of physics, one year of basic biology plus an additional half-year of more advanced study in the field of biology including courses such as biochemistry, mammalian anatomy, histology, cell biology, or others that are appropriate for individuals aspiring to research careers in science.

Applicants for admission to the Master of Science program whose background includes formal training in the biomedical field beyond the baccalaureate degree will be required to satisfy one of the following: 1) minimum of 9 quarter hours of satisfactory performance on the Graduate Record Examination; or 2) acceptance of transfer credit based on previous work in the field of study.

Requirements for Admission to the Doctoral Philosophy Degree Program: Applicants will generally be expected to have a Master's degree in one of the biological sciences or a professional degree in one of the medical sciences.

Individuals having baccalaureate degrees with strong backgrounds in the physical sciences may be admitted upon presentation of evidence satisfactory to the Graduate Record Examination.

Eligibility for the above requirements may be made by the discretion of the Admissions Committee if the minimal requirements of The Graduate School have been met. Applicants who are admitted to graduate programs but who are lacking in course requirements will be required to correct these deficiencies early in their graduate programs.

For additional information, see sections in this catalog on College of Veterinary Medicine and College of Agriculture—Knoxville, or write to the Office of Research and Graduate Programs, P.O. Box 10/171, Knoxville, TN 37901.
Industrial and Organizational Psychology

DEGREES

Major

Industrial and Organizational Psychology

Bachelor of Science in Psychology

Chair: J. A. L. Dunn

Program Requirements:

1. Management or Psychology 5170-80-90.
2. Statistics 5050-60-70 and 3 hours of applied psychology.
3. Eighteen hours of additional coursework, at least six of which must be selected from among the 5000-level course offerings in management or psychology.
4. Management or Psychology 5250, 5260, Management 5110, 5230.
5. A minimum of 30 psychology credits.

Ph.D.

1. Management or Psychology 5170-80-90.
2. Statistics 5050-60-70 and 3 hours of applied psychology.
3. Eighteen hours of additional coursework, at least six of which must be selected from among the 5000-level course offerings in management or psychology.
4. Management or Psychology 5250, 5260, Management 5110, 5230.
5. A minimum of 30 psychology credits.
6. A thesis or dissertation is required.

Cooperative Education Program

The cooperative education program is designed to provide students with professional experience in the field of Industrial and Organizational Psychology. Students are expected to work for a minimum of 12 weeks during the academic year and 24 weeks during the summer months, with a minimum of 480 hours of work during the academic year and 960 hours during the summer months.

Cooperative education courses are listed as 5000-level courses and are available for credit towards graduation. Students are required to complete a minimum of 30 credits in industrial and organizational psychology courses, including 12 credits in 5000-level courses.

Applicants for the cooperative education program must have completed at least 30 credits in psychology and have a minimum grade point average of 3.0. Applicants must also complete an application form and interview with the Industrial and Organizational Psychology Program.

Career Opportunities:

Graduates of the Industrial and Organizational Psychology Program are prepared for careers in organizations, government, and consulting firms. Graduates find employment in a variety of positions, including human resources, training and development, and organizational development. Graduates may also pursue further education in psychology, business administration, engineering, or related fields.

For more information, please contact the Industrial and Organizational Psychology Program at 865-974-3030 or visit their website at https://www.utk.edu/psychology/academic-departments/industrial-and-organizational-psychology/
departmental and interdepartmental programs which augment the programs of individual departments.

The graduate program in Life Sciences supports studies and research in the following concentrations: animal physiology, cellular and molecular biology, environmental toxicology, ethology, plant physiology/biochemistry, and reproductive and developmental biology. Students interested in any of these areas should contact either the chair of Life Sciences or the director of the area of interest. Each concentration area is overseen by a committee and may have unique admission and graduation requirements above the minimums for the overall program.

**ADMISSION REQUIREMENTS**
1. A Bachelor’s degree with a major in a biological, behavioral or physical science.
2. GRE (general) exam.
3. Three letters of recommendation.
4. Course work including a year of calculus (differential and integral), one year of chemistry, and a year of physics. Specific course deficiencies may be corrected during the first year.

**PROGRAM REQUIREMENTS**

The Master’s program requires 45 hours of study approved by the student’s committee, a thesis, and a comprehensive oral examination. The minimum requirements for the doctoral program include at least 9 hours above the 6000 level, 36 hours of course work 6000, a pattern of courses approved by the student’s committee, a comprehensive examination, a doctoral dissertation, and a final individual examination. Individual concentration areas may have additional requirements.

**AREAS OF CONCENTRATION**

**Animal Physiology:** The interdepartmental program in physiology includes research in the areas of regulatory, reproductive, and developmental physiology, as well as the interactions between the nervous system and the endocrine and immune systems; stress and defense; pain and repair, and testing and residue analysis of potentially toxic agents from the point of mechanisms of intended and unintended effects.

**Environmental Toxicology:** The toxicology program provides intensive training in basic toxicological principles and techniques. Courses and research expose trainees to mechanisms of intended and unintended interactions between living systems and potentially toxic agents from the point of view of biochemistry, physiology, ecology, public health, environmental law and regulation, pest management, pollution control and repair, and testing and residue analysis of toxic agents.

**Ethology:** Ethology is the naturalistic study of normally occurring animal and human behavior. The program provides intensive training in basic ethology with specialization in studies available in the development, evolution, and physiology of behavior; human ethology; and behavioral ecology and sociobiology.

**Plant Physiology/Biochemistry:** This program provides the opportunity for intensive training and research experience in areas transcending the usual boundaries of botany, biochemistry, and agricultural plant sciences. It devotes itself to solving problems concerning the interactions of energy and agriculture, primarily at the biochemical and physiological level.

**Reproductive and Developmental Biology:** The interdepartmental program includes research in animal and plant development, reproductive endocrinology, and control of reproductive function, gene regulation and cellular interactions in development.

**Total 50**

A thesis option is available which substitutes 8 hours of thesis credit for the following 14 hours of coursework: Management Science 5335-40, and a three-hour course in the applied concentration area and 6 hours of electives in any area. The Management Science Committee will work closely with the student in tailoring a program to his/her needs. The committee must approve a tentative overall program during the student’s first quarter and must approve all courses on a quarter-by-quarter basis. Recognizing the diverse backgrounds and needs of Management Science M.S. students, the Management Science Committee is prepared to waive some of the above requirements on an individual basis. For example, an undergraduate major with a strong background may be allowed to take 6 additional hours of electives in place of the mathematics requirements. On the other hand, a student lacking experience in rigorous senior-level mathematics courses will be asked to take such courses to fulfill the 6-hour mathematics requirement. The total course load will remain 50 hours for all non-thesis students and 45 hours for all thesis students; however, the number of hours of electives can be renegotiated in time between 6 and 18 as a function of prior background.

The M.S. program in Management Science is designed as preparation for a career in the application of quantitative techniques for the solution of complex problems. The program’s flexibility also allows students to designate as preparation for doctoral study in Management Science.

Management Science coursework will expose students to both the theoretical and practical aspects of cells and subcellular components, or the interactions between cells.

**Environmetrical Toxicology:** The toxicology program provides intensive training in basic toxicological principles and techniques. Courses and research expose trainees to mechanisms of intended and unintended interactions between living systems and potentially toxic agents from the point of view of biochemistry, physiology, ecology, public health, environmental law and regulation, pest management, pollution control and repair, and testing and residue analysis of toxic agents.

**Electives in any area approved by advisor**

Management Science

**MAJOR DEGREE**

Management Science M.S.

**Committee:**

R. G. Badger, Chairperson, Management Science; J. S. Bradley, Mathematics; B. A. Lachin, Geography; E. Glauboff, Economics; J. K. Ho, Management Science; N. E. Rosemblat, Management Science; R. G. O'Brien, Statistics; M. S. Thompson, Computer Science.

**THE MASTER’S PROGRAM**

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Management Science coursework will expose students to both the theoretical and practical aspects of cells and subcellular components, or the interactions between cells.
The College of Law is conducted on the semester system.

Information regarding admission, financial aid, academic policies, extracurricular activities, and student services is available in the College of Law Bulletin. Students interested in the college should obtain a copy of the Bulletin from the Admissions Office, The University of Tennessee, College of Law, 1505 West Cumberland Avenue, Knoxville, Tennessee 37996. Completed application should be received before February 1 of the year of expected admission.

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. While the principal objective of the college is to prepare students for the private practice of law, its total mission is more broadly conceived. The college exposes students to the legal issues of our society, enabling them to develop analytical skills in respect of decisions, to understand the historical growth of the law, an awareness of the ethical responsibilities of lawyers and their professional role, and an understanding necessary for the accomplishment of the many tasks assigned by society to the legal profession.

LEGAL CLINIC

The University of Tennessee Legal Clinic was established in 1947. Though the Legal Clinic provides legal assistance to indigent persons, it is designed primarily as a teaching device to correlate theory and practice. It introduces the student, under faculty supervision, to the law in practice through personal contact with clients and their problems. The Legal Clinic functions as a large law office in which the student gains experience in interviewing clients, writing legal letters, investigating and evaluating facts, preparing memoranda of law, preparing cases for trial or appeal, and briefing cases. Classroom work supplements the handling of actual cases. The student is thus trained in the technique of law practice and the management of a law office. The ethical responsibilities of lawyers and their function as public servants are stressed.

Under present rules of the Tennessee Supreme Court, students, under the direct supervision of the Legal Clinic staff, are certified to practice before all courts of Tennessee.
The College of Law will award credit toward the J.D. degree for acceptable performance in up to three (3) upper-level courses taken in other departments at The University of Tennessee. Courses selection and registration are subject to guidelines established 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. Note: Students are advised to consult The Graduate School's degree requirements as stated in the front section of this catalog as well as the requirements for this college.

DUAL J.D.-MBA DEGREE PROGRAM

The College of Business Administration and the College of Law offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and the Master of Business Administration degrees. A student pursuing the dual degree program is required to take fewer hours of course work than would be required if the two degrees were pursued separately. Admissions: Applicants for the J.D.-MBA program must meet the admission requirements to both, and be competitively and independently accepted by, the College of Law for the J.D. degree and the Graduate School and College of Business Administration for the MBA degree, and by the Dual Degree Committee. Students who have been accepted by both colleges may commence studies in the dual program at the beginning of any term subsequent to the semester in which they are enrolled. In cases where courses in the other college, except as such courses qualify for credit without regard to the dual degree program, the J.D. and MBA degrees will be awarded upon completion of requirements of the dual degree program.

Satisfactory/No Credit Option (1) Course Eligibility

A. Students electing the Satisfactory/No Credit basis except as specifically designated.

1. The College of Law will award credit toward the J.D. degree for acceptable performance in up to 28 semester hours of approved graduate-level courses offered by the College of Law. A student shall be required to register for a minimum of 9 semester hours. A student may elect to take some of the approved courses on a Satisfactory/No Credit basis. The course work of the student will be recorded and the course cannot be used for purposes in the College of Law for graduate credit. To register for more than 28 semester hours, a student must register with the approval of the Dean of the College of Law.

2. A student electing Satisfactory/No Credit who makes 2.0 or above shall receive credit for the course, but the grade shall be recorded as S and will not be used in determining the grade average. A student electing Satisfactory/No Credit who makes below 2.0 shall receive an NC for the course and neither this grade nor the hours for the course will be used in computing the grade average or hours credit.

3. A student electing Satisfactory/No Credit basis will not be taken on a Satisfactory/No Credit basis exclusively.

4. A student receiving a Satisfactory/No Credit grade in a law course taken on the Satisfactory/No Credit basis will not be allowed to take more than 6 semester hours of courses in other colleges, except as specifically designated.

5. A student electing Satisfactory/No Credit basis except as specifically designated.

6. A student electing Satisfactory/No Credit may elect to receive a minimum of 9 semester hours. A student may elect to take some of the approved courses on a Satisfactory/No Credit basis. The course work of the student will be recorded and the course cannot be used for purposes in the College of Law for graduate credit. To register for more than 28 semester hours, a student must register with the approval of the Dean of the College of Law.

7. A student electing Satisfactory/No Credit who makes 2.0 or above shall receive credit for the course, but the grade shall be recorded as S and will not be used in determining the grade average. A student electing Satisfactory/No Credit who makes below 2.0 shall receive an NC for the course and neither this grade nor the hours for the course will be used in computing the grade average or hours credit.

8. A student electing Satisfactory/No Credit basis will not be taken on a Satisfactory/No Credit basis exclusively.

MAXIMUM COURSE LOAD PER SEMESTER

The maximum course load for a law student is 18 hours in any one semester. During the summer term the maximum course load is 7 hours.

POLICY FOR GRADUATE STUDENTS

TAKING LAW COURSES

Law courses are not available for graduate credit; however, a graduate student may elect to take courses in other colleges, except as specifically designated. A student must receive credit for any course taken in other colleges, except as such courses qualify for credit without regard to the dual degree program, or both the J.D. and MBA degrees will be awarded upon completion of requirements of the dual degree program. Each course in which the student completes a grade of 2.0 or above shall receive credit toward the J.D. degree. Law courses will not be included in the 30 semester hours of approved graduate-level courses offered by the College of Law which are included in the calculation of grade points. However, a student may elect to take courses on a Satisfactory/No Credit basis for which purpose credit may be awarded. A student electing the Satisfactory/No Credit basis must receive credit for each such course successfully completed in order that the course may be included in the calculation of grade points. A student must receive credit for any course taken in other colleges, except as such courses qualify for credit without regard to the dual degree program. Two of the 8 semester hours must be earned in courses taken at the University of Tennessee. Students wishing to pursue an advanced accounting course. If College of Law credit is given for such account- ing course, the dual degree student may not receive College of Law credit for Legal Accounting (Law College Course 5355). The College of Business Administration will award credit toward the MBA degree for acceptable performance in a maximum of 8 semester hours of approved courses offered by the College of Law. Except while completing the first year courses in the College of Law, students are encouraged to maximize the integrative facets of the joint program by taking courses in both colleges each year. Awarding of Grades: For grade recording purposes in the College of Law for graduate business courses and in the College of Business Administration for law school courses, grades awarded will be converted to either Satisfactory or No Credit and will not be included in the computation of the student's grade average or class standing in the colle- gium where such grades are so converted. The College of Law will award a grade of Satisfactory for a graduate business course in which the student has earned a B grade or higher and a No Credit for any lower grade. The College of Business Administration will award a grade of Satisfactory for a College of Law course in which the student has earned a 3.0 grade or higher and a No Credit for any lower grade. Grades earned in courses of either college may be used on a regular graded basis for any appropriate purpose in the college offering the course. The official academic record of the student maintained by the Registrar of the University shall reflect the actual grade earned by the instructor without conversion.

NON-LAW ELECTIVE COURSE CREDIT

Students enrolled in the J.D.-MBA degree program may not receive credit toward the J.D. degree for courses taken in other departments of the University except for the student enrolled in conjunction with the joint program. Satisfactory/No Credit Option (1) Course Eligibility

A. Electing to take courses on a Satisfactory/No Credit basis except as specifically designated.

1. Students electing the Satisfactory/No Credit basis except as specifically designated.

2. The College of Law will award credit toward the J.D. degree for acceptable performances in a maximum of 6 semester hours of approved graduate-level courses offered by the College of Law. A student shall be required to register for a minimum of 6 semester hours. A student may elect to take some of the approved courses on a Satisfactory/No Credit basis. The course work of the student will be recorded and the course cannot be used for purposes in the College of Law for graduate credit. To register for more than 28 semester hours, a student must register with the approval of the Dean of the College of Law.

3. A student electing Satisfactory/No Credit who makes 2.0 or above shall receive credit for the course, but the grade shall be recorded as S and will not be used in determining the grade average. A student electing Satisfactory/No Credit who makes below 2.0 shall receive an NC for the course and neither this grade nor the hours for the course will be used in computing the grade average or hours credit.

4. A student electing Satisfactory/No Credit basis will not be taken on a Satisfactory/No Credit basis exclusively.

5. A student selecting the Satisfactory/No Credit basis must register for a minimum of 6 semester hours. A student may elect to take some of the approved courses on a Satisfactory/No Credit basis. The course work of the student will be recorded and the course cannot be used for purposes in the College of Law for graduate credit. To register for more than 28 semester hours, a student must register with the approval of the Dean of the College of Law.

6. A student electing Satisfactory/No Credit who makes 2.0 or above shall receive credit for the course, but the grade shall be recorded as S and will not be used in determining the grade average. A student electing Satisfactory/No Credit who makes below 2.0 shall receive an NC for the course and neither this grade nor the hours for the course will be used in computing the grade average or hours credit.

7. A student electing Satisfactory/No Credit basis will not be taken on a Satisfactory/No Credit basis exclusively.

8. A student receiving a Satisfactory/No Credit grade in a law course taken on the Satisfactory/No Credit basis will not be allowed to take more than 6 semester hours of courses in other colleges, except as specifically designated.

9. A student electing Satisfactory/No Credit who makes 2.0 or above shall receive credit for the course, but the grade shall be recorded as S and will not be used in determining the grade average. A student electing Satisfactory/No Credit who makes below 2.0 shall receive an NC for the course and neither this grade nor the hours for the course will be used in computing the grade average or hours credit.

10. A student electing Satisfactory/No Credit basis will not be taken on a Satisfactory/No Credit basis exclusively.