Division of Continuing Education, Knoxville

Joseph P. Goddard, Dean
William D. Barton, Associate Dean
Judy B. Constantine, Administrative Assistant

The Division of Continuing Education, Knoxville, is the administrative unit of UTK that extends academic courses, educational services, and other programs to the nontraditional student. While most people who participate in the programs are adults, persons of all ages and academic levels can be counted among the people who enroll in the credit and non-credit offerings of the Division.

Programs and courses are based upon student needs and desires, whether for self-motivated learning; for leisure and recreational programs; or for professional promotion, certification, licensure, relicensure, or midcareer changes. The Division provides these educational opportunities through program coordination and development of the two departments: Conferences and Non-Credit Programs, and the University Evening School. Specific programs and services of each department are described on the following pages.

Conferences and Non-Credit Programs

Director:
W. L. Whelan, Ed.D., Pacific States.

Assistant Director for Program Development:
D. A. Myers, Ph.D., Florida.

Assistant Director for Administration:

Staff Assistant:
M. A. Barry

Administrative Assistant:
I. P. Keith

Coordinators:

It has become evident that learning can take place for an extended period of time in a variety of modes, settings, and circumstances other than in the traditional classroom. To bring this fact to reality, The University of Tennessee, Knoxville, continuing education program has been designed and staffed to bring together under University auspices groups of participants and qualified resource persons to share new learning and ideas; to develop new insights; to address current problems; or to impart new skills and techniques. The program embraces virtually all disciplines, professions, vocations, and avocations.

The Department of Conferences and Non-Credit Programs is staffed and equipped to advise, assist, and provide administrative support in the delivery of successful conferences, seminars, and non-credit courses. In these roles, the Department can consult on program content; develop a working budget; secure appropriate classroom and/or meeting sites; devise an attractive format; arrange for auxiliary services, such as lodging, meal and banquet events, extra excursions and tours, and handle complete registration procedures. In addition, the Department designs, prints, and mails conference brochures and non-credit catalogs. The Department is equipped to handle computerized registrations and to process all monies as required.

Non-credit courses administered by the Department are tailored to meet the personal and professional needs of individuals and groups in the area. These courses are offered in cooperation with other academic units of the University and/or non-University agencies and cover a wide range of interests. One program, the Smokey Mountain Field School, generates considerable interest by emphasizing outdoor learning experiences in the Great Smoky Mountains National Park. One phase of the Department which has experienced increased interest and growth is the English Language Institute. This program is of special interest to non-English speaking people and is structured to help foreign students obtain a sufficient mastery of the English language so as to pursue their educations in the United States.

Continuing Education Units (CEU's) are awarded to students satisfactorily completing courses which are approved. A CEU is defined by the Southern Association of Colleges and Schools as "ten contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction." A permanent record of CEU's is maintained by the Department. A letter of completion of all CEU's earned at The University of Tennessee, Knoxville, may be obtained upon written request.

Recent statewide legislation gives Tennessee citizens who are 60 years of age or older or those who are totally disabled the opportunity to audit courses at UTK free of charge, according to availabe space. Legal verification of either of these conditions is required for enrollment. Additional information may be obtained by calling (615) 974-5261 or 974-6688.

University Evening School

Director:

Directors, Off-Campus Graduate Engineering Program:
Kingsport-M. K. Goodman, M.S., Tennessee; Oak Ridge and Nashville-J. D. Westbrook, Ph.D., V.P.I.; Assistant Director, Oak Ridge-V. Maya, M.S. Tennessee.

Assistant Directors:

Coordinator:
M. K. Warden, M.S., Tennessee

Administrative Assistant:
B. H. Boeker

Assistant Professors:

Instructor:
A. J. MacCabe, M.S., SUNY at Albany.

The University Evening School, in conjunction with academic colleges and departments, administers credit programs for those students attending classes on-and off-campus in a variety of non-traditional formats. Support services are provided to assist students in their educational pursuits.
On-Campus Evening Program. Classes are offered during late afternoon and evening hours for those students who work or have other commitments during the day. The following undergraduate degrees are available:

- **College of Business Administration** - Bachelor of Science in Business with a major in Accounting, General Business, Economics, or Management (General concentration);
- **College of Liberal Arts** - Bachelor of Arts with major in Anthropology, Art, Biology, Computer Science, Economics, Mathematics, Psychology, or Sociology.

Some departments within the Colleges of Business Administration, Education, and Engineering offer all courses required for an advanced degree during the evening. The College of Business Administration also offers all courses required for the MBA degree with a concentration in Management. For other majors, consult the appropriate academic department.

- **Mini-Term.** The University Evening School offers two Mini-Terms a year— one during September and one in December. Students may enroll in one concentrated credit course during the ten-day Mini-Term period. Courses and instructors listed for the Mini-Term are carefully selected to reflect a broad academic base of individualized offerings suited to an intensive program of study. Courses cover traditional material and information included in regular quarter offerings; however, these courses may be supplemented with films, team teaching, field trips, independent research projects and specialized areas of study, affording students the opportunity to immerse themselves in the discipline selected.

- **Off-Campus Programs.** The Evening School conducts undergraduate and graduate courses in many locations away from the Knoxville campus. The courses are scheduled in response to requests and identifiable needs of adult part-time students who live some distance from the UT campus and who take part or all of their courses at off-campus locations. All course offerings and instructors are approved by the appropriate academic department heads, and the credit awarded is resident credit. The majority of colleges cooperate in off-campus programming. Some off-campus locations offer course work leading to specialized graduate degrees. Graduate students in the College of Education may acquire sufficient course work at Cleveland State Community College to complete the Masters degree in Curriculum and Instruction with a major in Curriculum.

The Evening School administers off-campus centers at Kingsport, Nashville, and Oak Ridge where courses leading to advanced degrees in science, engineering, and business are offered. The Kingsport Center offers course work leading to Masters and Doctoral degrees in Chemical, Electrical, and Industrial Engineering (Management options available). At Oak Ridge, graduate study programs lead to an MBA with concentrations in Management or Statistics, as well as Masters and Doctoral degrees in Engineering, Mathematics, and Physical Sciences.

- **Graduate programs leading to the Masters in Industrial Engineering are available at the Nashville location.** Workshops. Credit workshops are coordinated through various academic departments of the University and provide students the opportunity to participate in short periods of intensive study. As a result, students may earn college credit within a shorter time frame than the traditional quarter system.

- **Workshops** offer flexibility of timing, location, and content; and summer workshops are particularly popular with teachers and school administrators. Although most workshops are held on the UT campus, geography is not a limiting factor.

### FINANCIAL AID

Evening School students who encounter difficulty in pursuing academic goals because of financial restrictions may be eligible for assistance through the Evening School Scholarship Fund. Interested students may also obtain applications for the Pell Grant (formerly Basic Educational Opportunity Grant) in the Evening School Office.

### Elderly and Disabled Persons

Recent legislation gives Tennessee citizens who are 60 years of age or older, or those who are totally disabled, the opportunity to attend courses at the University at no charge on an audit, space available basis. Legal verification of either of these conditions is required for enrollment. Students who are 65 or over, or who are totally disabled, and who desire to receive UT credit for their courses, may pay a reduced charge of $5 per credit hour up to a maximum of $50 for a full-time load. Registration for day and evening classes is handled by the Evening School.

The University Evening School office is located at 451 Communications & University Extension Building on the UTK campus and may be reached by calling (615) 974-5361. All inquiries concerning these programs are welcome.
College of Education

William H. Colfeild, Dean
C. Glennon Rowell, Associate Dean for
Instructional Programs
Thomas W. George, Assistant Dean for
Support Services

Teacher education is historically a major function of The University of Tennessee. Beginning in 1903, when the first courses for teachers were offered, the University has increasingly fulfilled its responsibility to provide schools with competent teachers and service personnel and to improve the teaching profession by continually upgrading its membership. The College of Education was established in 1926, and all teacher preparation programs at The University of Tennessee are now coordinated within its seven departments and its School of Health, Physical Education, and Recreation.

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 faculty of the College of Education is committed to performing three major functions: (1) to provide professional preparation for teachers, administrators, and school service personnel at 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 experimental and research studies in education.

The teacher preparation programs represent utilization of University-wide resources and cooperation of all appropriate units. Certain requirements are of basic importance: A broad cultural background in the arts and sciences (general education), mastery of professional knowledge and skills, and thorough preparation of specific teaching fields. Through a carefully planned program of combined academic and direct experiences, the prospective teacher acquires a depth and breadth of knowledge and understanding superior to that of the typical college graduate—superior in cultural and citizenship appreciation as well as in professional and scholarly accomplishment.

The Claxton Education Building contains many modern and functional facilities for the professional training of teachers. Classrooms, laboratories, seminar rooms, faculty and administrative offices, the instructional materials center, the Bureau of Educational Research and Service, the School Planning Laboratory, and facilities for special activities such as observation and experimentation are located in this air-conditioned building.

Teacher Placement Service

The College of Education, cooperating with the University Placement Service, assists qualified students and alumni in securing positions. School and college administrators are cordially invited to make full use of these services in their efforts to employ competent personnel.

General Information

Application with the College

Application for association with the College of Education may be made at any time.

Course Load—Permission for more than 19 hours in a quarter must be obtained from the Assistant Dean for Support Services. A normal course load in the college is 16-19 hours.

Applicants for association with the College of Education are classified accordingly:

1. Full Association. Minimum 2.5 high school grade point average (4 point scale) and a minimum of 17 ACT composite score or 765 SAT combined score.
2. Provisional Association. Students not eligible for Full Association are granted Provisional Association. Status may be upgraded to Full Association upon the completion of a minimum of 45 quarter hours and the achievement of a minimum 2.5 grade point average (4 point scale).

Transfer students, from within and external to The University of Tennessee, Knoxville, must meet the same Association requirements described above. Post-secondary work completed and grade point averages earned at other institutions will be used in the determination of Full Status for transfer students who have not earned the minimum high school grade point average and standardized test scores.

Admission to Teacher Education

Students desiring certification to teach must gain admittance into Teacher Education before enrolling in various required upper-division education courses. Applicants are encouraged to (1) begin the multiphase admission process during their first quarter of full-time attendance and (2) complete the process by approximately the sixteenth quarter hour.

Requirements:

1. Basic Skills Tests. The State Board of Education requires all applicants to pass tests of reading comprehension, mathematics, and language. Applicants with a minimum ACT composite score of 17 are exempted from this requirement. Transfer students having a minimum ACT composite score of 17 or a total score of 765 (Verbal/Quantitative) on the SAT or CEEB must supply the assistant dean’s office with an official record of their score(s).

2. SAT. Students desiring certification to teach must meet the same Association requirements described above. Applicants for transfer students, except for junior-senior transfer students, are encouraged to begin the basic skills tests during their second quarter of full-time attendance, using time during their first quarter of attendance for test preparation. (Details on preparation are available through the assistant dean’s office.)

3. Field Experience. Applicants to Teacher Education must provide evidence of having
successfully completed a field experience in a public school setting. (Refer to program area curriculum for specific required experiences.) Students, except for junior-senior transfer students, should complete the field experience requirement during their fourth quarter of full-time attendance.

4. Speech and Hearing Evaluations. Applicants are required to undergo speech and hearing evaluations.

Students, except for junior-senior transfer students, should undergo the speech and hearing evaluations during their fourth quarter of full-time attendance.

Applicants to Teacher Education are required to have a minimum of 2.5 UTK grade point average. Furthermore, transfer students must also, have a minimum of 2.5 cumulative grade point average. (No applicant's grade point average will be considered until the completion of at least 60 quarter hours.)

A program area recommendation may be required of some applicants.

Applicants to Teacher Education will be reviewed by the Office of Student Conduct. Any applicant who has established a record of misconduct will be reviewed by the college's Admission and Retention Committee.

Graduate students, except for those previously admitted to the College's Teacher Education Program, must gain admittance to Teacher Education before receiving the College's recommendation for certification.

Students interested in complete details on admission to Teacher Education should contact the Assistant Dean for Support Services, 212 Claxton Education Building.

Admission to Student Teaching

Application for all student teaching programs must be filed no later than January 1 of the academic year preceding the actual experience. For example, if a student plans to student teach during the 1983-84 academic year, application must be made by January 1, 1983. Applications for student teaching may be completed on approximately four occasions each quarter. A schedule of the application meetings is available in the Office of the Director of Student Teaching, 212 Claxton Education Building. Making application for student teaching is not contingent upon admission to the Teacher Education Program. Students should apply for student teaching as soon as possible, regardless of their status in the process of admission to the Teacher Education Program.

Following are the general prerequisites for student teaching. Student teaching prerequisites are program area (art, elementary, P.E., etc.) available in the student teaching office or from the academic advisor.

(1) Full admission to the Teacher Education Program no later than the quarter preceding student teaching.

(2) Completion of the professional core courses (Education 3010, 3020, 3030 and Educational Psychology 2430 or 3810).

(3) Completion of field experiences required in the program curriculum.

(4) Completion of special methods teaching courses at The University of Tennessee.

(5) Completion of at least nine quarter hours of prescribed course work in Professional Education at The University of Tennessee at Knoxville.

(6) Senior standing and a minimum grade point average of 2.5 on work completed at The University of Tennessee, and a cumulative grade point average of 2.5. In addition, any record established by the student in the Office of Student Conduct will be reviewed by the Admissions and Retentions Committee.

The 15-quarter hour student teaching experience is evaluated on a satisfactory/no credit basis and must be evaluated by the University policy requiring a 2.0 in the last 45 hours worked.

The most important criterion in placing student teachers in the public schools is the value of the experience for preparing for teaching. The University cannot guarantee the geographic locale desired by the student though effort will be made to follow the student's wishes. Student teaching centers are maintained in East Tennessee communities, some of which are at a considerable distance from Knoxville. Married students will be placed as near their homes as possible in order to preserve family life.

Substitutions

It is sometimes necessary and advisable for students to substitute other courses for those required in a particular curriculum. This is particularly true of students who transfer to the University of Tennessee College of Education from another college or university. The general test of whether a substitution would be appropriate is, Does the course you wish to substitute meet the spirit of the course requirement? That is, is the content similar or perhaps more appropriate to your needs?

To initiate a substitute the student should visit with the advisor first. If they agree that the substitution is an appropriate one, the substitution request form should be forwarded to the Office of the Assistant Dean for Support Services, 212 Claxton Education Building. Approved petitions are forwarded to the Dean of Admissions for further approval, and for filing in the Records Office.

Courses taken at junior or community colleges may be substituted for lower division (1000/2000 level) courses or may be used as electives. These courses may not be substituted for upper division (3000/4000 level) courses.

Recommendation for Certification

The application for a professional teacher's certificate should be completed early in the final quarter before graduation. Application forms may be obtained in the Registrar's Office, 215 Student Services Building, and in the Office of the Assistant Dean for Support Services, 212 Claxton Education Building.

Tennessee state regulations stipulate that the applicant for a professional certificate must be recommended by the teacher-training institution. The dean of the College of Education is the official designated to recommend University of Tennessee graduates for teacher certification. To receive this recommendation, the applicant must have fulfilled the following requirements:

(1) A minimum cumulative grade point average of 2.0.

(2) Satisfactory performance of the student teaching experience.

(3) A minimum grade point average of 2.0 in the teaching field(s).

(4) Completion of a methods course in each area of endorsement.

(5) Fulfillment of all special recommendations of the Admissions and Retention Committee.

(6) Successful completion of at least one three quarter hour course dealing with the learning characteristics of handicapped students.

(7) Effective January 15, 1981, the Tennessee State Board of Education requires all persons seeking Tennessee teaching certification to take the National Teacher Examinations. Students may obtain further information in the Advising Center, 212 Claxton Education Building.

Graduate Programs

The College of Education, through the Graduate School, offers programs leading to the Master of Science degree, the Master of Education degree, the Master of Arts in College Teaching degree, the Master of Public Health degree, the Specialist in Education (advanced graduate) degree, the Doctor of Education, and the Doctor of Philosophy degrees. For further information, see the Graduate Catalog.

Undergraduate Curricula

The college offers courses of study leading to the Bachelor of Science in Education and to eligibility for teacher certification in Tennessee and in those states which grant reciprocity privileges to graduates of institutions accredited by the National Council for Accreditation of Teacher Education (NCATE).

A core of studies provides the foundation for specialization in all teacher education curricula. In addition, approved concentrations must be completed in subject fields specifically related to the public school curriculum. A choice is to be made among programs leading to recommendation for certification at one of three levels: elementary, (kindergarten-9), secondary (grades 7-12), or special subjects in grades 1-12.

Courses in library science are available to students who are interested in beginning positions in any library or in preparation for further graduate study in professional librarianship. The minimum requirements for full-time librarianship in any size school in Tennessee can be met through completion of the basic library service courses (3510, 3520, 3530, 4140, 4150, 4270, 4330, 4750).

Endorsement as a librarian requires 27 quarter hours in library science. At the undergraduate level, only a minor in library science is available. Students in the college will select an appropriate curriculum from those outlined under the (undergraduate curriculum) section.

Students interested in this program should consult with a member of the faculty of the Graduate School of Library and Information Science.

Students should work closely with faculty advisers in planning programs of study. The chosen curriculum must be followed as outlined to assure graduation and certification, and any proposed substitution for a required course should be filed for approval before the end of the junior year.

Satisfactory/No Credit Courses

For the curricula listed under roman numerals I, II, and III only, a student may include a maximum of 30 hours in non-
directed electives taken on a Satisfactory/No Credit basis in the total hours required for graduation. S/NC may not be used in required courses or controlled electives, except where the course is offered on an S/NC basis (such as student teaching and field experiences). An area of concentration will be considered as non-directed electives except where specific courses or controlled electives are required.

**NOTE:** Students are advised to consult the University’s degree requirements as stated in the front section of this catalog as well as the requirements for the college or department.

### I. Curricula for Elementary Teachers

#### A. Grade 1 through Grade 8

**General Education...** 81 hours

**Communications...** (13 hours)

English 1010 or 1011; 1020; 1031 or 1032 or 1033 (English 1019 may be required for some students); Speech 2021 or 2311.

**Health and Physical Education...** (15 hours)

P.E. 3450 (3), School Health 3610 (3), P.E. activities (4), P.E. electives (2-3 hours) and Health elective (3) from School Health 1110, 3000, 3210, School Health 3410, 3510.

**Humanities...** (12 hours)

Literature 8 hours; Art Education 3500 or Music Education 3500 (4 hours).

**Mathematics...** (9 hours)

Mathematics 2110, 2120, 2130.

**Natural Sciences...** (16 hours)

8 hours in biological science. Recommended series are Biology 1210, 1220 (1230) or Botany 1110, 1120. 8 hours in physical science. Recommended series are Physics 1410, 1420 (1430), or Geology 1410, 1420, or Astronomy 2110, 2120 (2130); or Chemistry 1110, 1120 (1130).

**Social Studies...** (16 hours)

U.S. History (8 hours) (it is recommended that the history course be taken at the sophomore level); Social Institutions (4 hours); Geography (4 hours).

**Core Professional Courses...** 9 hours

Educ. C & I 3010*, 3020*, 3030*.

**Elementary Education Courses...** 49 hours


**Specialized Courses...** 33 hours

Educational Psychology 3430; Educ. Psych. 3110; Art Ed. 3100, 3150; Music Ed. 2100, 3110; Ed. C & I 3510; Special Ed. 3333; C & I 4303; C & I 4420; C & I 4750.

**Electives...** 18 hours

TOTAL MINIMUM REQUIRED... 191 hours

### B. Kindergarten through Grade 8

**General Education...** 81 hours

**Communications...** (13 hours)

English 1010 or 1011; 1020; 1031 or 1032 or 1033 (English 1019 may be required for some students); Speech 2021 or 2311.

**Health and Physical Education...** (15 hours)

P.E. 3450 (3), School Health 3610 (3), P.E. activities (4), P.E. electives (2-3 hours) and Health elective (3) from School Health 1110, 3000, 3210, School Health 3410, 3510.

**Humanities...** (12 hours)

Literature 8 hours; Art Education 3500 or Music Education 3500 (4 hours).

**Mathematics...** (9 hours)

Mathematics 2110, 2120, 2130.

**Natural Sciences...** (16 hours)

8 hours in biological science. Recommended series are Biology 1210, 1220 (1230) or Botany 1110, 1120. 8 hours in physical science. Recommended series are Physics 1410, 1420 (1430); or Geology 1410, 1420; or Astronomy 2110, 2120 (2130); or Chemistry 1110, 1120 (1130).

**Social Studies...** (16 hours)

U.S. History (8 hours) (it is recommended that the history course be taken at the sophomore level); Social Institutions (4 hours); Geography (4 hours).

**Core Professional Courses...** 9 hours

Educ. C & I 3010*, 3020*, 3030*.

**Elementary Education Courses...** 49 hours


**Specialized Courses...** 33 hours

Educational Psychology 3430; Educ. Psych. 3110; Art Ed. 3100, 3150; Music Ed. 2100, 3110; Ed. C & I 3510; Special Ed. 3333; C & I 4303; C & I 4420; C & I 4750.

**Electives...** 6 hours

TOTAL MINIMUM REQUIRED... 191 hours

**C. Nursery School through Grade 3**

**General Education...** 83 hours

**Communications...** (12 hours)

English 1010 or 1011; 1020; 1031 or 1032 or 1033; Speech 2021 or 2311.

**Humanities...** (12 hours)

Literature (4); Music 1210 or 1220 or Art 1815 or 1825; philosophy or religious studies (4).

**Natural Science...** (16 hours)

Biology (6-12 hours) (e.g. Biology 1110-20-30) or 3 hours in a series of three areas of social science other than history.

**Mathematics...** (9 hours)

Math 2110-20-30 taken in sequence.

**Social Sciences...** (18 hours)

Four hours in history; 12 hours electives from a minimum of three areas of social science other than history.

**Core Professional Education...** 53 hours

**A. Education Curriculum & Instruction...** (9 hours)

Educ. C & I 3010*, 3020*, 3030*.

**B. Education and Methods...** (29 hours)


**Electives...** 6 hours

TOTAL MINIMUM REQUIRED... 192 hours

### II. Joint Elementary-Mathematics Education Certification

**Mathematics...** (9 hours)

Mathematics 2110, 2120, 2130. Students with at least 3 years high school mathematics (e.g. Algebra I, Geometry, and Algebra II) and ACT Mathematics score of at least 22 may replace the 9 hours of Mathematics 2110-20-30 with the following six hours of mathematics courses: 3 hours credit in courses selected from Mathematics 3310, 3320, 3330; 3 hours credit in courses selected from Mathematics 3100, 3110, 3270.

**General Education...** 90 hours

**Communications...** (12 hours)

English 1010-20 and 1031 or 1032 or 1033 (English 1019 may be required of some students); Speech 2021 or 2311.

**Humanities...** (12 hours)

Eight hours of literature and four elective hours.

**Health and Physical Education...** (19 hours)

Psychology 2500, Educ. Psychology 2430; Physical Education 3450; physical education electives (3 hours); School Health 3610. Select one of the following as a prerequisite to School Health 3610: Physical Education 3110-20-30 or Botany 1110-20 or Geography 1410, 1420-30 or Chemistry 1110-20-30

**Mathematics...** (9 hours)

Math 2110-20-30 taken in sequence.

**Social Sciences...** (18 hours)

Four hours in history; 14 hours electives from a minimum of three areas of social science other than history.

**Core Professional Education...** 53 hours

**A. Education Curriculum & Instruction...** (9 hours)

Educ. C & I 3010*, 3020*, 3030*.

**B. Education & Methods...** (29 hours)


**Electives...** 6 hours

TOTAL MINIMUM REQUIRED... 192 hours
AREA OF CONCENTRATION ...........................36 hours at
SPECIALIZED COURSES .........................15 hours
represented.)

or public health or nutrition (P.E. must be
some students); and Speech 2311.

GENERAL EDUCATION ..............................70 hours

2. Minimum of 12 hours of mathematics
   courses numbered 3050 or above,
   including at least one course in algebra
   and one in geometry.

ELECTIVE ..................................................6 hours

TOTAL MINIMUM REQUIRED .......................201 hours

III. Curricula for Secondary Education (7-12)

GENERAL EDUCATION ..............................70 hours

Communications (13 hours)
English 1010 or 1011; 1020; 1031 or 1032
or 1033 (English 1019 may be required of
some students); and Speech 2311.

Health and Physical Education (9 hours)
including at least 3 hours of school health
or public health or nutrition (P.E. must be
represented).

Humanities (16 hours)
Any 4 hours from English 2510-20-30-40-
50-60-70-80-90; plus 12 hours of electives
from anthropology, art, English literature,
Library and Information Science 3510-20-30,
foreign language (beyond introductory level),
history (upper-division), music, philosophy,
or religious studies. (NOTE: At least three fields
must be represented.)

Mathematics (4 hours)1
Natural Science (12 hours)
A biological science, a physical science, or
a combination of the two.

Psychology (4 hours)
Psychology 2500.

Social Studies (12 hours)
Two fields should be represented from
anthropology, economics, geography, history,
human services, political science, and
sociology.

CORE PROFESSIONAL EDUCATION...........9 hours
Educ. C & I 3010, 3020, 3030

SPECIALIZED PROFESSIONAL
EDUCATION.............................................39 hours
Special Ed 3333, Educational Psychology
3810; 6 hours of appropriate methods
courses; Educ. C & I 3521-22-23, 4100, 4710-
20*, Ed. 4300 or Ed. 4304, and 6 hours of
electives selected from the College of
Education.
NOTE: An appropriate special methods
course must be taken in each subject and/or
area in which endorsement is sought, and
admission to Teacher Education Program is
required for each.

English
Educ. C & I 3657 and
3658

Foreign Language
Educ. C & I 3652 and
3653

Mathematics
Educ. C & I 3751 and
3752
Science
Educ. C & I 3654 and
4654
Social Studies 2
 Educ. C & I 3653 and
5855

TEACHING SUBJECT AREAS
AND ELECTIVES .....................................72 Hours
See outline of the programs below.

TOTAL MINIMUM REQUIRED ...................190 hours

PROGRAMS AVAILABLE
Program majors leading to graduation and
certification for high school teaching range
from the broad fields, comprehensive major,
to the subject major and minor combination
programs.

A. English Education
1. English with a Minor
   a. 45 quarter hours in English, including
      three in English language (3330, 3340,
      4430, 4440, 4450). Nine of the 45 hours
      may be in speech provided the student is
      not minoring in speech.
   b. 27 hours in some other subject which
      constitutes a minor. (If students who
      elect to minor in a foreign language do
      not have two entrance credits in a
      foreign language from high school, they
      must take 36 hours in a foreign
      language.)
   c. Students enrolled in this program must
take two English methods courses:
      Education C&I 3657 and 3658.

B. Foreign Language Education
1. Foreign Language Area
   a. 36 quarter hours in one language with no
      less than 18 quarter hours of upper-
      division courses.
   b. 27 quarter hours in another language
      with no less than 18 quarter hours of
      upper-division courses.
   c. 9 hours of general and applied linguistics.

2. Foreign Language Major and Minor
   a. 45 quarter hours (9 less quarter hours if
      based upon 2 entrance credits from high
      school) and one language with no less
      than 27 quarter hours of upper-division
      courses.
   b. 27 quarter hours in another subject.

C. Mathematics Education
1. Area Majors in Mathematics
   a. Mathematics and Physical Sciences (75
      hours)
      (1) Mathematics1 (27 hours) must include
      at least a one-year sequence in calculus
      or analytic geometry and calculus and at
      least 12 hours in courses numbered
      3050 or above with at least one course
      in algebra and one in geometry.
      (2) Related Sciences—12 hours in physics2
      and 12 hours in each of two of the
      following subjects: astronomy, biology,
      botany, chemistry, geology, microbiology,
      zoology.
      Endorsements: Mathematics, General Science3
   b. Mathematics and Physical Science, General Science4
      (72 hours)
      (1) Mathematics1 (36 hours)—must include
      at least a one-year sequence in calculus
      or analytic geometry and calculus and at
      least 12 hours in courses numbered
      3050 or above with at least one course
      in algebra and one in geometry.
      (2) Computer Science and Physics—24
      hours in computer science and 12 hours in
      physics5.
      Endorsement: Mathematics

D. Psychology Education
1. A concentration and endorsement in
   psychology shall require a minimum of 30
   quarter hours—12 hours upper division
distributed as follows:

   Core ..................................................16 hours
   Psychology 2500 ..........................................4
   Psychology 3120 ..........................................4
   Psychology 3150 ..........................................4
   Psychology 3210 ..........................................4

   Electives—14 hours selected from:
   Psychology 2520, 2530, 2540, 3129, 3210, 3220, 3230, 3240, 3580, 4560,
   4230, 4510, 4520, 4610, 4900;
   Psychology or Edu. Psych. 4640; Ed.
   Psych. 3110, 4110, 4130, 4800, 4880,
   4850,
   2. Two minors (18-27 hours for a total of 45
      quarter hours) each with minimum of 6
      hours upper division.
   At least one of the two minor areas must
   meet Tennessee minimum endorsement
   requirements for the subject area.

E. Science Education
1. Area Majors in Science
   a. Biological science (72 hours minimum)
      Biology 1210-20-30* or Botany 1110-20-
      40 (12 hours)
      Biology 3110-20-30 (12 hours)
      Microbiology 2010 (4 hours)
      Chemistry (excluding 1410 series) (12
      hours)
   Science electives—(32 hours minimum),
   approved electives must be selected
   from one or more of the following:
   biological sciences—biochemistry,
   botany, microbiology, zoology, physical
   science—chemistry. Minimum
   requirement in biological science consists
   of 56 hours (12 hours chemistry required,
   excluding 1410 series).

*Requires admission to Teacher Education Program.
1At least one must be taken concurrently with a special
methods course.
2Excluding Math 2012, 2110, 2120, 2130.
3Excluding Physics 1410, 1420, 1430;
4Plant and animal science courses required.
5Only one freshman-level biological science series permitted.

1At least one must be taken concurrently with a special
methods course.
2Excluding Math 2012, 2110, 2120, 2130.
3Excluding Physics 1410, 1420, 1430;
4Plant and animal science courses required.
Endorsements: Biology (Life Science) and General Science.

b. Earth and Environmental Sciences (72 hours minimum)
Includes 12 hours biological science required, and 14 hours science electives selected from astronomy, chemistry (excluding 1410 series), geography, geology, and physics.

Geology (10 hours).

Chemistry (8 hours).

Physics (excludes 1410 series) (4 hours).

Astronomy (4 hours).

Geography (physical) (4 hours).

Geography (meteorology or climatology) (4 hours).

Cartography, conservation, oceanography, or soil science (6 hours).

Endorsements: Earth Science, General Science,
and Physical Science

c. Natural Science (72 hours minimum)

Basic requirement of 12 hours in each of the following:

1. Biology 1210-20-30 or Botany 1110-20-40.

Chemistry series (excluding 1410 series).

Geology series (excluding Geology 1000).

Physics (excluding 1410 series)

Mathematics (excluding 1020, 2020 and 2110-20-20).

Credit for only 12 math hours accepted in the program.

Approved science electives—24 hours

minimum, including a total of six quarters of
course work in one subject area other
than math.

Biology is considered as one subject for
high school endorsement.

Endorsements: General Science
(Possible endorsements: Biology,
Chemistry, and Physics)

2. Subject Majors in Science

The only single subject majors in science
leading to teacher certification are
chemistry and physics. Majors 45 quarter
hours; minors 27 quarter hours.

Endorsements: Major Subject

F. Social Science Education

Program I

Broad fields Social Studies (Major 72 hours)

Certification includes economics,

geography, history, political science and

sociology.

a. 28 quarter hours in history, including

1510-20 and 2510-20, and 12 hours in

World and/or American history.

b. 8 quarter hours in each of the following:

geography, political science, and

sociology.

c. 4 quarter hours in anthropology.

d. 9 quarter hours in economics, including

2510-20 and an elective.

e. 7-8 additional quarter hours in the above-

listed or related fields.

Program II

Specific subject major (45 hours plus 27

hours for a minor).

Minors. A minor is defined as 27 quarter

hours in a single subject area, i.e., biology,

history, French, psychology, speech, etc. A

minor does not meet certification requirements

in all cases.

IV. Art and Music Education

A. Art Education

GENERAL EDUCATION.............68-70 hours

Communications (12-13 hours)

1. Plant and animal science courses required

2. Certification in any single area.

English 1010 or 1011; 1020; 1031 or 1032
or 1033; and 3-4 hours in speech.

Health and Physical Education (9 hours)

Activities courses in physical education plus

School Health 3510.

Humanities (15-16 hours)

Art History 1615 and 1625, one literature

course, one elective from anthropology,

philosophy, foreign language above 1000

level, history, library service, religious studies

or music.

Mathematics (4 hours)

Natural Science (12 hours)

Any twelve hours from the biological and/or

physical sciences.

Psychology (4 hours).

Psychology 2500.

Social Studies (12 hours)

Any twelve hours from at least two areas.

CORE PROFESSIONAL EDUCATION...9 hours

Ed. C &I 3010, 3020, 3030

SPECIALIZED PROFESSIONAL

EDUCATION........................................22 hours

Student teaching: Ed. C & I 4710*, 4720*;
Ed. Psych. 2430 or 3810; Special Educ. 3333,
Art Ed. 4100.

TEACHING AREAS AND ELECTIVES........44 hours

A. Major (60 hours)

Art Educ. 3100, 3120, 3220, 3320, 4110,
4130, 4200, 4300, 4400.

Art 1115, 1125, 1135. Plus twelve quarter

hours in a single studio area and twelve

additional hours distributed over three other

studio areas.

B. Minor (24 hours)

May be taken in any department.

TOTAL MINIMUM REQUIRED........183 hours

B. Music Education

GENERAL EDUCATION.............66-68 hours

Communications (12-13 hours)

English 1010-20 and 1031 or 1032 or 1033;

and 3-4 hours in speech.

Health and Physical Education (9 hours)

Activities courses in physical education plus

School Health 3510.

Humanities (14 hours)

Music 2290-30, literature course, and one

elective from art, anthropology, literature,

foreign language beyond introductory level,

history, philosophy, or religious studies.

Mathematics (4 hours)

Natural Science (11-12 hours)

Three courses from the biological and/or

physical sciences, to include Physics 1810.

Psychology (4 hours)

Psychology 2500.

Social Studies (12 hours) Any 12 hours, to

include at least two areas.

CORE PROFESSIONAL EDUCATION...9 hours

Ed. C & I 3010*, 3020, 3030*

SPECIALIZED PROFESSIONAL

EDUCATION........................................22 hours

Student teaching: Educ. C & I 4710*, 4720*;
Ed. Psych. 2430 or 3810; Music Ed. 4100,
and Special Ed. 3333.

TEACHING AREAS AND ELECTIVES.....85-110 hours

Concentration in Vocal Music (Voice

Principal)

1. Requires admission to Teacher Education Program.

2. Requires admission to Teacher Education Program.

a. 25 quarter hours in Music Education:

1010-20; 2110; 2411; 2421; 2431; 2433;
3100-32; 3150; 4420; 4510.

b. 60 hours in music: 1111-21-31; 1113-23-

33; 2111-21-31; 2113-23-33; 2340; voice

22 hours; required ensemble 11 hours

plus piano.

Concentration in Vocal Music (Piano or

Organ Principal)

a. 25 quarter hours in Music Education:

1010-20; 2110; 2411; 2421; 2431; 2433;
3100-32; 3150; 4420; 4510.

b. 66 hours in music: 1111-21-31; 1113-23-

33; 2111-21-31; 2113-23-33; 2340; piano or

organ 22 hours; voice 6 hours;

required ensemble 11 hours.

Concentration in Elementary Music

Education (Voice Principal)

a. 31 quarter hours in Music Education:

1010-20; 2110; 2411; 2421; 2431; 2433;
3101-22; 3150; 4420; 4441-42-43; 4450.

b. 60 hours in music: 1111-21-31; 1113-23-

33; 2111-21-31; 2113-23-33; 2340; vocal

22 hours; piano proficiency; required

ensemble 11 hours.

Concentration in Elementary Music

Education (Piano or Organ Principal)

a. 31 quarter hours of Music Education:

1010-20; 2110; 2411; 2421; 2431; 2433;
3101-22; 3150; 4420; 4441-42-43; 4450.

b. 66 hours in music: 1111-21-31; 1113-23-

33; 2111-21-31; 2113-23-33; 2340; piano

or organ 22 hours; voice 6 hours;

required ensemble 11 hours.

Concentration in Instrumental Music

a. 35 quarter hours in Music Education:

1010-20; 2110; 2411-13; 2421-22-23; 2431-

32-33; 3100-32; 3150; 4420; 4441-42-43;
4450.

b. 72 hours in music: 1111-21-31; 1113-23-

33; 2111-21-31; 2113-23-33; 2340; 3112;
3122 or 4124; principal instrument 22

hours; secondary instrument 6 hours;

piano proficiency; required ensemble

11 hours.

c. Music Education 4460 is required for all

students whose principal instrument is

wind or percussion.

TOTAL MINIMUM REQUIRED........182-209 hours

GENERAL REGULATIONS FOR ALL MUSIC

EDUCATION STUDENTS

A. Required participants with credit or as a

registered auditor, in a major instrumental

or vocal organization each quarter in

residence (on-campus) as a music education

major, as approved by the student's advisor

and the directors of the organizations

concerned. Students preparing to be band

directors are expected to enroll in marching

band unless officially excused.

Instrumental Major. Concert Band;

University Marching Band; or University

Orchestra.

Vocal Major: Concert Choir; University

Chorus, Chamber Singers.

Elementary Music Education Major.

Same as Vocal Major.

B. Transfer students must take proficiency

examinations in applied music, music

theory, sight-singing and dictation prior to

registration in music education curricula.

V. Health, Physical Education,

Recreation, and Safety

A. Concentration in Elementary Physical

Education (1-9)

GENERAL EDUCATION.............90 hours
Communications (12 hours) English 1010 or 1011; 1020 and 1031 or 1032 or 1033; Speech 2021 or 2311.

Humanities (16 hours) English 2510 or 2520 plus 12 hours of electives.

Social Studies (16 hours) Sociology 1510 plus 12 hours of electives.

Natural Science (24 hours) Chemistry 1510-20, Physics 1450, and Zoology 3220-30 and 4840.

Mathematics (4 hours) Psychology 2500.

Health and Physical Education (14 hours) School Health 3000 and 3420; physical education activities (6 hours) including P.E. 2012, 2022, 1022, 3180.

CORE PROFESSIONAL EDUCATION 9 hours Ed. C & I 3010*, 3020, 3030*


TEACHING AREAS AND ELECTIVES 70 hours

Elementary Physical Education (46 hours) P.E. 1000, 3550, 3560, 3570, 3650, 3660, 3670, 3830, 4110, 4150, 3330, 4440, 3260, and 4 hours of P.E. activities electives.

Cognate Course and Electives (24 hours) CFS 3210 and 21 hours to be used for endorsement, minor, or free electives.

TOTAL MINIMUM REQUIRED 197 hours

B. Minor in Elementary Physical Education

(Open only to students with a concentration in secondary physical education.) P.E. 3540; 3550; 3560; 3570; 3650; 3660; 3670; 3860; 4150; 3260.

C. Concentration in Secondary Physical Education (7-12)

GENERAL EDUCATION 96 hours English 1010 or 1011; 1020 and 1031 or 1032 or 1033; speech elective (4); chemistry (1510-20 suggested); Physics 1450; Zoology 2920-30 and 4840; Mathematics elective (3); School Health 3210. Humanities electives (16 hours) selected from: English literature; anthropology; art; foreign language; music; philosophy; religion; dance appreciation; interior design and housing. Social studies electives (20 hours) selected from: history; anthropology; economics; geography; political science; sociology; geology; psychology. Psychology 2500. Physical education activities (12 hours); P.E. 1020, 1021 or 1022, 1032, 2012, 2022, 2032.

PROFESSIONAL EDUCATION 33 hours Education C & I 3010-20-30*, Educ. Psych. 3810; Educ. C & I 4710-20, education elective (3 hours); Physical Education 4100, 3290 (practicum, field experience—2 hours).

SPECIALIZED PROFESSIONAL EDUCATION 6 hours P.E. 1000; 3210; 4140; 3320; 4110; 4120; 4250; 3260 or 3170; 4310; 4440 or 4450.

*Requires admission to Teacher Education Program.

**Requires admission to Teacher Education Program.

Electives

School Health 3210, Public Health 3210 or Safety 3260.

Health and Safety (3 hours minimum) School Health 3210, Public Health 3210 or Safety 3260.

Humanities (16 hours minimum) At least 4 hours selected from English 2000 level and above; at least 3 hours selected from history; at least 9 additional hours selected from English 2000 level and above, History 1510-20, 1590-60, 2510-20, 2350, Anthropology 2530, Geography 3660, Classics 2910-20, 2910-20, 3910-20, 3910-20, 4010, Philosophy 1510-20, 2310, 2410, 3315, 3630, 3910, Religious Studies 2610, 2611.


PROFESSIONAL RECREATION EDUCATION 24 hours Recreation 1100, 3100, 3140, 3220, 3860, 4130, 4200.

FIELD STUDY 21-24 hours Recreation 1000, 2000, 3000, 4000.

SKILLS AREAS 18-24 hours Student selects two of the following skill areas and completes at least 3 courses in each area (9-12 hours) in each:


Dramatics: Theatre 1310-20-30, 2111, 2121, 2211-21, P.E. 4070.

Music: Music Education 4410, 2100, 1010-20, Music 1500 through 1595 applied music series.
Outdoor Recreation and Camping: 4120, 4240, Recreation 3301, 3302, 3710, 4310.
Sports: Physical education—2 team sports, 3 individual sports.

FREE ELECTIVES: to be added to above requirements to total minimum of 192 hours for the degree.

TOTAL MINIMUM REQUIRED.............192 hours

I. Major in Public Health

GENERAL EDUCATION..............87 hours

Communications (13 hours)
English 1010 or 1011; 1020 and 1032;
Speech 2311.

Health and Physical Education (11 hours)
School Health 3000
School Health 3210
Physical education electives.

Humanities (16 hours)
English—any 4 hours from literature;
Anthropology 2530; Philosophy or religious studies elective (4); Art or music elective (4).

Mathematics (4 hours)
Natural Science (20 hours)
Chemistry or physics sequence; Biology 1210-20 or Zoology 2920-30.

Psychology (4 hours)
Psychology 2500.

Special Studies (19 hours)
Economics 2110; Geography 2110 or 2120 or Political Science 2510 or 2520; History 1510-20 or 2510-20; Sociology 1510.

CORE PROFESSIONAL EDUCATION...9 hours

EDUCATION...........28 hours

Education C & I 4750, 4710 and 4720; Education Psychology 3810; School Health 3650, 4100; Special Educ. 3333.

TEACHING AREAS AND ELECTIVES........66 hours

School Health required courses (9): 3410, 3420, 3620; School Health electives (3): 4710 or 4810-20-30 Public Health required courses (9): 3310, 3320, 3330 Public Health electives: Safety 3520; Biology 1230; Microbiology 2910-19; Psychology 3130; Sociology 1520; Social Psychology 3130; Nutrition 1230; electives: Special Note: If some of the specific courses cited above are dropped or changed, they may be substituted with an equivalent course.

TOTAL MINIMUM REQUIRED.............190 hours

K. Minor in Driver and Traffic Safety Education (28 hours)

REQUIRED COURSES..................17 hours
Safety 3520, 4410, 4420; School Health 3210.

ELECTIVES.........................11 hours
At least nine hours selected from: School Health 4120; Educ. C & I 4750; Educ. Psychology and Guidance 2520; School Health 3650.

L. Minor in School Health Education (30 hours)

School Health 3000, 3210, 3410, 3650, 3420; Safety 3520; Public Health 3310, 3320, 4410; Nutrition 1230 or School Health 4420 or School Health 3620.

VI. Special Education* A. Concentration in General Special Education

GENERAL EDUCATION..............74 hours

Communications (9 hours)
English 1010-20 and 1031 or 1032 or 1033. (Some students may be required to take English 1019 based on placement scores.)

Health and Physical Education (18 hours)
P. E. 3430, 3450, 4110 activities electives (4 hours); School Health 3510; Psychology 2500.

Humanities (12 hours)
Language Arts (4 hours); electives from anthropology, art, literature, library and information science, upper-division history, music, philosophy, religious studies, or foreign language above the introductory level (8 hours).

Mathematics (3 hours)
Elective (Math 2110 recommended).

Natural Science (16 hours)

*Requires admission to Teacher Education Program.

Mathematics (4)
Natural Science (20 hours)
Chemistry or physics sequence; Biology 1210-20 or Zoology 2920-30.

Psychology (4 hours)
Psychology 2500.

Special Studies (19 hours)
Economics 2110; Geography 2110 or 2120 or Political Science 2510 or 2520; History 1510-20 or 2510-20; Sociology 1510.

CORE PROFESSIONAL EDUCATION..9 hours

EDUCATION...........28 hours

Education C & I 4750, 4710 and 4720; Education Psychology 3810; School Health 3650, 4100; Special Educ. 3333.

TEACHING AREAS AND ELECTIVES........66 hours

School Health required courses (9): 3410, 3420, 3620; School Health electives (3): 4710 or 4810-20-30 Public Health required courses (9): 3310, 3320, 3330 Public Health electives: Safety 3520; Biology 1230; Microbiology 2910-19; Psychology 3130; Sociology 1520; Social Psychology 3130; Nutrition 1230; electives: Special Note: If some of the specific courses cited above are dropped or changed, they may be substituted with an equivalent course.

TOTAL MINIMUM REQUIRED.............190 hours

K. Minor in Driver and Traffic Safety Education (28 hours)

REQUIRED COURSES..................17 hours
Safety 3520, 4410, 4420; School Health 3210.

ELECTIVES.........................11 hours
At least nine hours selected from: School Health 4120; Educ. C & I 4750; Educ. Psychology and Guidance 2520; School Health 3650.

L. Minor in School Health Education (30 hours)

School Health 3000, 3210, 3410, 3650, 3420; Safety 3520; Public Health 3310, 3320, 4410; Nutrition 1230 or School Health 4420 or School Health 3620.

VI. Special Education* A. Concentration in General Special Education

GENERAL EDUCATION..............74 hours

Communications (9 hours)
English 1010-20 and 1031 or 1032 or 1033. (Some students may be required to take English 1019 based on placement scores.)

Health and Physical Education (18 hours)
P. E. 3430, 3450, 4110 activities electives (4 hours); School Health 3510; Psychology 2500.

Humanities (12 hours)
Language Arts (4 hours); electives from anthropology, art, literature, library and information science, upper-division history, music, philosophy, religious studies, or foreign language above the introductory level (8 hours).

Mathematics (3 hours)
Elective (Math 2110 recommended).

Natural Science (16 hours)

*Requires admission to Teacher Education Program.

Mathematics (4)
Natural Science (20 hours)
Chemistry or physics sequence; Biology 1210-20 or Zoology 2920-30.

Psychology (4 hours)
Psychology 2500.

Special Studies (19 hours)
Economics 2110; Geography 2110 or 2120 or Political Science 2510 or 2520; History 1510-20 or 2510-20; Sociology 1510.

CORE PROFESSIONAL EDUCATION..9 hours

EDUCATION...........28 hours

Education C & I 4750, 4710 and 4720; Education Psychology 3810; School Health 3650, 4100; Special Educ. 3333.

TEACHING AREAS AND ELECTIVES........66 hours

School Health required courses (9): 3410, 3420, 3620; School Health electives (3): 4710 or 4810-20-30 Public Health required courses (9): 3310, 3320, 3330 Public Health electives: Safety 3520; Biology 1230; Microbiology 2910-19; Psychology 3130; Sociology 1520; Social Psychology 3130; Nutrition 1230; electives: Special Note: If some of the specific courses cited above are dropped or changed, they may be substituted with an equivalent course.

TOTAL MINIMUM REQUIRED.............190 hours

K. Minor in Driver and Traffic Safety Education (28 hours)

REQUIRED COURSES..................17 hours
Safety 3520, 4410, 4420; School Health 3210.

ELECTIVES.........................11 hours
At least nine hours selected from: School Health 4120; Educ. C & I 4750; Educ. Psychology and Guidance 2520; School Health 3650.

L. Minor in School Health Education (30 hours)

School Health 3000, 3210, 3410, 3650, 3420; Safety 3520; Public Health 3310, 3320, 4410; Nutrition 1230 or School Health 4420 or School Health 3620.
110 College of Education

Edu. C & I 3260, 3270, 3280, 3281, 3350, 3351, 3720, 3511-12-13 or Special Education 3461, 4610*, 4820.

SPECIALIZED COURSES............18 hours

SPECIAL EDUCATION COURSES.....42 hours
Special Education 3333, 4520, 4110, 4210, 4610, 4130, 4150, 4351, 4440, 4740, 5260, and 6 hours psychology or educational psychology electives.

STUDENT TEACHING WITH EXCEPTIONAL CHILDREN..........................15 hours
Special Education 4860, 4861, 4862.

TOTAL MINIMUM REQUIRED......205 hours

C. Concentration in the Hearing Impaired ADMISSION TO THE PROGRAM FOR TEACHERS OF THE HEARING IMPAIRED

In addition the college requirements for Admission to Teacher Education, Special Education students in the program for teaching the hearing impaired will follow these procedures:

1. File application for admission to the program.
2. The Program Screening Committee will review all applications quarterly. The following criteria are considered:
   a. cumulative grade point average;
   b. completion of these courses: Special Education 2110-20, 3333 and 9 additional hours of course work in the major field (AREA OF CONCENTRATION);
   c. advisor's recommendations (based on personal interview and career planning);
   d. instructor's recommendations (from the courses in Special Education listed above);
   e. the candidate's personal aptitude for teaching in Special Education as indicated by practical experiences;
   f. writing sample;
   g. the committee will grant full, or provisional, admission or will deny admission. A candidate may appeal the decision to the Departmental Appeals Committee and the College Appeals Committee.
3. Formal admission to the program will be granted after the Program Screening Committee reviews applications and the above criteria are considered.
4. A comprehensive examination in sign language and finger-spelling must be taken at least two quarters before student teaching. A remedial course in sign language and finger-spelling will be offered each quarter.
5. Transfer students will follow the same admission procedures.

1. Specialization in Early Childhood Development

GENERAL EDUCATION............74 hours
Communications (9 hours)
English 1010-20 and 1032. (Some students may be required to take English 1019 based on placement scores.)

Health and Physical Education (10 hours)
School Health 3510, P.E. 3450; P.E. electives.

Psychology (4 hours)
Psychology 2500.

Humanities (11-12 hours)

- English literature
- Psychology 2500.

- Specialized Professional Education

Elementary Education................12 hours

- Specialized Courses


- Required admission to Teacher Education Program

AREA OF CONCENTRATION.........67 hours
Audiology and Speech Pathology elective (3050 recommended), Audiology and Speech Pathology 3010, 3710 (or Sp. Ed. 4240), 4930 (or 5950), Special Education 2110, 2120 (or Educ. C & I 3511-15-19), 3333, 4190, 4200, 4210-20-30, 4250, 4280, 4290, 4351, 4361, 4371, 4870, 4871, and pre-student teaching seminar, 4100 (1).

TOTAL MINIMUM REQUIRED......189 hours

3. Specialization in Secondary Education

GENERAL EDUCATION............75 hours
Communications (9 hours)
English 1010-20 and 1032. (Some students may be required to take English 1019 based on placement scores.)

Health and Physical Education (9 hours)
School Health 3510 and physical education electives.

Humanities (11-12 hours)

- English literature; 7-8 elective hours (choose from two areas): anthropology, art, history, philosophy, foreign language (above introductory level), religious studies, music, library and information science.

Mathematics (4 hours)
Mathematics 2110.

Natural Science (20 hours)
(If major is science education, student must take 12 hours in biological sciences); 8-12 hours in the biological science: (choose one series) Biology 1210-20-30, Botany 1110-20, 8-12 hours in physical science: Physics 1410-20-30, Astronomy 2110-20-30, Chemistry 1110-20-30.

TOTAL MINIMUM REQUIRED......180 hours

2. Specialization in Elementary Education

GENERAL EDUCATION............77 hours
Communications (9 hours)
English 1010-20 and 1032. (Some students may be required to take English 1019 based on placement scores.)

Health and Physical Education (15 hours)
P.E. 3450; School Health 3510, 3610; P.E. electives.

Psychology (4 hours)
Psychology 2500.

Humanities (12 hours)

- Literature (6); elective from philosophy, art, religious studies, or music.

Mathematics (3 hours)
Mathematics 2110.

Natural Science (16 hours)

- 8-12 hours in biological science (choose one series): Biology 1210-20-30, Botany 1110-20, 8-12 hours in physical science: Physics 1410-20-30, Astronomy 2110-20-30, Chemistry 1110-20-30.

Social Studies (18 hours)

- History 1510-20 or 2510-20. 10 hours (choose 3 areas): anthropology, economics, geography, political science, sociology.

- Mathematics (3 hours)

- Specialized Professional Education

7 hours Educational Psychology 3810 and appropriate methods course for major area.

AREA OF CONCENTRATION........67 hours
Audiology and Speech Pathology elective (3050 recommended), Audiology and Speech Pathology 3010, 3710 (or Sp. Ed. 4240), 4930 (or 5950), Special Education 2110, 2120 (or Educ. C & I 3511-15-19), 3333, 4190, 4200, 4210-20-30, 4250, 4280, 4290, 4351, 4361, 4371, 4870, 4871, and pre-student teaching seminar, 4100 (1).

TOTAL MINIMUM REQUIRED......187 hours

4. Specialization in Multiple Handicapped

GENERAL EDUCATION............75 hours
Communications (9 hours)
English 1010-20 and 1032. (Some students may be required to take English 1019 based on placement scores.)
Health and Physical Education (10 hours)
School Health 3510; P.E. 3450 and P.E.
electives.

Psychology (4 hours)
Psychology 2500.

Humanities (11-12 hours)
English literature; 8 hours electives (choose 2 areas: anthropology, art, history, philosophy, foreign language (above introductory level), religious studies, music, library and information science.

Mathematics (3 hours)
Mathematics 2110.

Natural Science (20 hours)
8-12 hours in biological science (choose one series): Biology 1210-20-30; Botany 1110-20; 8-12 hours in physical science: Physics 1410-20-30, Geology 1510-20, Astronomy 2110-20-30, Chemistry 1110-20-30.

Social Studies (18-20 hours) History 1510-20 or 2510-20; 10-12 hours (choose 3 areas): anthropology, economics, geography, political science, sociology.

CORE PROFESSIONAL COURSES: 9 hours
Educ. C & I 3010, 3020, 3030.

AREA OF CONCENTRATION: 67 hours

- Audiology and speech pathology elective (3050 recommended), Audiolog and Speech Pathology 3010, 3710 (or Sp. Ed. 4240), 4930 (or Speech 5950); Special Education 2110-20, 3333, 4100, 4200, 4250, 4260, 4280, 4290, 4351, 4361, 4371, 4870, 4871, and pre-student teaching seminar, Spec. Educ. 4100.

- Select from the following: Spec. Ed. 3210-20-30, 4740, 3310, 3520, 4110-20-30, 4150-80, 4440, 4610-20, 4840, 5400, 5401, 5620, and special education electives.

TOTAL MINIMUM REQUIRED: 161 hours

D. Concentration in Speech and Hearing

GENERAL EDUCATION: 84 hours
Communications (12 hours)
English 1510-20, Speech 2311.

Health and Physical Education (6 hours)
Activities courses recommended plus health and physical education electives (both areas must be represented).

Humanities (16 hours)
English (4 hours from 2000-level literature); electives from two of the following areas: anthropology, art, English (literature), foreign language (above introductory level), history (upper division), Library and Information Science 3510-20-30, music, philosophy, and religious studies.

Mathematics elective (4 hours).

Natural Sciences (16 hours)
8 hours biological sequence; 8 hours physical sequence.

Psychology (4 hours)
Psychology 2500.

Social Studies (20 hours)
History electives (8 hours); 12 hours from three of the following areas: anthropology, economics, geography, political science, sociology.

General Electives (6 hours).

CORE PROFESSIONAL EDUCATION: 9 hours
Education C & I 3010, 3020, Special Ed. 4030.

SPECIALIZED PROFESSIONAL EDUCATION: 42 hours
Psychology 2520 or 2530, Psychology 3550 or 2540 or Ed. Psych. 2430 or 3610, 11-12 hours upper-division psychology or educational psychology including Psychology 3150. (Ed. Psych. 3110, 4800, 4640 recommended.)

TEACHING AREAS AND ELECTIVES: 69 hours
Special Education 3333, three-hour elective (4110 or 4130 recommended); Audiology and Speech Pathology (or Special Education) 3310, 3710, 4040, 4310, 4400, 4720, 4900. Audiology and Speech Pathology 3010, 3050, 3065, 3200, 4610, 4650; Clinical Practicum Courses (12-15 hours); Audiology and Speech Pathology (or Special Education) 4320-30-40; Special Education 4341, 4342.

TOTAL MINIMUM REQUIRED: 181 hours

E. Concentration in Partially Seeing Electives: 12 hours
The following area of endorsement requires completion of requirements of the elementary (K-9) or secondary education curriculum.

VI. Vocational-Technical Education
A. Business Education
See curricula for Secondary Education (7-12) p. 106 for General Education and Professional Education requirements.

63 quarter hours in business and economics to meet five business endorsement areas approved by the department adviser. A statement of requirements and alternative programs may be obtained from the coordinator of business education.

B. Distributive Education Option 1.

GENERAL EDUCATION: 71-73 hours
Communications (12 hours)
English 1010 or 1011, 1020, 1031 or 1032 or 1033; speech elective.

Health and Physical Education (9 hours)
Physical education or health elective.

Mathematics (3-4 hours)
Mathematics elective.

Humanities (16 hours)
Literature elective (4) plus 12 hours humanities electives.

Natural Science (12 hours)
Natural science electives.

Psychology (7-8 hours)
Psychology 2500, Psychology 2520 or Educ. Psych. 3110.

Social Studies Electives (12 hours)
Economics 2110-20-30; plus 3 additional hours in any social studies other than economics.

PROFESSIONAL EDUCATION: 42 hours

SPECIALIZED COURSES: 42 hours
Business Adm. 1110; Office Adm. 4310 or 4320; Accounting 2110; Marketing 3110-20, 4140, 4130, 4150; Finance 3120; Management 3101; Business Law 4110; Voc. Tech. Ed. 4440; Textiles and/or Advertising electives (6 hours).

ELECTIVES: 23 hours

TOTAL MINIMUM REQUIRED: 183 hours

Option 2. Distribution Training Option (Non-Certification)

GENERAL EDUCATION: 67 hours
Communications (12 hours)
English 1010-20 and 1031 or 1033; speech elective.

Health and Physical Education (3 hours)
Physical Educ. or Health elective.

Mathematics (3-4 hours)
Mathematics elective.

Humanities (16 hours)
Literature elective (4); 12 hours humanities electives.

Natural Science (12 hours)
Natural science electives.

Psychology (7-8 hours)
Psychology 2500, 2520, or Educ. Psych. 3110 or 3190.

Social Studies Electives (12 hours)
Economics 2110-20-30; 3 hours elective.

TRAINING SPECIALIST: 45 hours

SPECIALIZED COURSES: 48 hours
Bus. Admin. 1110; Office Adm. 4310-20, Accounting 2110; Marketing 3110-20, 4140, 4130, 4150; Finance 3120; Industrial Management 3010; Business Law 4110; Textiles and/or Advertising elective (6 hours) VTE 4440 (6 hours).

ELECTIVES: 23 hours

TOTAL MINIMUM REQUIRED: 183 hours

C. Industrial Education
Option 1. Concentration in Trades and Industries:

GENERAL EDUCATION: 67 hours
Communications (12 hours)
English (9 hours); speech elective (3 hours).

Health and Physical Education (9 hours)
Health and P.E. electives. (Both areas must be represented).

Humanities (15 hours)
Literature elective (4 hours); 11 hours from two of the following areas: philosophy,

*Requires admission to Teacher Education Program.
anthropology, art or art education, literature, foreign language, music or religious studies. Mathematics (3 hours)
Natural Science (12 hours)
Psychology (4 hours)
Psychology 2500.
Social Studies (12 hours)
Two of the following areas must be represented: history, anthropology, economics, geography, political science, sociology.

PROFESSIONAL EDUCATION........12 hours
Ed. C & I 3101*, 3200, 3203* (select any two); Special Education 3333; Ed. Psych. 3810.

PROFESSIONAL INDUSTRIAL EDUCATION 42 hours
Vo. Tech. Ed. 3830, 3850, 3860, 3870, 4010, 4010, 4830, 4840, 4850, 4870, 4785.

OCCUPATIONAL COMPETENCY........45 hours
Vo. Tech. Ed. 3810, 3811, 3812.

ELECTIVES ................................20 hours

**TOTAL MINIMUM REQUIRED**........186 hours

Option 2. Concentration in Industrial Arts

GENERAL EDUCATION..............67 hours
Communications (12 hours) English (9 hours); speech (3 hours).
Health and Physical Education (9 hours) Health and P. E. electives. (Both areas must be represented.)

Humanities (15 hours)
Literature elective (4 hours); art or art education (6 hours); additional hours taken from the following: history (upper division), philosophy, anthropology, foreign language (beyond introductory level), music or religious studies.

Mathematics (3 hours)
Natural Science (12 hours)
Psychology (4 hours)

Social Studies (12 hours)
Two areas from the following must be represented: history, anthropology, economics, geography, political science, sociology.

**PROFESSIONAL EDUCATION**........10 hours
Ed. C & I 3101*, 3200, 3203* (select one); Special Education 3333; Ed. Psych. 3810, 3811, 3812.

**PROFESSIONAL INDUSTRIAL EDUCATION** 42 hours
Vo. Tech. Ed. 3830, 3850, 3860, 3870, 4010, 4010, 4830, 4840, 4850, 4851, 4880, 4815, 4896.

**TECHNICAL COMPETENCY**........45 hours
Vo. Tech. Ed. 3810, 3811, 3812 or technical courses in an associate of applied science degree.

ELECTIVES ................................13 hours

**TOTAL MINIMUM REQUIRED**........186 hours

D. Agricultural Education

See page 61 for this program.

E. Home Economics Education

See page 164 for this program.

**Departments of Instruction**

**Art and Music Education**

Professors:

Associate Professors:

Assistant Professors:

**Art Education (141)**

1511 Field Experiences in Teaching Art (1) Field experiences in which students perform tasks related to teaching and to teacher roles. S/NC. May be repeated for credit.

3100 Introduction to Art in Education (3) Philosopy, developmental theory, goals, and media in relation to art education; directed experiences with selected media; field experience optional; prerequisite to other art education courses; for both majors and non-art education majors.

3110 Crafts in the Elementary School (3) Prereq: 2110. 1 hours and 2 labs.

3120 Learning Through Studio Experiences: Sculpture and Craft Design (3) Selected sculptural and craft design experiences; consideration of (1) subject matter, ideas, and concepts; (2) media and processes; (3) development and sequencing of appropriate learning activities for art program. Prereq: Art Ed. 3100 and at least one course in sculpture or crafts.

3150 Drawing, Painting, and Design Activities in Elementary School (3) Program planning and teaching strategies in elementary art; directed classroom activities with media; lesson planning and field experience.

3210 Learning Through Studio Experiences: Sculpture and Craft Design (3) Selected sculpture and craft design experiences; consideration of (1) subject matter, ideas, and concepts (2) media and processes (3) development and sequencing of appropriate learning activities for art program. Prereq: Art Ed. 3100 and at least one course in sculpture or crafts.

3320 Learning Through Studio Experiences: Graphic Design and Lettering (3) Selected graphic design and lettering experiences; consideration of (1) subject matter, themes, and concepts (2) media and processes (3) development and sequencing of appropriate learning activities for art programs. Prereq: Art Ed. 3100 and at least one course in lettering or graphics.

3500 Art and Music Appreciation in the Elementary School (4) For majors in Elementary Education, Music. Media, techniques, and styles of arts and music; methods and materials of teaching art appreciation in the elementary classroom.

3511 Field Experiences in Teaching Art (1) Field experiences in which students perform tasks related to teaching and to teacher roles. S/NC. May be repeated for credit.

4100 Pre-Student Teaching Seminar (1) Orients student teachers to the off-campus centers and the student teaching program; describes the objectives and policies of the student teaching program; meets special needs of student teachers; raises awareness of professional liability. The pre-student teaching seminar must be completed the quarter immediately preceding student teaching. Fall quarter student teachers complete pre-student teaching seminars spring quarter. Prereq: full admission to the Teacher Education Program. Undergraduate credit only. May not be repeated for credit. S/NC only.

4110 Program Development in Art (3) Foundation readings for philosophy; writing program units; analysis of curriculum guides; field experience required (credit optional). Prereq: Art Ed. 3100 and 9 hours art education.

4200 Designing Teaching Aids for Art (3) Resources for art teaching, teaching materials and methods, development of slide-tape presentation and other teaching aids for art teaching. Prereq: Art Ed. 3100 and 9 hours art education.


4350-60-70 Problems in Art Teaching (3, 3, 3) Prereq: Consent of instructor.

4400 Strategies for Teaching Art (3) Readings on teaching art and planning for teaching; development of art and cultural studies; field experience in classrooms. Prereq: Art Ed. 3100 and 9 hours in Art Education.

4410 The Administration and Organization of Recreational Arts and Crafts Programs (3) Purpose of art activity in recreation; scope of activities; organizational procedures, resources, and coordination required in community arts and crafts programs.

**GRADUATE**

5000 Thesis
5002 Non-Thesis Graduation Completion (3-15) 5210 Organization, Administration, and Supervision of Art in the School Program (3)
Music Education (707)

The curricula in music education provide for five areas of concentration: vocal music (voice principal), upper grades, elementary music education (voice principal), elementary music education (piano or organ principal), and instrumental music.

1010-20 Choral Laboratory (1, 1) Choral conducting: methods and materials required of all music education majors. Prereq: Consent of instructor.

1511 Field Experience in Teaching Music (1) Field experiences in which students perform tasks related to teaching and to teacher roles. S/NC. May be repeated for credit.

2100 Basic Experiences in Classroom Music (3) Vocal, instrumental, rhythmic, listening, music reading, and creative activities. Prereq: Major in elementary or special education. 5 hours.

2110 Experiences in Classroom Music (3) Vocal, instrumental, rhythmic, listening, music reading, and creative activities. Forms of music education majors. Prereq: Approval of instructor, one year of music theory. 2 hours and 1 lab.

2411-12 Methods, Materials, and Techniques of Singing (2, 2) Structure, use, techniques of playing, care, and repair of principal instruments in school instrumental organizations. Emphasis on techniques necessary for basic understanding and effective teaching of the instruments. Practical use of current instructional materials. 2 hours per week.

2421-22-23 Methods, Materials, and Techniques of Woodwind Class Instruction (2, 2, 2) Structure, use, techniques of playing; care and repair of principal instruments in school instrumental organizations. Emphasis on techniques necessary for basic understanding and effective teaching of the instruments. Practical use of current instructional materials. 2 hours per week.

2431-32 Methods, Materials, and Techniques of Brass Class Instruction (2, 2) Structure, use, techniques of playing, care and repair of principal instruments in school instrumental organizations. Emphasis on techniques necessary for basic understanding and effective teaching of the instruments. Practical use of current instructional materials. 2 hours per week.

2433 Methods, Materials, and Techniques of Percussion Class Instruction (2) Structure, use, techniques of playing, care and repair of principal instruments in school instrumental organizations. Emphasis on techniques necessary for basic understanding and effective teaching of the instruments. Practical use of current instructional materials. 2 hours per week.

3110 Teaching Music in the Primary Grades (3) Singing, rhythmic, instrumental, listening, creative, and music reading activities; evaluation; materials appropriate for Grades K-3. For elementary education majors only. Prereq: 2100 or 2110; Educ. Psych. 2430, upper-division standing.

3120 Teaching Music in the Intermediate and Upper Grades (3) Singing, rhythmic, instrumental, listening, creative, music reading activities; evaluation; materials appropriate for grades 4-6. Primarily for elementary education majors. Prereq: Music 2100 or 2110; Educ. Psych. 2430 and upper-division standing.

3130 Teaching Music in the Elementary School (3) Singing, rhythmic, instrumental, listening, creative, and music reading activities; evaluation; materials appropriate for grades K-6. For music education majors only. Prereq: 2110, Educ. Psych. 2430 or 3810, and two years of music theory.

3150 Teaching Music in Junior and Senior High Schools (3) Procedures, techniques, curriculum, scheduling, administration, evaluation, materials and equipment, coordination. Prereq: Two years of music theory; coreq. 3511.

Associate Professors:

Assistant Professors:

Instructors:
M. A. Blank, M.S. Tennessee; F. L. Hagan, M.S. Tennessee.

* Alumni Distinguished Service Professor.

Educational Curriculum and Instruction (301)
Undergraduate programs in the Department of Curriculum and Instruction provide the general professional courses for the preservice education of teachers in elementary and secondary schools.

1410 Efficient Reading and Study Skills (2,1) Improvement of reading and study skills, and study skills as they relate to content area subjects. May be repeated for a maximum of 1 hour credit for individual laboratory credit only.

1500 Introduction to Early Education (3) (Same as Child and Family Studies 1500.)

2010-20-30 Field Study in Education (3, 3, 3) Problems of teachers in active service in the fields of methods of teaching, curriculum materials, school-community relationships, and school organizations.

3010 History and Philosophy of Education (3) Role of philosophy in education; realism, Neo-Thomism, pragmatism, and other contemporary movements; major ideas, historical roots, and modern applications. Undergraduate credit only.

3020 Principles and Organization of Education (3) Relation to current educational problems and practices; organizational patterns; financing of public education; professionalization of teaching. Undergraduate credit only.

3030 Social Foundations and Curriculum (3) Culture and society and their influences on curriculum; principles, problems, and procedures of subject matter selection; sequence, grade placement, and time allotment; curriculum issues; state curriculum policies and practices. Undergraduate credit only.

3150 Analysis of Teaching (3) Use of interaction analysis; K. J. Yoshida, M.A. Illinois; B. E. Bourke, B.S. Pennsylvania; R. L. French, Ph.D. Ohio. Observation of the teacher and the students' behavior recorded on the tape. Prereq: Consent of instructor.

3180 Microteaching (3) Emphasis upon the development of instructional skills. Students teach a series of lessons to small groups of students in elementary or secondary schools. Lessons are videotaped, and the students, Ph.D. Illinois; R. J. French, Ph.D. Ohio. Observation of the teacher and the students' behavior recorded on the tape. Prereq: Consent of instructor.

3260 Teaching Language Arts in the Elementary School (3) Methods and materials in teaching writing, spelling, and language. Undergraduate credit only. Should be taken prior to or concurrently with C & I 3290. Prereq: Educ. Psych. 2430 or equivalent, admission to Teacher Education.

3268 Developing Social Studies Content Concepts for Elementary School (3) Study of content of Social Studies Education. Methods and concepts relevant to elementary social studies. Prereq: Admission to teacher education.

3270 Teaching Social Studies in the Elementary School (3) Methods and materials. Undergraduate credit only. Prereq: Educ. Psych. 2430 or equivalent, admission to Teacher Education.

3290 Teaching Developmental Reading in the Elementary School (3) Beginning course in sequence designed to enable preservice teachers to develop skills and understandings necessary for operation of successful developmental reading program in the elementary school. Prereq: Educ. Psych. 2430 or equivalent and admission to Teacher Education.

3281 Teaching Developmental Reading in the Elementary School (3) Second course in sequence designed to teach content and skills of teaching reading in the elementary school. Prereq: 3290.

3310 History of Education (3)...

3320 History of Education in the United States (3)...

3350 Teaching Elementary School Mathematics (3) Enables preservice teachers to develop skills and understandings necessary for operation of successful mathematics program in the elementary school. Prereq: Educ. Psych. 2430 or equivalent. Mathematics 2110-20-30 admission to Teacher Education. Must be taken prior to student teaching.

3351 Teaching Elementary School Mathematics (3) Methods of teaching elementary school mathematics. Prereq: 3350 or equivalent.

3350 Books and Related Materials for Children (3) (Same as Library and Information Science 3510.)

3511 Field Experience in Teaching Elementary (Primary Level K-3) (2) Field experience in which students perform tasks related to teaching and teacher roles. Must be taken prior to 3512 and student teaching. Prereq: Admission to teacher education.

3512 Field Experience in Teaching Elementary (Intermediate Level 4-6) (2) Field experience in which students perform teacher-related tasks. Must be taken prior to 3513 and student teaching. Prereq: 3511.

3513 Field Experience in Teaching Elementary (Secondary) (2) Field experience in which students perform teacher-related tasks. Must be taken in sequence to 3512 and 3514. Prereq: 3511; four of the following: C & I 3260, 3270, 3280, 3281, 3350, 3511, 3720; admission to Teacher Education. S/NC.

3520 Books and Related Materials for Young People (3) (Same as Library and Information Science 3520.)

3521-22-23 Field Experiences in Teaching: Secondary (1, 1, 1) Field experiences in which students perform tasks related to teaching and to teacher roles. Must be taken before student teaching and must be taken in sequence. Prereq: 3522 and 3523 require Admission to Teacher Education. S/NC.

3531-32-33 Field Experiences in Teaching: Social Foundations (1, 1, 1) For description, see 3521-22-23. S/NC.

3561 Teaching of Speech and Drama, Grades 7-12 (3) For description, see 3563.

3562 Teaching of Modern Foreign Languages: Oral Communication Skills, Grades 7-12 (3) For description see Educ. C & I 3563. This course and Educ. C & I 3563 are required for certification in foreign languages. Must be taken concurrently with 3563.

3563 Teaching of Modern Foreign Languages: Reading, Literature, Grammar, and Composition, Grades 7-12 (3) For description see Educ. C & I 3563. This course and Educ. C & I 3562 are required for certification in foreign languages. Must be taken concurrently with 3562.

3573 Teaching of the Social Studies, Grades 7-12 (3) Purposes, techniques, evaluation, and principles to be considered; directed observation in public schools; preparation of teaching plans and materials. Undergraduate credit only. Prereq: Educ. Psych. 2430 or equivalent.

3574 The Teaching of Science, Grades 7-12 (3) For description, see 3573.

3577 Teaching Language, Composition, and Speaking, Grades 7-12 (3) For description, see 3573. Both this course and Educ. C & I 3565 are required for certification in English.

3578 Teaching Reading, Literature, and Listening, Grades 7-12 (3) For description, see 3565. Both this course and Educ. C & I 3565 are required for certification in English.

3719 Developing Social Science Content Concepts for Elementary School (3) Study of content of science and development of concepts relevant to the elementary science program. Prereq: Admission to teacher education.

3720 Teaching Science in the Elementary School (3) Methods and materials, undergraduate credit only. Prereq: Educ. Psych. 2430 or equivalent, admission to Teacher Education.

3751 Teaching of Mathematics: Numerical and Algebraic Concepts, Grades 7-12 (3) For description, see Educ. C & I 3562. Both this course and 3752 are required for certification in mathematics.

3752 Teaching of Mathematics: Geometry and Analysis, Grades 7-12 (3) For description, see Educ. C & I 3563. Both this course and 3752 are required for certification in mathematics.

3853 Teaching Strategies and Issues in Social Studies Education (Grades 7-12) (3) Problems and issues with practical teaching-learning activities in Social Studies Education. Both this course and Education 3653 are required for certification in Social Studies. Prereq: 3563.

4100 Pre-Student Teaching Seminar (1) Orient students to the off-campus centers and the student teaching program; describes the objectives and policies of the student teaching program, meets special needs of student teachers; and raises awareness of professional liability. The pre-student teaching seminars must be completed the quarter immediately preceding student teaching. Fall quarter student teaching; spring semester student teaching; seminars spring quarter. Prereq: full admission to the Teacher Education Program. Undergraduate credit only. May not be repeated for credit.

4090 Special Topics (1-6) Topics to be assigned. May be repeated. Will be offered for letter grade or S/NC.

4091 Independent Study (1-6) Topics to be assigned. May be repeated. Will be offered for letter grade or S/NC.

4092 Supervised Readings (1-6) Topics to be assigned. May be repeated. Will be offered for letter grade or S/NC.

4111 Non-Western Education: Anthropological Approaches (3) (Same as Anthropology 4110.)

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

4210 Curriculum in Elementary School Social Studies (3) Survey of current curricular approaches and trends in elementary school social studies. Prereq: Teacher experience or student teaching.

4215 Teaching Elementary School Science (3) Methods and materials in teaching science in elementary school. Developmental and diagnostic/ corrective programs. Not open to students with recent course or background in teaching of elementary school science.

4216 Teaching Elementary School Mathematics (3) Methods and materials used in teaching of mathemat-
ics in elementary school. Developmental and diagnostic/corrective programs. Not open to students with recent course or background in teaching of elementary school mathematics.

4217 Teaching Elementary School Language Arts (3) Methods and materials used in teaching of elementary school language arts. Development of functional relationships with other curriculum areas, diagnostic procedures, and corrective work. Not open to students with recent course or background in teaching of elementary school language arts.

4220 Orientation to Corrective Practices for Classroom Reading Problems (3) An orientation to the basic practices in diagnosing and correcting reading problems for students in the classroom. The inexperienced or beginning teacher deals with the collection and interpretation of reading behavior information and the presentation of corrective teaching. A course in the teaching of reading.

4300 Developmental Reading in Secondary School and Community College (3) An introductory course covering approaches and materials for teaching basic reading skills and organizing reading classrooms and/or laboratories at the middle school, secondary school, and community college level.

4303 Language Development of Children: Birth-Preschool (3) In-depth view of language development from birth through preschool adolescence; application of process of language development to instructional programs for early and middle childhood.

4304 Developing Reading Skills in Content Fields (3) Study of approaches and techniques for the teaching of reading skills in content areas of the school program. Emphasis on middle school and secondary school programs.

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

4410 Educational Sociology (3) (Same as Sociology 4410).

4430 Practicum in Teaching in the Elementary School (3) Practicum experience in elementary school classroom teaching designed for students seeking elementary certification who have obtained degrees in areas other than elementary education and who have obtained degrees and certification in areas other than this. Application must be filed with student teaching office at least one quarter prior to registration for practicum. Prereq: 3250-70-80, 3350, 3720 or equivalent and admission to Teacher Education.

4450 Teaching in Kindergarten: Overview (3) Relationship of kindergarten to total elementary program; goals; historical setting and current developments.

4451 Teaching in Kindergarten: Program Development (3) Curriculum planning and organization; classroom management. Prereq: Admission to Teacher Education.

4452 Elementary School Teaching: Minicourse (1-3) Minicourse focusing on various aspects of teaching in elementary school. Topics vary. Prereq: Student teaching. May be repeated.

4530 Home and School Relations (3) Study of need and techniques and materials used in maintaining close relationships between the home and school at both elementary and secondary levels. Prereq: Senior standing.

4654 Methods, and Materials in Environmental and Science Education (3) Instructional methods, materials, curricular programs and current issues in environmental and science education for classroom teachers.

4710 Student Teaching, Grades 7-12 (6) Application for student teaching must be filed not later than the final quarter of junior year. Students should hold themselves available to do this work in off-campus centers. Must be taken with 4720. Prereq: 3010-20-30, Educ. Psych. 3810, appropriate special methods course(s), minimum grade point average of 2.0. Undergraduate credit only. S/NC.

4720 Student Teaching, Grades 7-12 (6) Cooperative planning with other students and teachers; analyses of teaching practices; evaluation of teaching competencies as a result of student teaching. Must be taken with 4710. Undergraduate credit only. S/NC.

4750 Utilization of Instructional Media (3) Introduces the basic communications process, need for instructional media, instructional development, selection and utilization of media and basic software production techniques. (Same as Library and Information Science 4750 and Vocational-Technical Education 4750).

4810 Student Teaching in the Elementary School (9) Application for student teaching must be filed not later than final quarter of junior year. Students should hold themselves available to do this work in off-campus centers. Must be taken with 4820. Prereq: 3210, 3220, 3260-70-80, 3350, 3720; Educ. Psych. 2430; Library Service 3510; minimum grade point average of 2.0. Undergraduate credit only. S/NC.

4820 Student Teaching in the Elementary School (6) Must be taken with 4810. Undergraduate credit only. S/NC.

4850 Student Teaching in Early Elementary School (K-3) (9) Application filed no later than second quarter of junior year with placement one quarter prior to quarter of graduation. Prereq: Educ. C & 1 3260, 3270 or 3720, 3280, 3350, 4450; CFS 3120, 3210. S/NC.

4851 Student Teaching in Early Elementary School (K-3) (9) Application filed no later than second quarter of junior year with placement at least one quarter prior to quarter of graduation. Prereq: Educ. C & 1 3260, 3270 or 3720, 3280, 3350, 4450; CFS 3120, 3210. S/NC.

4860 Programmed Learning (3) Theories of learning as related to technology of programmed instruction; techniques and applications of programing. 2 lectures and 1 lab. Prereq: Psychology 3210, Educ. Psych. 3730, or consent of instructor. (Same as Psychology 4860.)

GRADUATE

Graduate instruction in the Department of Curriculum and Instruction provides opportunities to improve the effectiveness of educational service in a number of areas.

5000 Thesis

5002 Non-Thesis Graduation Completion (3-15)

5040 Studies and Theory in Language Development (3)

5070 Seminar in Intercultural Education (3)

5090 Special Topics (1-6)

5091 Independent Study (1-6)

5092 Supervised Readings (1-6)

5100 History of European Education (3)

5112-12 History of American Education (3,3)

5120 Principles of Education (3)

5140 Comparative Philosophies of Education (3)

5141 Pragmatism in Education (3)

5142 The Existential Student (3)

5150-50-70 Seminar (1-3, 1-3, 1-3)

5180-90-5200 Educational Specialist Research and Thesis (3, 3, 3)

5210 Seminar in International Education: Asia and Africa (3)

5211 Instructional Strategies in Elementary School Social Studies (3)

5212 Programs and Materials in Teaching Elementary School Social Studies (3)

5230 Advanced Study and Practicum in Diagnosis and Remediation of Arithmetic Difficulties (3)

5240 Creative Thinking and Expression in Elementary School (3)

5250 Secondary School Instruction (3)

5260 Philosophy of Education (3)

5261 Educational Classics (3)

5270 The Elementary School Curriculum (3)

5280 Teaching Language Arts in the Elementary School (3)

5281 Teaching Social Studies in the Elementary School (3)

5282 Teaching Science in the Elementary School (3)

5283 Programs and Materials in Teaching Elementary Science (3)

5284 Seminar in Teaching Elementary Science (3)

5290 Teaching of Mathematics in the Elementary School (3)

5291 Programs and Materials in Elementary School Language Arts (3)

5292 Seminar in Research and Theory in Teaching Mathematics in the Elementary School (3)

5301 Developmental Reading in the Elementary and Middle School (3)

5302 Psychology of Reading (3)

5303 Methods and Materials for Teaching Critical Reading (3)

5304 Programs and Materials for Reading Instruction (3)

5305 Trends and Issues in Teaching Reading (3)

5306 Teaching Reading to the Linguistically Different Learner (3)

5307 Assessment and Correction of Classroom Language Arts Difficulties (3)

5350 Curriculum Development and Evaluation (3)

5360 Curriculum Development at the Local Level (3-9)

5365 Mathematics Laboratories in Elementary School (K-9) (3)

5379 Diagnosis and Correction of Classroom Reading Problems (3)

5380 Practicum in Diagnosis of Reading Problems (3)

5381 Practicum in Remediation of Reading Problems (3)

5382 Developmental Reading Practicum (3)

5400 Problems in Improvement of Instruction (1-3)

5410 The High School Curriculum (3)

5510 Education in Cultural Perspective (3)

5511 Non-Western Education: Anthropological Approaches (3)

5570 The Junior High and Middle School Curriculum (3)
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<td>Reflective Thinking: The Method of Education (3)</td>
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<td>6731</td>
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<td>6850</td>
<td>Principles of Educational Leadership (3)</td>
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<td>6899</td>
<td>Internship (1-6)</td>
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<tr>
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</table>

**Education (289)**

**GRADUATE**

- 6001 Trans-College Seminar (1) (See Graduate Catalog for further information).

**Educational Administration and Supervision (292)**

Professors:

Associate Professors:
- H. F. Almon, Ed.D. Tennessee (Vice Chancellor for Student Affairs); G. W. Harris, Jr., Ph.D. Michigan; P. H. Husen, Ed.D. Stanford.

Assistant Professors:

Lecturer:

**GRADUATE**

- 5000 Thesis (1-15)
- 5002 Non-Thesis Graduation Completion (3-15)
- 5100 Internship in Educational Administration (3)
- 5130 Introduction to Educational Administration (3)
- 5180-90-5200 Educational Specialist Research and Thesis (3, 3, 3)
- 5220 Philosophy and Theory in Educational Administration (3)
- 5230 Seminar in the Behavioral Sciences for Educational Administration (3)
- 5290 The Politics of Education (3)
- 5310 School Administration and Civil Rights Issues (3)
- 5420 District Level Administration (3)
- 5430 Building Level Administration (3)
- 5440 Introduction to Law, Finance, and Business Management at the Building Level (3)
- 5450 Organization of the School Program (3)
- 5460 Personnel Administration: Local School (3)
- 5470 Introduction to School Facility Planning (3)
- 5480 Instructional Supervision—Local School (3)
- 5530 Introduction to Educational Planning (3)
- 5540 Tennessee School Law (3)
- 5560 Research for Educational Administrators (3)
- 5580 Seminar in Communication Skills for Educational Administrators (3)
- 5711 Problems in Educational Administration and Supervision: School Operation (3)
- 5712 Problems in Educational Administration and Supervision: Higher Education (3)
- 5713 Problems in Educational Administration and Supervision: State School Administration (3)
5714 Problems in Educational Administration and Supervision: Preparation Programs (3)
5715 Problems in Educational Administration and Supervision: Community Education (3)
5751 Problems in Educational Administration and Supervision: Theory (3)
5752 Problems in Educational Administration and Supervision: Finance (3)
5753 Problems in Educational Administration and Supervision: Transportation (3)
5754 Problems in Educational Administration and Supervision: Business Management (3)
5755 Problems in Educational Administration and Supervision: Personnel (3)
5756 Problems in Educational Administration and Supervision: School Plant (3)
5757 Problems in Educational Administration and Supervision: Organization and Structure (3)
5758 Problems in Educational Administration and Supervision: School Law (3)
5759 Problems in Educational Administration and Supervision: Supervision (3)
5770 Maintenance of School Plants (3)
5810 Survey Research Methods (3)
5850-60-70 Independent Study in Educational Administration (3, 3, 3)
5860 Decision Making and Decision Theory in Educational Organizations (3)
5900 Special Topics (3)
5910-20-30 Problems in Lieu of Thesis (3, 3, 3)
5950 Elementary Administrators Seminar (3)
5960 Middle School Administrators Seminar (3)
5970 Secondary Administrators Seminar (3)
6000 Doctoral Research and Dissertation (3)
6040 Seminar in Educational Administration and Supervision (1, 1, 1)
6100 Internship in Educational Administration (3)
6110 Administrator Update (3)
6190 Administration in Higher Education (3)
6220 Programs for the Professional Preparation of Educational Administration and Supervision (3)
6340 Current Trends in School Law (3)
6380 Instructional Supervision—School District (3)
6420 School Board/Superintendency Relationships (3)
6440 School Business Management (3)
6450 Grant and Contract Proposal Preparation (3)
6460 School Personnel Administration (3)
6480 Special Topics in School Personnel Administration (3)
6530 Futuristic Educational Planning Methods (3)
6540 Contemporary Economics and Educational Finance (3)
6550 State-Federal Relations in Education (3)
6560 Legal Foundations of Public Education (3)
6580 Seminar in Managing Conflict (3)
6750-60-70 Independent Studies in Educational Administration and Supervision (3, 3, 3)
6800 Administration of Complex Educational Organizations (3)
6870 Advanced Study in School Facility Planning (3)
6900 Special Topics (3)
6981 Specialized Seminar: School Operation (3)
6982 Specialized Seminar: Higher Education (3)
6983 Specialized Seminar: State School Administration (3)
6984 Specialized Seminar: Preparation Programs (3)
6990 Specialized Doctoral Seminar in Politics of Education (3)
6991 Specialized Seminar: Theory (3)
6992 Specialized Seminar: Finance (3)
6994 Specialized Seminar: Business Management (3)
6995 Specialized Seminar: Personnel (3)
6996 Specialized Seminar: School Plant (3)
6997 Specialized Seminar In Organization and Structure (3)
6998 Specialized Seminar: School Law (3)
6999 Specialized Seminar: Supervision (3)

Educational Counseling and Psychology (311)

Professors:

Associate Professors:
T. W. Geogheg, Ed.D. Tennessee; M. A. Hector, Ph.D. Michigan State; L. M. Kindall, Ed.D. Tennessee; A. McIntyre 2, Ph.D. Yale; M. M. Meier, Ph.D. Ohio State; M. Peterson 1, Ph.D. Ohio State; R. S. Saunderg, Ph.D. Floria; K. Swander 1, Ph.D. Floria.

Assistant Professors:

1 Part time.
2 coconut.
3 Not offered.

2000 Field Experience (1) Field experiences in working with children and youth and their teachers. Students will perform various teaching tasks and be given opportunity to act in teaching roles. May be repeated for a total of 6 credit hours.
2210 Academic Development (3) The development of skills for competence in higher education, including principles of learning, self-knowledge, techniques of behavior change, time use, examination preparation, and independent study. Application of learned skills to current courses.
2220 Personal Development (3) A study of the relationships among self, others, and environment in contemporary culture. Topics include self-awareness, interpersonal skills, environmental awareness, values clarification, and socialization.
2230 Career Development (3) Vocational opportuni-ties and aspirations, including self-appraisal, career planning, decision making, occupational exploration, and vocational development.
2299 Developmental Laboratory (1) Repeatable to three credit hours. Specialized laboratory experiences in the improvement of skills related to academic, personal, or career development.
3000 Field Experience (1) Field experiences in working with children and youth and their teachers. Students will perform various teaching tasks and be given opportunity to act in teaching roles. May be repeated for a total of 6 hours.
3100 Learning Principles (4) The acquisition, retention, and transfer of information and skills, and major steps in problem solving and reasoning.
3110 Classroom Behavior Management (4) Student will develop understanding of behavior management procedures and skill in utilizing behavior management procedures in shaping pupil classroom behaviors. Prereq: Psychology 2500.
3550 Child Psychology (4) (Same as Psychology 3550.)
3560 Individual Skills for Campus Leaders (3) Knowledge and skills for effectively managing leadership and administrative roles in campus organizations.
3810 Educational Psychology: Adolescence (3) Physical, emotional, social, and behavioral aspects of the adolescent; factors contributing to adolescent development; major emphasis given to effective communication with adolescents within the educational setting. Prereq: Psychology 2500 or equivalent; coreq: either Educ. Psych. 2500 or Guidance 3000 or a 2-hour/week field experience.
4100 Pre-Student Teaching Seminar (1) Orients student teachers to the off-campus centers and the student teaching program; describes the objectives and policies of the student teaching program, meets special needs of student teachers, and raises awareness of professional liability. The pre-student teaching seminar must be completed the quarter immediately preceding student teaching. Fall quarter student teachers complete prestudent teaching seminars spring quarter. Prereq: full admission to the Teacher Education Program. Undergraduate credit only. May not be repeated for credit. S/NC only.
4110 Psychology of Sex Role Development (3) Examination, from both a theoretical and research base, of factors which contribute to sex role development with attention to changes in sex role definition in society and role of education in these changes. Aimed at the undergraduates or graduate student with minimal background in behavioral sciences. (Same as Psychology 4115.)
4130 Mental Health (3) Studies and exploration of positive mental health. Application of mental health criteria to the study of one's self based on a battery of personality assessment instruments.
4320 Self-Management for Personal and Professional Development (3) Self-management applications in career, social, emotional, and physical development. Includes both theoretical and experiential activities. Prereq: An introductory course in psychology or the consent of the instructor.
4350-60-70 Special Topics and Problems (1-4, 1-4, 1-4) May be offered for letter grade or S/NC and may be repeated.
4440 General Evaluation Procedures for Public Schools (3) Prereq: 2430 or equivalent.
4551-52-53 Student Leadership Workshops (1, 1, 1) Series of small group and individualized experiences to develop knowledge and skills required of students in leadership roles. Sections are designed for resident assistants, student government leaders, student activities, and other student organizations. Prereq: Consent of Instructor. S/NC.
4640 Standardized Testing (3) Use and interpretation of standardized group intstuments in assessment of intelligence, aptitude, achievement, vocational interests and personality adjustment.
4650 The Construction of Classroom Tests (3) Concerned with teacher-made classroom tests: in-
structural objectives, principles of test construction, item analysis, evaluating a test's reliability and validity, interpretation of test scores, relationship between testing and grading.

4700 Assertiveness Training (1) Readings and group exploration of the principles of assertiveness and the application of assertive behavior in a variety of settings.

4760 Advanced Child Study (3) Prereq: 2430 or 3810 or consent of instructor.

4800 Psychology of the Disadvantaged Child (3) Significant behavioral differences and causes; appropriate intervention approaches.

4810 Psychoeducational Aspects of Appalachian People (3) Exploration of psychology of people of Appalachian region through an examination of history, culture, and role of education.


4890 Differential Psychology (3) Nature and sources of individual differences in behavioral characteristics, and differences between racial, ethnic, socioeconomic, sex, and other groups.

GRADUATE

5000 Thesis

5002 Non-Thesis Graduation Completion (3-15)

5040 Guidance and Personnel Services in Education (3)

5050 Children and Adolescents (3)

5060 Group Approaches with Students (3)

5070 Seminar in Elementary School Guidance (3)

5090 Field Work in School Psychology (1-6)

5100 Developmental Psychology (3)

5101 Advanced Psychology of Adolescence (3)

5110 Psychology of Women (3)

5111 Seminar in Current Issues in School Psychology (3)

5120 Seminar in Bias-Free Counseling (2)

5140-50-60 Psychoeducational Assessment (3, 3, 3)

5149-59-69 Practicum in School Psychology I (2, 2, 2)

5180-90-5200 Educational Specialist Research and Thesis (3, 3, 3)

5210 Interpreting Published Articles: Statistics (3)

5220 Interpreting Published Articles: Research Design (3)

5310 Diagnostic and Corrective Teaching (3)

5319 Field Work in School Psychology: Level 1 (2)

5320 Advanced Classroom Behavior Modification (3)

5330 Theory and Research in Human Learning (3)

5331 Current Developments in Human Learning (3)

5340 Group Dynamics (3)

5350 Educational Applications of Cognitive Theories (3)

5560 The College Student (3)

5720 Evaluation in Education (3)

5760 Career Development: Theory and Research (3)

5785 Career Development: Program Development Implementation and Evaluation (3)

5790 Career Development: Workshop (1-6)

5840 Student Appraisal (3)

5850-60-70 Special Topics and Problems (1-6, 1-6, 1-6)

5880 Career Development: Occupational and Educational Resources (3)

5885 Career Development: Field Experience (1-3)

5890 Counseling Theories and Techniques (3)

5897 Pre-Practice (3)

5910-20-30 Problems in Lieu of Thesis (3, 3, 3)

5940 Counseling Practicum (3)

5950-60-70 Theory and Practice in Consultation (3, 3)

5959-69 Practicum in Consultation (3, 3)

5980 Organization and Administration of Pupil Personnel Programs (3)

6000 Doctoral Research and Dissertation (3-15)

6040 Seminar (1)

6099 Internship (1-6)

6110 Application of Research Design (3)

6120 Application of Experimental Research Design (3)

6319 Field Work in School Psychology: Level II (2)

6550-60-70 Seminar in College Student Personnel (2, 2, 2)

6610-20-30 Seminar in Dissertation Proposal Writing (2, 2, 2)

6750-60-70 Special Topics and Problems (1-6, 1-6, 1-6)

6810 Seminar in Counseling (3)

6840-50-60 Seminar in Professional Issues (1, 1, 1)

6910 Special Topics Seminar (3)

6931-32-33 Practicum in Counseling Psychology (3,3,3)

6940 Group Counseling Practicum (3)

6941-42-43 Practicum in Guidance, Counseling, and Personnel Services (3, 3, 3)

6944-45-46 Teaching Practicum (3, 3, 3)

6950 Counseling Supervision (3)

School of Health, Physical Education, and Recreation

Madge M. Phillips, Director

At the undergraduate level, professional preparation programs are offered in health, physical education, dance, and recreation. For information on graduate programs leading to the Master of Science, the Master of Public Health, Educational Specialist, the Doctor of Education, or the Doctor of Philosophy degrees, see the Graduate Catalog.

The School of Health, Physical Education, and Recreation also provides activities programs for all students in physical education and service courses in health and safety.

Health and Safety

Professors:

B. C. Wallace (Acting Chairman), Ed.D. Colorado State College; R. H. Kirk, H.S.D. Indiana.

Associate Professors:

J. D. Gorski, Ph.D. UCLA; R. J. Pursley, Ph.D. Iowa; A. F. Thompson, Ph.D. Michigan.

Assistant Professors:


Instructors:

D. S. Holloway, M.S. Tennessee.

Safety (890)

3520 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.


4410 Driver and Traffic Safety Education (5) Preparation of teachers of driver education in schools and colleges. Students are required to teach at least one non-driver. Valid driver's license required. 3 hours and 2 labs.

4412 Cardiopulmonary Resuscitation (2) (Same as School Health 4412.)

4420 Advanced Driver and Traffic Safety Education (5) Development of competency in teaching of driver education through use of simulation, multi-media and multiple-car driving range. Emphasis placed on teaching skills and supervision. Prereq. 4410.

4430 Sports Safety (5) Accident prevention and injury control in sports activities; philosophy of sports safety; human environmental factors and their interrelationships in sports injury and their control; risk-taking and decision solution strategies; and contributions of sports medicine to safety. 3 hours of lecture and 2 hours of lab.

4720 Workshop in Safety (3-6) Deals with special safety education problems. For advanced undergraduate students, graduate students, teachers, supervisors, and administrators. May be repeated for credit.

GRADUATE

5000 Thesis

5002 Non-Thesis Graduation Completion (3-15)

5320 Behavioral Problems in Safety Education and Accident Prevention (3)

5330 Problems and Research in Accident Prevention (3)

5340 Organization, Administration and Supervision of Safety Programs (3)

5350 Civil and Defense Education (3)

5720-30-40 Graduate Workshop in Safety (3-6, 3-6, 3-6)

5810-20-30 Problems in Safety (1-3, 1-3, 1-3)

5870-80-90 Current Issues in Safety Education (1, 1, 1)

6010-20-30 Internship and Research in Safety Education (3, 3, 3)

School Health (898)

1110 Principles in Personal Health (3) To develop ability to approach health scientifically and to develop justified confidence in judgments affecting personal health.

2040 Seminar in Human Sexuality (2) Problems and responsibilities of being male and female. S/NC.

2050 Seminar in Drug Use and Abuse (2) Study of problems related to use and abuse of substances potentially harmful to health and safety. Covers alcohol, drugs, tobacco and other substances. S/NC.
430 Women's Health (3) Study of factors influencing women's health and wellness as well as the physiological, psychological, and sociocultural factors that affect women's health. May be repeated. Maximum credit 6 hours. Prereq: completion of prerequisite core courses.

4430 Women's Health (3) Study of factors influencing women's health and wellness as well as the physiological, psychological, and sociocultural factors that affect women's health. May be repeated. Maximum credit 6 hours. Prereq: completion of prerequisite core courses.

4600-10-20 Field Practice in Health Education (3-5, 3-5, 3-9) Field practice in off-campus health education settings or field practice in educational or other agencies with qualified professionals.

4710 Workshop in School Health Education (3-6) For advanced students, teachers, school administrators, nurses, and other paramedical school personnel. Lecture, demonstrations, films, field trips, and supervised research in special health problems. May be repeated for credit.

4810-20-30 Problems in School Health Education (1, 1, 1) Individual identification and study of current problems in school health education. Extensive reading of literature required.

GRADUATE

5000 Thesis

5002 Non-Thesis Graduation Completion (3-15)

5010 Problems and Practices in School Health (3)

5020 Teaching of Sex Education and Human Sexuality (3)

5510 Curriculum Construction in School Health Instruction (3)

5520 Evaluation in School Health Instruction (3)

5530 School Health Program Surveys (3)

5620 School Health Administration and Supervision (3)

5630-40 Workshop in School Health Education (3, 3)

5720-30-40 Graduate Workshop in Health Education (3-4, 3-6, 3-4)

5810-20-30 Problems in School Health Education (1-3, 1-3-1, 1-3)

6000 Doctoral Research and Dissertation

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

6050-60 Seminar in Health Education (3, 3)

6210 Health Aspects of Gerontology (3)

6220 Seminar on the Nation's Health (3)

6230 International Health (3)

Physical Education (764)


1000 Introduction to Physical Education (2) Special emphasis on theoretical and practical aspects of physical education. Tool health education. F/NC only.

1020 Physical Education: Swimming (2)

1021 Physical Education: Bowling (2)

1022 Physical Education: Basketball (2)

1032 Physical Education: Tennis (2)

1201 Physical Education: Soccer-Speedball (2)

2022 Physical Education: Volleyball (2)

2032 Physical Education: Golf (2)

2040 New Repertory Dance Company (2) Preparation and presentation of public performances. May be repeated. Maximum credit 4 hours. Prereq: Consent of instructor.

2050 New Repertory Dance Company (2) Preparation and presentation of public performances. May be repeated. Maximum credit 4 hours. Prereq: Consent of instructor.

2060 New Repertory Dance Company (2) Preparation and presentation of public performances. May be repeated. Maximum credit 4 hours. Prereq: Consent of instructor.

2070 Orientation in Dance—Appreciation (3) Historical, aesthetic principles, and current trends in dance. F/NC.

3000 Orientation in Sports (3) Conduct of a program of athletic sports in high schools and colleges.

3010 Elementary Modern Technique (2) Analytical and practical study of modern dance techniques. May be repeated. Maximum credit 6 hours.

3020 Intermediate Modern Technique (2) Theoretical, technical, and improvisational study of modern dance. May be repeated. Maximum credit 6 hours. Prereq: 2050. Available to dance majors and minors or with consent of instructor.

3030 Intermediate Advanced Modern Technique (2) Emphasis on various styles and techniques. May be repeated. Maximum credit 6 hours. Prereq: 3020. Available to dance majors and minors or with consent of instructor.

3040 Elementary Jazz Techniques (2) Instruction and practice in styles and techniques of jazz. May be repeated. Maximum credit 6 hours.

3041 Intermediate Jazz Dance Technique (2) Intermediate jazz dance technique. Emphasis on lyrical and percussive styles. Prereq: 3040. Available to dance majors and minors or with consent of instructor. May be repeated. Maximum credit 6 hrs.

3060 Beginning Dance Composition (2) Experience in creative forms of dance. Prereq: 3010.

3061 Dance Composition II (2) Further development of solo and duo compositional skills with particular emphasis on form; content and use of music. Prereq: 3060.

3062 Dance Composition III (2) Study of choreography for small groups. Exploration of costumes, props, stage space, and alternative environments. Prereq: 3061.

3070 Elementary Ballet Techniques (2) Practical and analytical study of classical ballet technique. May be repeated. Maximum credit 6 hours.

3075 Intermediate Ballet Technique (2) Emphasis on styles and methods of intermediate classical ballet technique, basic pointe work and use of petit and grand allegro combinations. Prereq: 3070. Available to dance majors and minors or with consent of instructor. May be repeated. Maximum credit 6 hrs.

3080 Officiating Volleyball (3) Officiating appropriate to volleyball competition. Emphasis on knowledge of rules and officiating mechanics.

3100 Social Dance (2) Instruction, practice, and teaching in basic social dance steps.

3110 Athletic Coaching of Football (2) Fundamental and coaching techniques. Prereq: Approval of instructor.
3120 Coaching of Basketball (2) Individual and team fundamentals for the high school coach; attention given to conditioning, schedule making, and other business arrangements. Prereq: Approval of instructor.

3130 Athletic Coaching of Track and Field Events (2) Techniques and training procedures. Prereq: Approval of instructor.

3160 Officiating Basketball (3) Officiating appropriate program.

3180 Weight Control and Physical Activity (3) Theoretical knowledge of and practical experience in principles and methods of weight control and related physical activity.

3200 Athletic Coaching of Baseball (2) Individual and team fundamentals for high school and college coach. Prereq: Consent of instructor.

3210 History and Principles of Physical Education (3) Principles from basic sciences of anatomy, bacteriology, biology, chemistry, physiology, psychology, and sociology applied to health, physical education, and athletic coaching.

3220 Physical Fitness Activities (3) Teaching of calisthenics, conditioning activities, and weight training with emphasis on physical fitness concepts including muscular development of the body.

3240 Team Sports (2) Instruction, practice, and student teaching in selected team sports.

3250 Athletic Training Techniques (3) Theory and practice in the prevention and care of basic athletic injuries.

3260 Practicum for Physical Education Majors (1-10) Observation and limited teaching, coaching, and leadership experiences in physical education programs. Experiences intended to cover the last three-year period of professional preparation. May be repeated; Maximum credit 10 hours. S/NC.

3300 Tap Dance (2) Instruction, practice, and student teaching.

3320 Applied Anatomy and Kinesiology (3) Bones, joints, ligaments, and muscles involved in movements; reaction to joints and muscular mechanism to bodily development and efficiency.

3330 Stunts and Tumbling (2) Instruction and practice; student teaching and lesson planning focused on safety techniques.

3420 Adapted Physical Education Laboratory (1) Practicum, including student teaching, supplementing 4110.

3450 Physical Education in the Elementary School (3) Movement experiences appropriate for elementary school children; planning and teaching a development program.

3510 Conceptual Bases for Study of Human Movement Behavior (3) Biophysical, percepto-cognitive, and psycho-social forces causing humans to move as they do. Prereqs: 1011 or 1012.

3530 The Teaching of Swimming and Lifesaving (2) Certification in ARC Water Safety Instructor Training or Senior Lifesaving with additional practice in teaching of swimming.


3560 Human Growth and Motor Development (2) Structural and functional changes in man from birth to old age, and relationship of changes to physical performance and skill development.


3610-20 Individual and Dual Sports (2, 2) Instruction, student teaching, and practice in organizing adult sports and recreation programs suitable for schools, churches, or community recreation centers.

3650 Teaching Strategies and Program Implementation in Elementary Physical Education (3) Understanding and employing teaching strategies appropriate to elementary physical education, and study of program content and implementation. Prereq: 3570.

3660 Basic Movement Sequences for Children (3) Movement patterns and skills which are fundamental to movement activity, with emphasis upon designing and presenting sequential learning tasks and creative activity experiences. Prereq. or coreq: 3650.

3670 Practicum in Developmental Movement for Early Childhood (3) Experiences in designing and presenting developmental movement tasks to pre-school children. Prereq. or coreq: 3660.

3680 Structured Movement Activities in Elementary Physical Education (4) Self-testing, games and sports, and development of a structured elementary school physical education program, with emphasis upon designing and presenting sequential learning experiences. Prereq: 3670.

3720 Philosophy of Physical Education and Sport (3) Introduction to form and content of philosophy of physical education and sport; specific emphasis on ethical and social aspects and historical and sociological status of physical education and sport.

3910 Principles and Problems of Coaching (3) Examination of practical problems and situations which prepares students to make judgments and decisions in a coaching environment. Prereq: At least sophomore standing.

4000 Intermediate Advanced Ballet Technique (2) Emphasis on styles and methods of intermediate/advanced classical ballet techniques, intermediate/ad advanced pointe work, ballet, and petit allegro. Prereq: 3075. Available to dance majors and minors or with consent of instructor. May be repeated. Maximum credit 6 hours.

4055 Advanced Ballet Technique (3) Emphasis on styles and methods of advanced classical ballet technique, including multiple pirouettes, battements, enchainments, allegretto, and allegro work. Prereq: 4000. Available to dance majors and minors or with consent of instructor. May be repeated. Maximum credit 6 hours. Seniors standing and employing teaching techniques. Open to men and women.

4060 Advanced Modern Technique (2) Emphasis on styles and methods of advanced modern ballet technique, with emphasis on advanced practice and principles. May be repeated. Maximum credit 6 hours.

4100 Advanced Modern Technique (2) Development, integration, and synthesis of previous dance vocabulary; emphasis on advanced practice and principles. May be repeated. Maximum credit 6 hours. Senior standing and employing teaching techniques. Open to grade status required for graduate credit. There is a different level of performance expected of those registered for graduate credit.

4100 Advanced Modern Technique (2) Development, integration, and synthesis of previous dance vocabulary; emphasis on advanced practice and principles. May be repeated. Maximum credit 6 hours.

4230 Program Planning in Physical Education (3) Curriculum building, course construction, and lesson planning for public schools and colleges.

4300 Folk and Square Dance (2) Materials and methods for public schools, colleges and recreation centers.

4300 Intermediate Tap Technique (2) Instruction and practice in intermediate tap techniques. Prereq: P.E. 3300 or consent of instructor.

4300-450-50 Specialization Study in Physical Education (1-3, 1-3, 1-3) Senior standing and employing teaching techniques. Open to men and women. Prereq: 3300.

4410 Wrestling (2) Theoretical and practical work for prospective teaching; emphasis on safety procedures.

4430 Women's Gymnastics (2) Development of skills on balance beam, uneven parallel bars, and side horse vaulting; special emphasis on nutrition, safety, and teaching techniques. Open to men and women. Prereq: 3330.

4440 Men's Gymnastics (2) Development of skills on pommel horse, parallel bars, and long horse vaulting. Special emphasis placed on safety, progression, and teaching techniques. Open to men and women. Prereq: 3330.

4450 Men's Gymnastics II (2) Development of skills on still rings, horizontal bar, trampoline, and exhibition gymnastics. Special emphasis placed on safety, progression, and teaching techniques. Open to men and women. Prereq: 3330.

4460 The Coaching and Judging of Women's Gymnastics (3) Appreciation of women's gymnastics according to the rules of the United States Gymnastics Federation. National tests and ratings will be given. Both men and women are encouraged to take this course. Prereq: 2734 or 4440.
Service Program in Physical Education

The service program in physical education provides all students a program of physical education planned in accordance with their present and future needs and interests.

- 2701 ARC Advanced Life Saving (2)
- 2702 ARC Water Safety Instructor Training (2)
- 2703 ARC Water Safety Instructor for Handicapped (2)
- 2707 Badminton Elementary (2)
- 2708 Badminton Intermediate (2)
- 2711 Ballet Elementary (2)
- 2712 Ballet Intermediate (2)
- 2713 Ballet Advanced (2)
- 2714 Basketball (2)
- 2715 Bowling Elementary (2)
- 2716 Bowling Intermediate (2)
- 2717 Bowling Advanced (2)
- 2719 Equitation Elementary (2)
- 2725 Field Hockey (2)
- 2727 Flag Football (2)
- 2728 Folk and Square Dance (2)
- 2730 Foundations of Physical Fitness (Lecture, Lab, Activity) (2)
- 2731 Golf Elementary (2)
- 2732 Golf Intermediate (2)
- 2734 Women’s Elementary Gymnastics (Coed) (2)
- 2735 Women’s Intermediate Gymnastics (Coed) (2)
- 2736 Women’s Advanced Gymnastics (Coed) (2)
- 2737 Handball Elementary (2)
- 2738 Handball Intermediate (2)
- 2739 Handball Advanced (2)
- 2741 Ice Skating Elementary (2)
- 2742 Ice Skating Intermediate (2)
- 2743 Ice Skating Advanced (2)
- 2745 Lacrosse Elementary (2)
- 2747 Modern Dance Elementary (2)
- 2748 Modern Dance Intermediate (2)
- 2749 Modern Dance Advanced (2)
- 2750 Modern Jazz (2)
- 2752 Paddleball Elementary (2)
- 2753 Paddleball Intermediate (2)
- 2755 Racquetball Elementary (2)
- 2756 Physical Fitness (Conditioning Program) (2)
- 2757 Men’s Elementary Gymnastics (Coed) (2)
- 2758 Personal Safety and Defense for Women (2)
- 2759 Men’s Intermediate Gymnastics (Coed) (2)
- 2760 Soccer (2)

- 2761 Men’s Advanced Gymnastics (Coed) (2)
- 2762 Social Dance (2)
- 2764 Softball (2)
- 2765 Sport in Society (2)
- 2766 Racquetball Intermediate (2)
- 2770 Racquetball Advanced (2)
- 2771 Swimming Elementary (2)
- 2772 Swimming Elementary II (2)
- 2773 Swimming Intermediate (2)
- 2774 Swimming Advanced (2)
- 2775 Synchronized Swimming Elementary (2)
- 2776 Synchronized Swimming Intermediate (2)
- 2778 Tap Dance Elementary (2)
- 2779 Tap Dance Intermediate (2)
- 2781 Tennis Elementary (2)
- 2782 Tennis Intermediate (2)
- 2783 Tennis Advanced (2)
- 2784 Track and Field (2)
- 2785 Tumbling Elementary (2)
- 2786 Tumbling Intermediate (2)
- 2787 Tumbling Advanced (2)
- 2789 Volleyball Elementary (2)
- 2790 Volleyball Intermediate (2)
- 2791 Volleyball Advanced (2)
- 2792 Weight Control and Figure Improvement (2)
- 2794 Weight Training Elementary (2)
- 2795 Weight Training Intermediate (2)
- 2797 Wrestling Elementary (2)
- 2798 Wrestling Intermediate (2)

Public Health (839)

Associate Professors:

C. B. Hamilton (Acting Chairman), Dr. P.H. Oklahoma; R. J. Pursley, Ph.D. Iowa.
Assistant Professors:

S. F. Spear, Ph.D. Iowa.

3310 Communicable and Noncommunicable Diseases (3) Modern concepts of diseases; etiology of common communicable and chronic disease problems including prevention and control. Prereq: One year of biological science and one course in bacteriology.

3320 Sanitation (3) History of sanitary awakening; disease-producing relationships and controls of water, sewage, refuse, milk, meat and other foods, air, insects, and soil; sanitation of homes, swimming pools, industrial plants, markets, restaurants, camps, and public bathing places; healthful school life as affected by buildings and grounds, lighting, acoustics, thermal control, and safety provisions. Prereq: one year biological science, one course in microbiology, 2 hours and 1 lab.

3330 Introduction to Public Health (3) Philosophy, organization, and functions of federal, state, and local official and voluntary public health agencies. Includes periodic field trips.
College of Education

spring quarter. Prereq: full admission to the Teacher Education Program. Undergraduate credit only. May not be repeated for credit. S/NC only.

4210 Urban and Industrial Health (3) Health problems created by a burgeoning population and the megalopolis; industrial health problems of concern to management, supervisor, and industrial worker, control of occupational diseases, poisons, accidents, and other conditions incidental to industry.

4220 Communications for Better Health (3) Selective study of communications in health enterprise. Consideration in logical progression of the problems of transmitting current and new information to practitioners; communications among members of modern health teams, among health agencies, and use of mass media for transmitting health information.

4410 Consumer Health and Safety Education (3) Survey of major consumer health and safety problems; selecting, purchasing, and financing of safety and medical services. (Same as School Health 4410.)


6220 Seminar on the Nation's Health (3)

6230 International Health (3)

Recreation (853)

Professor:
M. L. Peters (Chairman), Ph.D. Illinois.

Assistant Professor:
M. D. Blanton, Re.D. Indiana; K. L. Krick, Re.D. Indiana.

1000-2000-3000 Field Practice (2-3, 2-3, 2-3) Supervised practice in an approved agency offering leisure services. Each hour's credit requires 25 hours of work in field agency. For recreation students only. Must be taken in sequence.

1100 Orientation to Recreation Profession (3) Overview of types, functions, and relationships of delivery systems for recreation and park services.

3100 Recreation Leadership Procedures (3) Principles and practices of recreation leadership; techniques and methods of working with individuals and groups in leisure activity. Two-one-hour lectures and one two-hour lab each week. Prereq: 1000, 1100, and passing score on CAT.

3140 Philosophical Foundations of Recreation (3) Examination of recreation as personal experience; theories of play, philosophies of leisure and relationship to economy, ecology, health, government, culture, and self-realization; history of recreation movement.

3200 Planning Leisure Programs (3) Principles and methods employed in planning effective and well balanced leisure time programs for varied groups in various settings. Prereq: 2000, 3100.

3220 Organization, Supervision, and Management of Recreation Programs (3) Management, organization, and supervision of recreation programs and facilities. Prereq: 2000 and 3200.

3301 Outdoor Recreation Skills and Techniques I (3) Fundamentals necessary for safe participation in outdoor recreation activities such as hiking, camping, climbing, boating, and backpacking. Emphasis: enjoyment of natural environment without disturbance or destruction of plant and animal habitats. Prereq: Consent of instructor.

3302 Outdoor Recreation Skills and Techniques II (3) Instruct in safe and effective outdoor recreation activities such as skiing, snowboarding, water sports, and camping. Prereq: 3301 and consent of instructor.

3710 Camp Counseling (3) History and philosophy of camping movement, counselor leadership and programming skills and outdoor living skills.

3800 Social Recreation (3) Principles and practice of social recreation suitable for all age groups and appropriate to a variety of settings. Content includes methods of conducting low-organized and social-interaction activities for special events and programs.

needs of exceptional children. Facilities are available for continuous observation and participation in directed relationships with exceptional children who are hospitalized, homebound, in residential schools, special classes, or regular classes.

Course sequences are planned in the areas of (1) General Special Education; (2) the Hearing Impaired; (3) Speech and Hearing; (4) Rehabilitation Counselor Education.

It is possible to plan a program which will lead to certification in more than one area. For planning a program, the student must consult with an advisor in the chosen area.

General Special Education:
3333, 4110, 4120, 4130, 4150, 4351, 4361, 4440, 4520, 4610, 4740, 4860, 4881, 4882, 5260, 5620.

The Hearing Impaired:
2110, 2120, 3333, 4190, 4200, 4210, 4220, 4230, 4250, 4280, 4290, 4351, 4361, 4371, 4470, 4480, 4520, 4571, 4871, 4890, 5220, 5240, 5280, 5310, 5320, 5330, 5820.

Speech and Hearing:
3310, 3333, 3710, 4030, 4040, 4310, 4320, 4330, 4340, 4341, 4420, 4420, 4720, 4920. Other courses from Audiology and Speech Pathology: 3010, 3050, 3065, 3200, 4060, 4460.

Rehabilitation Counselor Education:
5100, 5110, 5115, 5120, 5120, 5145, 5146, 5147, 5150, 5160, 5230, 5700, 5710, 5720, 5730, 5740, 5750, 5760, 5770, 5771.

2110 Field Experience (1) Students observe, tutor, and perform teacher-related tasks in special education programs. S/NC.

2120 Field Experience (3) Students observe, tutor, and perform teacher-related tasks in non-special education programs. S/NC.

3310 Articulation Disorders (4) (Same as Audiology and Speech Pathology 3010.)

3333 Education of the Exceptional Child (3) Principles, characteristics, and special needs; local and state programs for diagnosis and care; educational provisions in regular or special classes; home teaching; social and vocational guidance.

3710 Audiology I (3) (Same as Audiology and Speech Pathology 3710.)

4000 Rehabilitation Practicum (3) Evaluation of client data in predicting rehabilitation prognosis. Prereq: 4230.

4020 The Professional Aspects of Speech/Language/Hearing Programs in the Schools (3) Comprehensive study of the organization, administration of school programs. Also, other settings, hospitals, institutions, private practice, professional certification levels, legislation, careers.

4040 Appraisal of Speech and Language Disorders (4) (Same as Audiology and Speech Pathology 4040.)

4100 Pre-Student Teaching Seminar for Teachers in Special Education (1) A seminar to provide students with additional information about student teaching. Prereq: Coreq: 4110.

4110 The Nature and Concept of Mental Retardation (3) Identification, description, and study.

4120 Education of the Mentally Retarded Child (3) Philosophy and rationale underlying the teaching and guidance of the mentally retarded; methods and materials in special and regular classes. Prereq: or coreq: 4110.

4130 Education of the Brain-Injured Child (3) Nature of brain-injured child; skills for identifying educational, physical, and emotional characteristics; special educational techniques.

4150 Education of Children with Crippling and Special Health Conditions (3) Medical and educational characteristics of children with crippling and special health conditions; appropriate educational modifications and associated services. Prerequisite/Corequisite 3333 or consent of instructor.

4160 Education of Partially Sighted Children (3) Curricular adjustments and materials; home visits for parents' cooperation in medical care and special needs.

4190 Speech Development of the Hearing Impaired (3) Anatomy and physiology of speech system. Relationship of hearing to speech development. Theories and techniques of speech development and improvement for hearing impaired children. Prereq: Speech 3050. (Same as Audiology and Speech Pathology 4190.)

4200 Practicum in Speech Development of Hearing Impaired (3) Application of theories and techniques of speech development and improvement with hearing impaired children. Prereq: Speech 3050 and consent of instructor. (Same as Audiology and Speech Pathology 4200.)

4210 Language Development of Hearing Impaired (3) Systems by which formal language is presented. (Same as Audiology and Speech Pathology 4210.)

4220 Language Development for the Hearing Impaired II (3) Interactions between systems by which formal language is presented. Prereq: 4210 or consent of instructor. (Same as Audiology and Speech Pathology 4220.)

4230 Communication Processes for the Hearing Impaired (3) Communication skills required of the hearing impaired person; speech and language development; auditory training, speech reading, manual language, and its relation to other forms of communication. Observation practicum. (Student must acquire a degree of proficiency in use of manual language.) Prereq: Consent of instructor.

4231 Communication Processes for the Hearing Impaired II (3) Intermediate courses in manual communication skills and techniques with emphasis on vocabulary development with receptive and expressive fluency. Prereq: Spec. Ed. 4230 or consent of instructor.

4240 Nature of Hearing Impairments (3) Basic principles of audiology: anatomy and physiology of hearing; nature and causes of hearing loss; methods and instrumentation for assessment of hearing levels; interpretation of audiograms; selection and use of hearing aids; relation of audiological services to medical and other rehabilitative disciplines. Observations and practicum.

4250 Introduction to the Psychology and Education of the Hearing Impaired (3) Offered for the first time for the purpose of planning to enter field of teaching the deaf and hard-of-hearing. Review of history of education of the deaf. Research in teaching and learning of children with hearing impairments. Survey of professional literature in area of deaf adult education. (Same as Audiology and Speech Pathology 4250.)

4260 Curriculum Development in Elementary and Secondary Schools for the Hearing Impaired (3) Adaptation of curriculum development and methods in public school education to meet needs of deaf and hard-of-hearing students in residential and integrated settings.

4250 The Teaching of Reading to Hearing Impaired Children (3) Readiness activities, developmental approaches, theories, and specialized materials for curriculum in teaching reading.

4310 Stuttering (3) (Same as Audiology and Speech Pathology 4310.)

4320 Introduction to Clinical Practice in Speech Pathology (3) (Same as Audiology and Speech Pathology 4320.)

4330 Clinical Practice in Speech Pathology (1-6) (Same as Audiology and Speech Pathology 4330.)

4340 Clinical Practice in Speech Pathology (1-6) (Same as Audiology and Speech Pathology 4340.)

4341 Clinical Practice in Communication Disorders in Schools (3) Prereq: Audiology and Speech Pathology 4320-30-40, Special Ed. 4030, and consent of instructor.

4342 Seminar in Communication Disorders in Elementary and Secondary Schools (3) (Same as Audiology and Speech Pathology 4320-30-40, Special Ed. 4030, and consent of instructor.

4350-60-70 Problems in the Education of Exceptional Children (3, 5, 3) Prereq: Consent of instructor.

4351-61-71 Practicum in Special Education (3, 3, 3) Students prepare and deliver units of instruction in special education programs. S/NC.

4400 Voice Disorders (4) (Same as Audiology and Speech Pathology 4400.)

4440 High School Program for the Mentally Retarded (3) Trends, issues, and research relating to care and work study programs.

4520 Language—Speech Handicapped Child in the Classroom (3) Recognition, understanding, observation of communication disorders; information on referral procedures, agencies, legislation; incorporation of speech improvement-language development into regular curriculum. For students not majoring in speech—language pathology or audiology.

4610 Nature and Characteristics of Learning and Behavior Disorders (3) Forms of academic and socially disturbing behavior, degrees of severity, possible causes, and relationships to each other. Relationships with respect to the development of the learner as a person. Environmental and development factors interpreted through behavioral and psychodynamic theory as well as practical situations in which the student is introduced to observations for disorder may occur.

4620 Education of the Emotionally Disturbed Child (3) Managing behaviors, models for instruction, teaching techniques and materials, and teacher-pupil-family interprofessional relationships as basic to academic achievement for the pupil. Prereq: 4610.

4630 Practicum in Residential Settings Serving Children with Disturbing Behavior (3) Practice in scientifically identifying, observing, and recording disturbing behaviors; initiating behavior changes regarding academic and social behaviors; to performing in a tutorial capacity within a residential classroom; take part in discussion and evaluation of relevant academic curriculum and reinforcement schedules. Prereq: 4610 and 4620 or consent of instructor.

4640 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 practice in individualizing instruction for the special needs of the problem child. Survey and evaluation of relevant methods and materials used in each teaching situation. Prereq: 4610 and 4620 or consent of instructor.

4720 Audiology II (4) (Same as Audiology and Speech Pathology 4720.)

4740 Evaluating Exceptional Students (3) Explores mandates relative to evaluations; examines theoretical considerations and methods of evaluating exceptional students; introduces basic statistical concepts relative to norm-and criterion-referenced testing. Prereq. Sp. Ed. & Rtn. 3333 or consent of instructor.

4810 Student Teaching Mental Retardation (3) Prereq: Major in education of mental retardation. S/NC.

4811 Student Teaching Mental Retardation (9) Prereq: Major in education of mental retardation. S/NC.

4840 Educational Problems of the Cerebral Palseid Child at Home and School (3) Physical, social, and educational needs of cerebral palsied; evaluative techniques; related services.

4850 Eye Problems Encountered by the Teacher (3) Eye anatomy and hygiene; common diseases and defects; testing and treatment; educational adjustments for special eye conditions; related service sources.

4870 Student Teaching with Hearing Impaired Children (9) Supervised classroom, day school, and residential pupils. S/NC.
Application for student teaching must be filed not later than January 1 of the academic year preceding the actual experience. Prereq: 4110, 4120, 4130, 4140, 4150, 4351, 4361, 4740, S/NC.

4881 Application for Student Teaching in Special Education (1-6) Application for student teaching must be filed not later than January 1 of the academic year preceding the actual experience. Prereq: 4110, 4120, 4130, 4140, 4150, 4351, 4361, 4740, S/NC.

4921 Student Teaching in Crippling and Special Health Conditions (3-15) Observation and supervised practicum in home, hospital, and classroom. S/NC.

4922 Student Teaching of the Educable Mentally Retarded (3) Observation and supervised practicum. S/NC.

4923 Student Teaching of the Partially Seeing (3) Observation and supervised practicum in special and regular classes. S/NC.

4924 Student Teaching of the Emotionally Disturbed (3-9) Individual tutoring and classroom observation and teaching. Prereq. or coreq: Educ. C & 14720 or 4820. S/NC.

4930 Aural Rehabilitation: Speechreading and Auditory Training (3) (Same as Audiology and Speech Pathology 4950.)

4940 Introduction to the Verbo-Tonal System (4) (Same as Audiology and Speech Pathology 4940.)

GRADUATE

5000 Thesis

5001 Non-Thesis Graduation Completion (3-15)

5040 Advanced Clinical Practice in Audiology (1-6)

5100 Orientation to Rehabilitation (3)

5110 Medical Aspects of Rehabilitation Counseling (3)

5111 Psychology of Mental Retardation (3)

5112 Psychology of the Severely Mentally Retarded (3)

5113 Advanced Curriculum for the Mentally Retarded (3)

5115 Caseload Management in Rehabilitation (2)

5120 Psycho-Social Aspects of Disability (3)

5121 Job Development and Placement in Rehabilitation (3)

5130-40 Seminar in Rehabilitation (3, 3)

5141 Diagnostic Vocational Evaluation in Rehabilitation (3)

5142 Prognostic Vocational Evaluation in Rehabilitation (3)

5143 Interpretation of Vocational Evaluation Data in Rehabilitation (3)

5144 Development and Supervision of Client Evaluation Programs (3)

5145-46-47 Practicum in Rehabilitation (3, 3, 3)

5150-60 Internship in Rehabilitation (3, 9)

5170 Systematic Human Relations Training I (3)

5180 Approaches to Rehabilitation Counseling (3)

5220 Linguistics in the Education of the Hearing Impaired (3)

5240 Seminar in Language Remediation for the Hearing Impaired (3)

5260 Education of Gifted Children (3)

5280 Seminar on Educational Implications of Language Deficiency (3)

5310-20-30 Manual Communication (2, 2, 2)

5380 Cerebral Palsy (3)

5390 Cleft Palate (3)

5400 Assessment and Remediation of Learning Disabilities (3)

5401 Prescriptive Teaching for Children with Learning Disabilities (3)

5402 The Exceptional Child in the Regular Classroom (3)

5403 Resource Teachers for the Handicapped (3)

5410 Instructional Media for the Handicapped: Design, Production, and Evaluation of Prototypical Curriculum Materials for the Deaf (9)

5430-60-70 Experience in Teaching and Supervision of Exceptional Children (1-6, 1-6, 1-6)

5490 Educational Vocational Guidance of the Deaf and Hard-of-Hearing (3)

5510-20-30 Administrative Practicum or Problems in Institutional Care of Children (3, 3, 3)

5540 Seminar in Language Pathology (3)

5550-60-70 Problems in the Education of Exceptional Children (3, 3, 3)

5555-65-75 Special Topics (1-3, 1-3, 1-3)

5560 Counseling Parents of Exceptional Children (3)

5563 Psychology of the Exceptional Child (3)

5570 Evaluation and Mobilization of Community Resources (3)

5570 Medical Aspects of Disability I (3)

5572 Medical Aspects of Disability II (3)

5730 Vocational Assessment in Disability Evaluation (3)

5740 Disability and Work in Society (3)

5750 Principles and Problems of Disability Evaluation (3)

5760 Seminar: Functional Capability Assessment (3)

5770-71 Current Problems in Disability Claims Evaluation (1-3, 1-3, 1-3)

5790 Career Development: Workshop (1-6)

5820 Curriculum Development Applied to Programs for the Hearing Impaired (3)

5830 Seminar: Issues and Theories in the Education of the Exceptional Child (3)

5910-20-30 Problems in Lieu of Thesis (3, 3, 3)

5970 Juvenile Delinquency and the School (3)

Vocational-Technical Education (988)

Professors: J. L. Matthews (Head), Ph.D., Arizona State; R. J. Woodin (Emeritus), Ph.D., Ohio State; W. A. Cameron, Ph.D., Ohio State; G. O. Cheshuk, (Coordinator Ind. Ed.), Ph.D., Kansas State; C. B. Coakeley (Coordinator Dist. Ed.), Ph.D., Wisconsin; D. G. Craig, Ed.D., Cornell; R. W. Haskell, Ph.D., Purdue; N. P. Logan (Emeritus), Ed.D., Tennessee; J. L. Reed (Emeritus), M.S., Oklahoma; G. A. Wagoner (Emeritus), M.S., Indiana; G. W. Wiegner, Jr., Ed.D., Missouri.


Assistant Professors: G. K. LaBorde, Ed.D., Tennessee; R. H. Pierca, Ph.D., Ohio State; T. L. Powell, M.S., Oklahoma.

GENERAL

2010-20-30 Field Experience in Vocational Education (1,1,1) Field experience in public school programs in agriculture, business, distributive, home economics, trades and industries, and industrial arts education. S/NC only.

3000 Introduction to Vocational Education (1) Introductory and exploratory experiences concerned with teaching careers in all areas of vocational education. Includes visits within a vocational setting.

4010 Development and Utilization of Advisory Committees (3) Philosophy and rationale for use of craft advisory committees. Their selection, organization, implementation and utilization.

4140 Individual Study in Vocational-Technical Education (1-3) Individual study must be supervised by a supervising instructor and the service area coordinator or department head. Approval form must be filed in the Office of the Department Head. May be repeated.

4750 Utilization of Instructional Media (3) (Same as Educ. C & 1 4750 and Information Science 4750.)

GRADUATE

5000 Thesis

5002 Non-Thesis Graduation Completion (3-15)

5040 Advanced Clinical Practice in Audiology (1-6)

5100 Orientation to Rehabilitation (3)

5110 Medical Aspects of Rehabilitation Counseling (3)

5111 Psychology of Mental Retardation (3)

5112 Psychology of the Severely Mentally Retarded (3)

5113 Advanced Curriculum for the Mentally Retarded (3)

5115 Caseload Management in Rehabilitation (2)

5120 Psycho-Social Aspects of Disability (3)

5121 Job Development and Placement in Rehabilitation (3)

5130-40 Seminar in Rehabilitation (3, 3)

5141 Diagnostic Vocational Evaluation in Rehabilitation (3)

5142 Prognostic Vocational Evaluation in Rehabilitation (3)

5143 Interpretation of Vocational Evaluation Data in Rehabilitation (3)

5144 Development and Supervision of Client Evaluation Programs (3)

5145-46-47 Practicum in Rehabilitation (3, 3, 3)

5150-60 Internship in Rehabilitation (3, 9)

5170 Systematic Human Relations Training I (3)

5180 Approaches to Rehabilitation Counseling (3)

5220 Linguistics in the Education of the Hearing Impaired (3)
6000 Doctoral Research and Dissertation

6010 Curriculum Planning in Vocational-Technical Education (3)

6020 Program Planning and Development in Vocational-Technical Education (3)

Evaluation of Vocational-Technical Education Programs (3)

6040 Seminar in Vocational-Technical Education (1, 1, 1)

6050 Administration of Vocational-Technical Education (3)

6111-12-13 Internship in Vocational-Technical Education (3, 3, 3)

Agricultural Education (056)

3450 Agricultural Experience and Future Farmers of America Programs (3) Prereq: Consent of instructor.

3460 Methods in Teaching Agriculture (3) Prereq: Consent of instructor.

3470 Program Development and Adult Education in Agriculture (3) Prereq: Consent of instructor.

4110 Organizing and Teaching Agricultural Mechanics (3) Methods of teaching agricultural mechanics to vocational agricultural students. Emphasis on special competencies needed for planning, conducting, and evaluating agricultural mechanics programs. Prereq: Agriculture 1120, Agricultural Mechanization 3110, and/or consent of instructor. 2 hours and 2 labs.

4230-31-32 Problems in Ag-busi...
and multi-view drawing, conventional practices, pictorial procedures are studied and practiced.

3) Supervision of Home Economics in the Public Classes to Adults (3)

in Family Relationships Instruction (3)

Curriculum Development and Implementation (3) Problems in Home Economics Education. 3 periods.

the suspension system. Prereq: 1610.

Applications involving function of different types of circuits. Prereq: 1630.

involves basic machining, foundry, sheetmetal, and organization of metal-working industries. Involves processes, equipment, materials, products, and safety and using hand tools and basic machinery. Undergraduate credit only.

for registration. Applicants must show evidence of bonafide occupational experience compatible with State Plan requirements. Occupational experience must be in a recognized trade area. S/NC.

Industrial Education

Engine Analysis (3) Designed to give experimental laboratory experience in automotive technology. Engine tune-up and engine overhaul techniques and procedures are studied and practiced.

Industrial Clubs of America (VICA) (3) Designed to give students experience in a recognized trade area. S/NC.

Power and Energy (3) Development of control, transmission, conversion, interrelationship of power sources; content, curriculum, and techniques of laboratory operation. Prereq: Consent of instructor.

Visual Communications in Industrial Arts (3) Methods of developing ideas and information as related to industry and society. Content, curriculum, and techniques of laboratory operation. Prereq: Consent of instructor.

Course Construction in Industrial Arts (3) Advanced work in the selection and arrangement of course content. Emphasis upon instructional objectives, project selection and informational assignments and evaluations. Prereq: Consent of instructor.

Directed Teaching (9) Guided observation and teaching in trade, industrial, and/or technical programs in secondary, area, adult, post secondary, and junior college industrial vocational and technical curricula. Undergraduate credit only. S/NC.

Directed Teaching (6) Observation of all types of trade and industrial classes; preparation of lesson plans and supervised teaching in at least two types. Prereq: Senior standing in industrial education. Prereq, or coreq: 4210. 1 hour and 5 periods. Undergraduate credit only. S/NC.

Industrial Training & Supervision (3) Principles and techniques of handling and understanding the relationship between trainers, supervisors and employees. Covering such topics as effective communication, leadership traits, improving work methods, industrial safety and instructional skills for trainers and supervisors. Prereq: Senior standing.

Foremanship Training by the Conference Method (3)

Job Analysis (3, 3) Principles, practice, instructional methods.

Methods of Teaching Shop and Related Subjects (3) Undergraduate credit only.

Curriculum Building in Trade and Industrial Subjects (3, 3) Arranging course material in trade subjects, planning and supervising teaching in at least two types. Prereq: Senior standing in trade and industrial education. Prereq, or coreq: 4210. 1 hour and 5 periods. Undergraduate credit only. S/NC.

Numerical Control (3) Tooling, manual programming, automatic programming, automatic programming language, and use of automatic programmer as a computer. Undergraduate credit only.

Seminar in Industrial Education (3, 3, 3) Educational innovations, current events, problems, and philosophies associated with the field of industrial education.

Organization and Development of Vocational Industrial Clubs of America (VICA) (3) Designed to
give the industrial education teacher experiences and
an understanding of the organization and operation of
VICA. Prereq: Undergraduate degree and 3 yr. teach-
ing experience when taken for graduate credit.

4890 New Developments in Industrial Education (3)
Developments, pressing problems and recent trends in field of industrial education as presented by a
coordinating instructor in conjunction with knowledgeable resource personnel.

4891 New Developments in Industrial Education (3)
Developments, pressing problems and recent trends in field of industrial education as presented by a coordi-
nating instructor in conjunction with knowledgeable resource personnel.

4895 New Developments in Industrial Education (3)
Developments, pressing problems and recent trends in field of industrial education as presented by a
coordinating instructor in conjunction with knowledgeable resource personnel.

4896 Internship in Training and Supervision
(6,9,15) Cooperative work experience as a trainer or
supervisor in an industry, business or health institution. Supervision of the experience is conducted by a
person in management and the university coordinator. Seminar required. Prereq: Senior standing and VTE
4815. S/NC only.

GRADUATE

5030 Organization and Operation of Area Vocational-Technical Schools (3)

5055 Vocational School Administration and Management (3)

5810-11-12 Administration and Supervision of Industrial Education (3, 3, 3)

5830-31-32 Special Problems in Industrial Education (3, 3, 3)

5840 Method of Research in Industrial Education (3)

5850 Improving Teachers in Service (3)

5860 Advisory Committees and Apprentice Training (3)

5880 Advanced Methods of Teaching Skills and Technical Information (3)

5890-91-92 Seminar in Industrial Technical Education (3, 3, 3)

5895 New Developments in Industrial Education (3)
College of Engineering

Robert E. C. Weaver, Dean
William A. Miller, Associate Dean
William K. Stair, Associate Dean
Andrew W. Spickard, Assistant Dean

The engineer applies mathematical and scientific knowledge in planning economical ways of providing materials and energy in forms that are useful to humankind. In today’s technology-based society, everyone feels the effects of the engineer’s plans and decisions. Hence, there is a continuing and urgent need for engineering graduates who possess a thorough understanding of mathematical and scientific principles, who can apply these principles to the solution of practical problems, and who can view the solutions in their overall social perspective so that the actions that they recommend will be truly beneficial. It is the purpose of the College of Engineering to educate men and women to the high levels of technical competence and social understanding that will enable them to fulfill their responsibilities as professional engineers.

Graduates of the B.S. curricula offered by the college may enter directly a position in industry, government, or private practice, or may pursue advanced study in graduate school. Their professional activities include research, development, design, operations analysis, construction, production supervision, and technical sales. Many practice their profession in Tennessee; but engineering knows no geographical bounds, and graduates of the college serve throughout the nation and in other countries as well.

The college had its beginnings early in the history of the University when surveying was introduced into the curriculum in 1838. In 1877 civil engineering was first recognized as a curriculum. The first mechanical course appeared in about 1847; other mechanical courses followed, and in 1877 this body of studies was designated as mechanical engineering. By 1877 mining had found a place in the University, but it was later dropped. Electrical engineering appeared about 1896, when a Professor of Physics and Electrical Engineering was appointed.

Although metallurgy was announced in the catalog as early as 1888, the program was dormant until it was revived in the Department of Chemical Engineering shortly after 1940. A separate degree in metallurgical engineering was authorized in 1957. Although the rudiments of chemical engineering appeared in the form of industrial chemistry shortly after 1900, a full chemical engineering program and a department were not established until 1936. Industrial engineering was introduced in 1940, was dropped for a time during the war years, and was reinstated in 1947.

Nuclear engineering was established as a separate curriculum in 1957 in response to the rapidly increasing demand for engineers with a knowledge of nuclear phenomena. Engineering physics, a program operated jointly with the physics department, first appeared as an engineering curriculum around 1942. Curricula in engineering mechanics and aerospace engineering were added in 1963 and 1966, respectively, and a curriculum in engineering science was added in 1967.

The first dean of the college, Professor Charles E. Ferris, was appointed in 1912. Prior to that time the engineering programs were organized as a school, with a chairman of the faculty. Other former deans are Nathan W. Dougherty, who served from 1940 to 1956, Armour T. Granger, who served from 1956 to 1965, Charles H. Weaver, who served from 1965 to 1968, and Fred N. Peebles, who served from 1968 to 1980.

The Cooperative Engineering Program was established in 1926. The University of Tennessee was one of the early pioneers in this valuable type of education, which originated at the University of Cincinnati in 1905. A Cooperative Engineering Scholarship Program was formally established in 1957, with emphasis on participation by students of superior ability. A conventional cooperative program, open essentially to all students in good standing in the college, was re-established in 1967, replacing the scholarship program.

The College, in cooperation with industrial sponsors, established the Minority Engineering Scholarship Program in 1973. The program goal is to increase significantly the number of qualified black engineering graduates.

The Engineering Experiment Station was established in 1922.

The college has ten major undergraduate curricula in which a student may specialize: aerospace, chemical, civil, electrical, industrial, mechanical, metallurgical, and nuclear engineering; engineering physics, and engineering science.

Agricultural engineering is based in the College of Agriculture with facilities located on the Agricultural Campus. The agricultural engineering curriculum is offered cooperatively by the College of Agriculture and the College of Engineering. Details of the curriculum may be found in the College of Agriculture section of this catalog.

Facilities

The College of Engineering is housed in Ferris, Estabrook, Perkins, Dougherty, and Berry Halls, and in the Nuclear Engineering Building, all located on the southeastern end of the campus, and is the Alumni Memorial Auditorium-Gymnasium.

Ferris Hall. This building houses the offices, classrooms, laboratories, and shops of the electrical engineering department, and the Water Resources Laboratory. There is also a remote input/output terminal and computer graphics facility connected with The University of Tennessee Computing Center.

Estabrook Hall. Some operations of the Departments of Civil Engineering and Engineering Science and Mechanics and of the Engineering Experiment Station are carried out in Estabrook Hall.

Perkins Hall. This building houses the Departments of Civil Engineering and Engineering Science and Mechanics, and the Office of the Dean of the College of Engineering. The building contains laboratories, drafting rooms, faculty offices, and classrooms.

Nuclear Engineering Building. This building houses operations of the nuclear engineering department and contains laboratories and equipment for monitoring, counting, and investigating various nuclear phenomena. It also houses subcritical reactors.

Nathan W. Dougherty Engineering Building. This building, the most recent and
largest of the engineering buildings, houses the Department of Chemical, Metallurgical, and Polymer Engineering, and Mechanical and Aerospace Engineering. In addition to classrooms and instructional laboratories, it provides modern facilities for various types of research.

Alumni Memorial Auditorium-Gymnasium A 1,600-seat auditorium, lecture halls, classrooms, and laboratories of the Department of Industrial Engineering.

Berry Hall. This building is used by the Department of Civil Engineering and the Engineering Experiment Station for maintenance and research work.

Tau Beta Pi National Headquarters

The college is honored to have the National Headquarters of Tau Beta Pi, the National Engineering Honor Society, housed on our campus. This honor was earned in part through the untiring efforts of R.C. "Red" Matthews, who served as secretary-treasurer for the organization from 1905 to 1947. The suite of offices, located in Dougherty Hall, is occupied by Mr. R. H. Nagel, secretary-treasurer, and his staff.

Chi Epsilon National Headquarters

The college is also honored to have the National Headquarters of Chi Epsilon, the National Civil Engineering Honor Society, located in Perkins Hall. Chi Epsilon was founded in 1922. Dexter C. Jameson, Jr., associate professor of civil engineering, serves as the first executive secretary of Chi Epsilon.

Cooperative Engineering Program

The five-year Cooperative Engineering Program is offered to students in the college in order to provide a superior engineering education that affords the opportunity to combine significant experience in industry with academic preparation.

Cooperative work assignments differ from part-time or summer employment in that they involve regularly scheduled cycles of full-time academic quarters alternated with full-time work periods, usually six, a minimum of five—in career-related, planned assignments of progressive complexity and responsibility. In exposing the student in this manner to the work periods alternating with academic quarters prior to beginning their senior year in order to qualify for co-op participation, Applicants must be able to schedule a minimum of five work periods alternating with academic quarters in the College of Engineering at UTK before beginning co-op participation.

In general, students begin their work periods after completing their freshman academic work and continue them until beginning their senior coursework. Exceptionally well qualified candidates may be placed to begin their work experience after two quarters of freshman courses. Applicants must be able to schedule a minimum of five work periods alternating with academic quarters prior to beginning their senior year in order to qualify for co-op placement. With very few exceptions, transfer students must complete a minimum of two academic quarters in the College of Engineering at UTK before beginning co-op participation.

Students in the Cooperative Engineering Program are classified as follows in terms of quarter hours credited of completed courses:

<table>
<thead>
<tr>
<th>Class</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td>0-42.0</td>
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<tr>
<td>Sophomore</td>
<td>53-103.9</td>
</tr>
<tr>
<td>Junior</td>
<td>104-153.9</td>
</tr>
<tr>
<td>Senior</td>
<td>154-up</td>
</tr>
</tbody>
</table>

Sample academic schedules for co-op students are shown elsewhere in this section. A brochure with further details may be obtained from the Cooperative Engineering Program, University of Tennessee, Knoxville, Tennessee 37996-2350.

Binary Program (Dual Degree)

A binary program in engineering is available. The college has informal agreements with a number of liberal arts colleges to conduct a five-year program, three years of which will be given at the liberal arts college and the last two years at The University of Tennessee in engineering. At the end of the fifth year, or whenever all requirements at UTK have been satisfied, the college will award a baccalaureate degree in one of the branches of engineering.

Institutions which have previously cooperated with UTK in offering this Liberal Arts-Engineering 3-2 Binary Plan include: Belmont College, Nashville, Tennessee; Bethel College, McKenzie, Tennessee; Carson-Newman College, Jefferson City, Tennessee; David Lipscomb College, Nashville, Tennessee; East Tennessee State University, Johnson City, Tennessee; King College, Bristol, Tennessee; Knox College, Galesburg, Illinois; Maryville College, Maryville, Tennessee; Middle Tennessee State University, Murfreesboro, Tennessee; Southwestern University, Memphis, Tennessee; Tennessee Wesleyan College, Athens, Tennessee; Union University, Jackson, Tennessee; Tennessee State University, Knoxville, Tennessee; University of the South, Sewanee, Tennessee; and Vassar College, Poughkeepsie, New York.

Curricula in Engineering

Graduate Program

Graduate programs leading to the degree of Master of Science are offered in all areas of study, and the degree of Doctor of Philosophy is offered in eight major subjects: aerospace engineering, chemical engineering, electrical engineering, engineering science, mechanical engineering, metallurgical engineering, nuclear engineering, and polymer engineering. A Master of Engineering degree focusing on engineering design professional practice is offered in aerospace, civil, electrical, environmental, materials, mechanical, and nuclear engineering. Information concerning graduate programs is given in the Graduate Catalog.

Graduate Program at the UT Space Institute

At The University of Tennessee Space Institute near Tullahoma, graduate-level courses are offered in engineering fields such as aerospace, electrical, and mechanical engineering, and in mathematics and physics. Current programs lead to the M.S. and Ph.D. degrees. Many members of the faculty of the Space Institute are also members of the faculty of the college at The University of Tennessee, Knoxville. Information may be obtained from the REGISTRAR, THE UNIVERSITY OF TENNESSEE SPACE INSTITUTE, TULLAHOMA, TN 37388.

Engineering Experiment Station

William K. Starr, Director

The management of the Engineering Experiment Station is vested in the president of the University, the dean of engineering and the director. An advisory committee consisting of the heads of the departments of the college and the heads of departments in allied scientific fields may assist in determining policy and procedures. Members of the faculty of the college are available for consultation and advice in technical matters.

The station is organized to conduct research underlying engineering practice and to aid in the development of the state's resources and industries insofar as funds available will permit. Inquiries from industries concerning technical questions which interest them are welcomed.

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 whole expense will be carried by the parties requesting the investigation.

Bulletins are published from time to time giving the results of various investigations. Upon request, unpublished results of current studies are made available to interested parties.

Curricula in Engineering

NATIONAL ACCREDITATION

Since 1936 engineering programs at institutions of higher learning have been accredited by the engineering educational program formed by many engineering societies and now known as the Accreditation Board for Engineering and Technology (ABET). Currently accredited engineering curricula at UTK include aerospace, agricultural, chemical, civil, electrical, engineering science, industrial, mechanical, metallurgical, and nuclear.

COURSE LOAD

The maximum number of hours which can be taken by an undergraduate engineering
student without special permission is 19 hours. The dean of engineering or his designee must give permission to take 20 hours or more.

DROP DEADLINE
The drop deadline for all undergraduate courses administered by any department in the College of Engineering shall be the end of the eighth calendar day of each quarter, counted from the opening day of classes. This coincides with the Campus add deadline. Any drop action after this date on the part of any student (regardless of major) is subject to late drop regulations.

GENERAL REQUIREMENTS
NOTE: Students are advised to consult the University's degree requirements as stated in the front section of this catalog as well as departmental requirements.

Inspection Trip. Each candidate for graduation majoring in aerospace, mechanical, chemical, or metallurgical engineering must participate in inspection trips scheduled by the major department.

Transfer Credit. Every attempt will be made to give maximum credit for courses taken elsewhere and transferred to the college. Discussions concerning the evaluation of transfer credit should be conducted with the head of the department (or his designee) into which the student purposes to transfer following the evaluation of transfer credits by the Admissions Offices. Program for Second B.S. Degree. Upon approval by the Dean of Engineering and the Committee on Degrees of a program of study recommended by the major engineering department, a student who already holds a bachelor's degree may obtain the appropriate first degree in engineering upon completion of a minimum of 45 quarter hours' credit. The prevailing University regulations shall apply (see page 33).

Satisfactory/No Credit Courses. An undergraduate engineering student may count towards a degree up to 12 quarter hours obtained by Satisfactory/No Credit (S/NC) grading. Such courses must be used for humanistic-social (non-technical) elective credit in engineering. Certain engineering courses carrying only S/NC grading do not count in this limit.

Correspondence Courses. A student should check with his or her major department to see what restrictions there are, if any, on the use of correspondence course credit to meet the minimum degree requirements.

Humanities and Social Sciences Electives.

The college assumes an obligation to include in each of the engineering curricula a means whereby students gain greater insight into their interaction with society, both personally and professionally. For this purpose, a part of each engineering curriculum is devoted to humanities and social science electives. Broadly stated, this requirement serves a threefold need: to provide an expanded sensitivity to the human aspects of the practice of engineering; to enrich the student's knowledge of the world in which he or she lives—its culture, behavior patterns, history, and governance; and to provide a basis for the appreciation of and the ability to deal with complex interactions between technology and society in the contemporary world. Engineers are now working with new constraints that demand a consciousness of the social and political implications of their work. They are interacting with the public in explaining their work as the public demands greater participation in the decision-making process concerning the utilization of technology. Because of the significance of this technology-society interaction, engineering students are encouraged to seriously consider their selection of required electives in this area.

Students are urged to plan a non-technical electives program which will enhance their own interests and objectives. It is recognized that, just as engineers show individual preference for concentration in one of the areas of engineering, they differ in their interests in the many areas of the humanities and social sciences. However, these subjects should be pursued with sufficient depth in terms of courses to permit a reasonable level of comprehension of the selected areas. In order to increase the effectiveness of this interest and to meet ABET accreditation guidelines, the Humanities and Social Studies Committees of the college provides a list of approved courses in the form of 13 coherent groups of courses identified in three broad areas as follows:

Area I. Human, Economic, and Political Relationships to Engineering
A. Governance and Political Science
B. Economics
C. Sociology and Psychology
D. Human Values

Area II. Society—Its History, and Literature
A. Fine Arts
B. American Culture
C. History
D. Literature
E. Anthropology

Area III. Technology and Society
A. Human Habitat
B. Technology Assessment
C. Communication
D. Resources

Courses in the list which follows are selected by the committee with revisions as course offerings and needs change. They are recommended as satisfying the non-technical (humanities-social studies) electives requirement in the various curricula of the college. However, the structure and permissible courses of the non-technical elective content of each engineering curriculum are established by the respective departments. Therefore, individual departments may delete courses from this list, require certain courses, or require selection of courses from specific subgroups. Students should consult their departments for any restrictions.

This course is intended to eliminate paperwork for the commonly-chosen electives and to illustrate the kinds of suitable courses. This list is not exhaustive and it is recognized that individual students may desire to take courses not on the approved list. Those students should discuss their interests and desires with their academic advisor prior to registering for elective courses if such courses are to be used to satisfy degree requirements. Also the catalog may state prerequisites for upper-division courses in the list. In such cases, students are encouraged to consult the instructor in the particular course. With respect to student records these lists are handled by means of a substitution sheet which originates with the adviser. Courses which are primarily skill development courses in the departments of mathematics or science, are intended for specialists in another field (such as education), or which are very elementary in nature are usually not approved as humanities-social studies electives in an engineering curriculum.

ELECTIVE COURSES IN HUMANITIES AND SOCIAL STUDIES

Area I. Human, Economic, and Political Relationships to Engineering

IA. Governance and Political Science
Philosophy 2340
Geography 3610
History 3795, 4310-20-30, 4370, 4380
Political Science 2510-20, 3545-46, 3710-20, 3750-60, 3901-02-03-04, 3880, 4060, 4535-36, 4540-50, 4545-46, 4665-66
Sociology 3030, 4530, 4560

IB. Economics
Economics 2110-20-30, 3110-11-12, 3120, 3210-11-3220, 3240, 3310, 3410-20, 4110
Geography 2110-20-30, 3410

IC. Sociology and Psychology
Geography 3000, 3600, 3860, 4530-31, 4540-50, 4900,
Rural Sociology 3420
Sociology 1510-20, 3030, 3150, 3310, 3410, 3610, 3620, 4350, 4560

ID. Human Values
Geography 3000
History 3060-70-80, 3270
Philosophy 2310, 3111-21-31-41-51,
3440, 3690
Religious Studies 2610, 3560, 3600-10-20, 3611, 3740
Zoology 3410 (Bioethics)

Area II. Society—Its History, and Literature

IA. Fine Arts
(Not: No more than 8 quarter hours may be taken in the performing arts—band, chorus, etc.)
Art 1815-25, 3715-16, 3725-26, 3750, 3765-66
English 2660, 3411-12-20-30-40
Music 1210-20-30, 1340, 2310-20-30-40, 3550, 4210, 4230, 4241, 4261-71
Philosophy 2410, 3910
Theatre 3252-53-54

IB. Culture
American Studies 3010
Anthropology 3410
Black Studies 2010-20, 3550-60, 4830
English 2640-50, 3310, 4721-31-41
French 2610-20-30, 4110-20-30
Geography 3430, 3450, 3660, 3910-20-30-40
History 1950-60, 2350, 3670, 3680, 4290, 4640-50-60
Italian 2610-20
Music 1210-20-30, 1340, 2310-20-30-40, 3550
Philosophy 1510-20, 3311-12, 3720
Very few ROTC courses can be used as a humanities-social studies elective. Individual departments determine the appropriate substitutions.

Approval of Electives and Substitutions. Not later than the beginning of the third quarter prior to anticipated graduation, each student shall discuss with an advisor the status of the program of study. Any necessary additions or substitutions in the program, or electives requiring special approval, shall be cleared in written form at that time, and it is each student’s responsibility to see that all necessary approvals are secured. Inattention to such matters may delay graduation.

CURIULA, TABULAR VIEW

Following are the course requirements for the various engineering curricula. The numbers in the columns indicate the number of quarter hours of credit for each course. Columns represent the three principal quarters of the academic year—fall, winter, and spring. This is not a schedule, and courses are available in quarters other than those indicated here. This listing is a guide, not a rigid schedule. Individual course prerequisites should be strictly adhered to, even if courses are not taken in the quarters indicated. Although the requirements for each degree can be completed in four academic years (five for the cooperative program), the quality of the learning experience is much more important than the speed with which the curriculum is completed.

Humanities-social studies electives are the same as non-technical electives in these tabulations. Questions about individual courses should be directed to the department responsible for the course; questions about a particular curricula should be directed to the major department.

Aerospace Engineering

Before entering the third quarter of the junior year, the student, with the advice and approval of his or her advisor, must select a program of technical electives.

American History Requirement. Engineering students, regardless of national origin, must fulfill the American history requirement described on page 28 of this catalog. Those students who have not had the required year of American history in high school may choose the required nine quarter hours from History 2510, 2520, 2511, and 2521, or other courses deemed suitable by the Department of History. These hours can be counted as part of the required block of humanities and social science electives.

Technical Electives. Technical electives are to be selected with the advice and approval of the student’s major department. In some of the curricula tabulation of a choice of such electives is indicated, and regulations in regard to their selection are stated. The University of Texas Engineering students may participate in the ROTC Program. Advanced ROTC courses (3000 and 4000 series) may be counted as technical elective credit toward an engineering degree up to a total of nine (9) quarter hours.
### Electrical Engineering

**Hours Credit**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Hours</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math 1840-50-60</td>
<td>4</td>
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<tr>
<td>Chemistry 1110-20-30</td>
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<td>Physics 2310-20-30</td>
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<td></td>
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<tr>
<td>Math 3150</td>
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<tr>
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<td>3</td>
</tr>
<tr>
<td>Elect. Engr. 4510</td>
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<td>3</td>
</tr>
</tbody>
</table>

**TOTAL: 203 hours**

### Chemical Engineering

**Hours Credit**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Hours</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Freshman</td>
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<tr>
<td>Math 1840-50-60</td>
<td>4</td>
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<tr>
<td>Chemistry 1110-20-30</td>
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<tr>
<td>Physics 2310-20-30</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Senior</td>
<td></td>
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<tr>
<td>Math 3150</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Elect. Engr. 4590</td>
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<tr>
<td>Elect. Engr. 4510</td>
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</table>

**TOTAL: 203 hours**

### Civil Engineering

**Hours Credit**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Hours</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
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<td>Freshman</td>
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<tr>
<td>Math 1840-50-60</td>
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<td>Chemistry 1110-20-30</td>
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<td>Physics 2310-20-30</td>
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<td>Senior</td>
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<td>Math 3150</td>
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<td>Elect. Engr. 4580</td>
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<td>3</td>
</tr>
<tr>
<td>Elect. Engr. 4510</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL: 206 hours**

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1. Required for pre-medical, pre-dental, and pre-veterinary medicine programs. Students in other biomedical engineering options should consult their advisor to revise this series by Chemistry 2320 and technical electives.
2. Humanities/social studies courses approved by the department.
3. Upper-division courses in mathematics, computer science, statistics, natural science, or engineering approved by the department.
4. Humanities/social studies electives must be taken from a specified list.
5. Non-technical electives must be approved by the student's area adviser.
6. Required for pre-medical, pre-dental, and pre-veterinary medicine programs. Students in other biomedical engineering options should consult their advisor to revise this series by Chemistry 2320 and technical electives.
7. Humanities/social studies courses approved in advance by the department.
8. Mechanical Engineering 3211 may be substituted.
9. Math/science courses approved by the department, or I.E. 4520.
10. Technical electives must be approved by the student's advisor and the primary and one of the secondary areas of study must come from the departmental list of approved courses for 15 credits and 6 credits respectively.
11. Non-technical electives must be approved by the student's area adviser.
12. Notice that any given senior course is offered only once every third quarter including the summer quarter.
13. Total 128 hours for all engineering options.

**College of Engineering**
### Engineering Science

<table>
<thead>
<tr>
<th>Semester</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
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**TOTAL: 197 hours**

*Humanities/social studies courses approved by the department.

Appropriate courses approved by the department.

Upper-division courses in mathematics, statistics, natural science, or engineering approved by the department.

### Industrial Engineering

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**TOTAL: 204 hours**

*Humanities/social studies electives: minimum of 24 hours required.*

*Technical engineering electives: senior courses in mechanical engineering not otherwise required.*

*Technical electives: upper-division courses in engineering, mathematics, or physics as approved by the department.

### Metallurgical Engineering

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**TOTAL: 206 hours**

### Mechanical Engineering

**TOTAL: 204 hours**

*Humanities/social studies electives: minimum of 24 hours required.*

*Technical engineering electives: senior courses in mechanical engineering not otherwise required.*

*Technical electives: upper-division courses in engineering, mathematics, or physics as approved by the department.

### Nuclear Engineering

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**TOTAL: 200 hours**

*Minimum of one-half (12 quarter hours) of the humanities/social studies electives must be taken from a single group under one of the three areas.*

Not required in the cooperative program.

### Departments of Instruction

**Agricultural Engineering** (See College of Agriculture)

### Basic Engineering and Graphics

(Non-Departmental Unit)

**Basic Engineering (179)**

Coordinator: W. T. Snyder

1310 Basic Mechanics I (4) Forces in a plane; free body diagram analysis; equilibrium in two dimensions;
## Cooperative Curriculum in Aerospace Engineering

### Students Working Spring and Fall Quarters—Group A

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**TOTAL: 204 hours**

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**TOTAL: 204 hours**

*Humanities/social studies electives: minimum of 24 hours required.

Technical electives: upper-division courses in engineering, mathematics, or physical science as approved by the department.
### Cooperative Curriculum in Agricultural Engineering
(See College of Agriculture Section)

### Cooperative Curriculum in Chemical Engineering

Students Working Spring and Fall Quarters—Group A

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Students Working Summer and Winter Quarters—Group B

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*minimum of one-half (12 quarter hours) of the humanities/social studies electives must be taken from a single group under one of the three areas of the humanities and social studies electives.
Cooperative Curriculum in Civil Engineering
Students Working Spring and Fall Quarters—Group A

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Students Working Summer and Winter Quarters—Group B

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1Humanities/social studies courses approved by the department.
2Mechanical engineering 3520 or 3311 may be substituted.
3Technical electives must be approved by the student's adviser and the primary and one of the two secondary areas of study must come from the departmental list of approved courses for 15 credits and 6 credits respectively.
4Math/science courses approved by the department.
# Cooperative Curriculum in Electrical Engineering

**Students Working Spring and Fall Quarters—Group A**

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| FIFTH YEAR | See Senior Year Areas of Interest, page 132. | TOTAL: 203-206 hours |

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# Students Working Summer and Winter Quarters—Group B

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| FIFTH YEAR | See Senior Year Areas of Interest, page 132. | TOTAL: 203-206 hours |
## Cooperative Curriculum in Engineering Physics

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### Students Working Summer and Winter Quarters—Group B

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TOTAL: 199 hours

1. To be taken from the College of Liberal Arts triads of Language, Literature and Arts, or History and Society, with at least 16 hours from courses approved for Language, Literature and Arts.
2. The honors sequence (Physics 1318-28-38) is recommended for qualified majors.
3. To be taken in College of Engineering.
5. From engineering, mathematics, computer science, physics, chemistry, or astronomy.
6. Students not pursuing graduate studies may substitute Physics 3710-20-30.
## Cooperative Curriculum in Engineering Science

### Students Working Spring and Fall Quarters—Group A

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**TOTAL: 196 hours**

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### Students Working Summer and Winter Quarters—Group B

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**TOTAL: 196 hours**

1. Humanities/social studies courses approved by the department.
2. Appropriate courses approved by the department.
3. Appropriate courses in the College of Engineering approved by the department.
4. Upper-division courses in mathematics, statistics, natural science, or engineering approved by the department.
Cooperative Curriculum in Industrial Engineering

Students Working Spring and Fall Quarters—Group A

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Students Working Summer and Winter Quarters—Group B

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### Cooperative Curriculum in Mechanical Engineering

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*Humanities/social studies electives: Minimum of 24 hours required.

Mechanical engineering electives: senior courses in mechanical or aerospace engineering not otherwise required.

Technical electives: upper-division courses in engineering, mathematics, or physics as approved by the department.
### Cooperative Curriculum in Metallurgical Engineering

**Students Working Spring and Fall Quarters—Group A**

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*TOTAL: 198 hours*

### Students Working Summer and Winter Quarters—Group B

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<td>Math. 1850 . . . . 4&lt;br&gt;Chem. 1120 . . . . 4&lt;br&gt;English 1020 . . . . 3&lt;br&gt;Basic Engr. 1420 . . . . 2&lt;br&gt;Basic Engr. 1330 . . . . 4</td>
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<td>Met. Engr. 3150 . . . . 3&lt;br&gt;Met. Engr. 4250 . . . . 3&lt;br&gt;Met. Engr. 4320 . . . . 1&lt;br&gt;Chemet Engr. 4320 . . . . 1&lt;br&gt;Materials Engr. 3130 . . . . 3</td>
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</table>

*A minimum of one-half (12 hours) of the non-technical electives must be taken from a single group under one of the three areas of the humanities and social studies electives.*
## Cooperative Curriculum in Nuclear Engineering

**Students Working Spring and Fall Quarters—Group A**

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Summer</th>
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<td>Nuc. Engr. 4120</td>
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TOTAL: 200 hours

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**Students Working Spring and Winter Quarters—Group B**

<table>
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<th>Year</th>
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<th>Spring</th>
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<td>Humanities/social studies elect</td>
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</table>

TOTAL: 200 hours
application to frames and machines; friction; introduction to forces in space. Required of all engineering students except physics majors. Coreq: Math 1840. 4 hrs. llec.

1320 Basic Mechanics II (4) Position and displacement vectors; particle kinetics using Newton’s laws; mass, momentum, work-energy; introduction to simple harmonic motion. Prereq: 1310; coreq: Math 1850. 4 hrs. llec.

Coordinator: P. F. Pasqua

1330 Basic Thermodynamics (4) Introduction to thermodynamics fluid statics, and mechanics. Buoyancy, force on confined surfaces; Bernoulli’s equations, first law of thermodynamics discussing work, heat, and phase changes of energy. Required of all engineering students except physics majors. Prereq: 1310; coreq: Math 1850. 3 hrs. and one 3-hr. lab.

1410 Engineering Computations (2) Familiarization and introduction to the use of the computer system for problems. BASIC language. Prereq: Math 1840. 2 hrs. and open computer lab.

Graphics (443)

Coordinator: W. A. Lyday

Basic Faculty:

Professors: C. A. Newton (Emeritus), M.S. Syracuse; W. W. Thomas, Jr. (Emeritus), B.S. Tennessee; Associate Professors G. H. Parham, Jr. (Emeritus), M.S. Tennessee; B. A. Boyce, E. K. Boyce, M.S. Tennessee; W. A. Lyday, Jr., Ph.D. Tennessee.

1310-20-30 Fundamentals of Engineering Graphics (2,2,2) Graphic representation of three-dimensional shape and size by orthographic and pictorial projection; sketching and dimensioning; tolerances. Problem solving utilizing spatial relationships and graphical vector analysis, and graphic presentation of engineering data. Must be taken in sequence. Two 3-hr. periods or three 2-hr. periods.

1410-20 Fundamentals of Engineering Graphics (3,3) Graphical representation of three-dimensional shape and size; space relationships. Graphical presentation of engineering data. Required of all engineering students. Must be taken in sequence. One lecture and three 2-hr. periods or two 3-hr. periods.

Engineering Studies (Non-Departmental Unit)

Engineering Studies (338)

Coordinator: E. E. Stansbury

2100 Introduction to Engineering Methodology (4) Introduces nonengineering students to representative methods utilized in engineering design, development, operation, and evaluation; processes and products for society; use of physical laws and examples of techniques such as modeling, systems analysis, economic balance, problem of resource use and technology, the engineering approach which may be used.

4100 History of Engineering (4) History of technology and engineering with emphasis on identification of and development in major areas such as transportation, communication, energy, manufacturing, design, and materials. Relations to social and political structures of historical periods. Open to all students.

4200 Technology Forecasting and Assessment (4) Procedures and problems in forecasting of consequences of existing and new technologies; assessment of and decisions on use of these technologies. Social, political, economic, and technological implications of consequence-based assessment and control of technology. Open to all students.


Chemical, Metallurgical, and Polymer Engineering


Associate Professor: W. M. Becker, Ph.D. Illinois; D. D. Burns, Ph.D. Houston; R. M. Conner, Ph.D. Tennessee.

Assistant Professor: F. Weber, Ph.D. University of Minnesota.

*Space Institute, Tullahoma

Alumni Distinguished Professor

BACHELOR OF SCIENCE PROGRAMS

Separate complete curricula are offered in chemical engineering and in metallurgical engineering. However, the first two years of these curricula are identical and a decision as to choice can be made in the third year. Both curricula are arranged to provide a central core of courses with flexibility in the upper division years to permit emphasis on preparation for graduate study or technical employment. Graduation in either chemical or metallurgical engineering requires a minimum grade point average of 2.00 for all departmental courses.

GRADUATE STUDY PROGRAMS

Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy with majors in chemical engineering, metallurgical engineering, or polymer engineering are offered. A program is arranged to provide a central core of courses with flexibility in the upper division years to permit emphasis on preparation for graduate study or technical employment. Graduation in either chemical or metallurgical engineering requires a minimum grade point average of 2.00 for all departmental courses.

3100 Introduction to the Materials of Technology (4) Examination of sources, processing, and properties of metallic, ceramic, polymeric, and composite materials. Required of all students with specialization in polymer science and engineering. Prereq: 2010. 3 hrs. and 1 lab.

Separate complete curricula are offered in chemical engineering and in materials engineering. Applications of the second law of thermodynamics to engines, cells, and other devices. Prereq: Math 2260. 3 hrs. and 1 lab.

3410 Flow of Fluids (4) Differential and overall momentum balances, mechanical energy balances; flow in channels, piping systems, and ducts; methods of analysis, devices, pumps. Prereq: Chem. Engr. 2200, Math 2260. 3 hrs. and 1 lab.

3420 Heat Transfer (4) Differential and overall energy balances; steady and unsteady heat conduction in simple geometries; heat transfer in tubes and heat exchangers; condensation and boiling radiation. Prereq: 3410. 3 hrs. and 1 lab.


3450 Diffusional Operations (3) Diffusion simultaneous heat and mass transfer, applications including humidification, gas absorption, extraction. Prereq: 3420, Chem. Engr. 3404.
4620 Process Modeling, Simulation, and Control of Chemical Processes (3) Development of process models, experimental process identification, process computer simulation, conventional and non-conventional feedback control systems. Unsteady state nature of chemical processes. LaPlace transform techniques, block diagrams, algebra, and transfer function analysis of chemical process control systems. Prereq: 3620 or equivalent background in basic control theory and differential equations.

4730 Mass and Energy Flow in Biological Systems (3) Basic physicochemical and organizational principles applicable to biological systems. Derivations of general equations of biomass and energy transfer. Thermodynamics of transport and equilibrium in biological systems. Discussion of Volterra's equations and biological clocks, etc. Prereq: Consent of instructor.

4740 Introduction to Transport Phenomena in Biological Systems (3) Application of principles of transport phenomena to biological systems. Transfer of chemical energy and various cellular active transports; structure and mechanism of physical fluids, membrane and interfacial phenomena; and design and analysis of artificial organs. Prereq: 3440 and 3450, or consent of instructor.

4750 Microbiological Process Engineering (3) Application of chemical engineering principles and design concepts to microbiological processes; continuous culture of microorganisms, food processing and pharmaceutical processes. Prereq: 3440, 3450, or consent of instructor.

4760 Principles of Biochemical Separation (3) Fundamental aspects and similarities of modern biochemical separation methods. Design of separation incidents, design of production and analytical systems. Prereq: Consent of instructor.

4900 Special Problems in Chemical Engineering (3) Chemical engineering problems related to recent developments in chemical engineering; student research project. Prereq: Consent of instructor. May be repeated. Maximum credit 9 hours.

GRADUATE

5000 Thesis

5010 Graduate Seminar (1)

5050 Engineering Analysis (3)

5120 Heat Convection (3)

5130 Methods of Optimization (3)

5210 Process Dynamics (3)

5250 Chemical Process Industry Economics (3)

5210 Thermodynamics of Heterogenous Equilibriums (3)

5320 Statistical Thermodynamics (3)

5510 Chemical Reactor Design (3)

5610 Stagewise Mass Transfer Operations (3)

5620 Differential Mass Transfer Operations (3)

5810 Mechanics of Visco Flows (3)

5900 Special Topics in Chemical Engineering

6000 Doctoral Research and Dissertation

6130 Process Optimization (3)

6210 Advanced Diffusional Operations (3)

6250 Venture Analysis in the Process Industries (3)

6310 Thermodynamics of Irreversible Processes (3)

6320 Statistical Thermodynamics of Nonequilibrium Systems (3)

6410 Stability Phenomena in Chemical Engineering: Discrete Systems (3)

6420 Stability Phenomena in Chemical Engineering: Continuous Systems (3)

6510 Applied Chemical Reaction Kinetics (3)

6520 Catalytic Reactor Design (3)

6710 Process Dynamics (3)

6900 Advanced Topics of Chemical Engineering (3)

Metallurgical Engineering (679)

2040 Experimental Methods in Metallurgy (4) Lectures provide subject bases for laboratory experiences. Explorations, use of potentiometers, X-ray spectrometers, computer experimental data acquisition and readout, dilatometry studies of magnetic and nonmagnetic materials. 2 hrs. and 2 labs. Prereq: 2030.

2110 Engineering Materials I (3) Introductory course involving the metallic, crystal, and microstructure of solids and mechanical, thermal, and electrical properties of materials. Prereq: Consent of instructor. 3 hrs. or 2 hrs. and 1 lab. Prereq: Sophomore standing in engineering.

2210 Electron Microscopy (1) Presents to science and engineering students a brief introduction to the operation of the electron microscope and its applications to scientific problems. Prereq: Physics 2310-20, 3-hr. lab. S/NC.

3010 Industrial Inspection Traps (1) Technology of metallurgical industries, emphasizing Tennessee industry; plant trips. S/NC.

3040 Metallurgical Thermodynamics (4) Application of laws of thermodynamics to problems of metallurgical engineering; phase diagrams of component systems, and entropy, auxiliary functions; relationship between free energy and phase diagrams: reaction equilibria in gases and between gases and condensed phases; phase diagrams of system capacity and free energy data in calculations. Concepts of activity and activity coefficient and their variations with T, P, and composition. Prereq: Math 2020, Chemistry 1130, coreq: Math 2840. 3 hrs. and 1 lab. period.


3110 Engineering Materials I (4) Introductory course correlating the atomic, crystal, and microstructure of solids with mechanical, physical, and chemical properties of engineering significance. 3 hrs. and 1 lab.

3120 Engineering Materials II (3) Extension of 2110 with emphasis on control of mechanical properties of materials by specification of composition, thermal, and mechanical treatment; correlation of resultant properties with service performance. Suggested for mechanical, civil, and industrial engineering students.

3130 Engineering Materials III (3) Extension of 2110 with emphasis on control of electrical and magnetic properties of materials, and on mechanical properties of materials, and on mechanical properties of materials for mechanical, civil, and industrial engineering students.

3140 Engineering Material IV (3) Extension of 2110 with emphasis on materials processing, specification, and evaluation. Suggested for mechanical and industrial engineering students.


3160 Engineering Materials V (3) Extension of 2110 with emphasis on materials of significance in nuclear engineering; nuclear reactor construction materials, nuclear fuel materials, and interaction of radiation with solids to produce changes in engineering properties. Suggested for nuclear and mechanical engineering.

3170 Engineering Materials V (3) Extension of 2110 to biomedical applications of materials. Engineering materials in biomedical applications, medical ceramics, polymers, and composites; prosthetic devices; dental applications; corrosion problems; failure analysis; fabrication. Prereq: 2110 or equivalent.

3210 Plastic Deformation (4) Phenomena and theory of plasticity of single and polycrystalline materials.
5050 Engineering Analysis (3)

5110 Point Defects and Dislocations (3)

5120 Plastic Deformation I (3)

5130 Plastic Deformation II (3)

5140 Diffusion and Annealing in Solids (3)

5150 Phase Transformations (3)

5170-80 Plastic Deformation (3,3)

5210-20-30 Welding Metallurgy (3,3,3)

5310 Solidification and Crystal Growth I (3)

5410-20-30 Advanced X-Ray Diffraction (3,3)

5510-20 Applied Properties of Solids (3,3)

5540-50 Electron Microscopy I and II (3,3)

5610-20 Radiation Effects on Materials (3,3)

5750 Corrosion (3)

5810-20-30 Special Topics in Metallurgy (3,3,3)

5840-50 Metallurgy of Deformation and Fracture (3,3)

6000 Doctoral Research and Dissertation

6110-20 Theoretical Metallurgy (3,3,3)

6210-20 Rate Processes in Metallurgy (3,3,3)

6320-30 Solidification and Crystal Growth II and III (3,3)

6410-20 Thermodynamics of Solids (3,3)

6610 Mechanical and Physical Properties of Crystals I (3)

6620 Mechanical and Physical Properties of Crystals II (3)

6830 Seminar in Anisotropic Properties of Crystals (3)

Polymer Engineering (805)

4230-40 Project Laboratory (3,3) Laboratory investigation of polymer engineering problem. Written report required for each quarter.

4910 Applied Polymer Science (3) First course in physical properties of polymers. Polymer structure, crystalline and glass transitions, physical properties of amorphous and crystalline polymers, crystallization kinetics, and mechanical properties are discussed.

4820 Polymer Processing (3) Rheological properties of polymer melts and solutions, viscometry, unit operations of fiber, plastics, and rubber industries: dimensional analysis and scale-up, flow through dies and pipelines, screw extrusion, spinning of fibers, injection molding. Prereq: Senior standing in engineering or science. Not for graduate credit by polymer engineering majors.

5450 Principles of Injection and Blow Molding (3)

5460 Textile Engineering Mechanics (3)

5710 Phase Transformations in Polymer Systems (3)

5810 Physical Properties of Polymer Structures (3)

5910-20-30 Selected Topics in Polymer Science (3,3,3)

6000 Doctoral Research and Dissertation

6110 Optical Properties of Polymer (3)

6150 Advanced X-Ray Diffraction Methods for Characterization of Macromolecules (2)

6210 Non-Linear Viscoelasticity (3)

6220 Advanced Methods in Polymer Processing (3)

6330 Advanced Mechanical Behavior of Polymers (3)

6250 Large Deformation Elasticity (3)

6450 Liquid Crystals: Structure, Characterization, Technology (1)

6610 Advanced Industrial Polymer Chemistry (3)

6910-20-30 Recent Advances in Polymer Science and Engineering (3,3,3)

Civil Engineering

 Including Environmental Engineering

Professors:


Associate Professors:


Assistant Professors:

E. S. Houghland, Ph.D. VPI & SU; R. B. Robinson, Ph.D. Iowa State, P. E.

Fred N. Peabody Professor

ABM Professor
BACHELOR OF SCIENCE PROGRAM

The curriculum in civil engineering is designed to provide training in fundamental engineering sciences and in certain non-technical and basic subjects in various civil engineering fields to serve as a basis for entrance into civil engineering practice, and/or for graduate study. By use of technical electives (27 hours maximum), a student can specialize as primary or secondary areas of study in environmental engineering, geotechnical/materials, structural, transportation, or water resources. Primary specialization will be shown on the student’s transcript.

Students are required to maintain a cumulative grade point average of at least 2.00 in all civil engineering and environmental engineering courses taken at The University of Tennessee, Knoxville, and used to satisfy the graduation requirements.

MASTER OF SCIENCE AND MASTER OF ENGINEERING PROGRAMS

Graduate programs in civil engineering and environmental engineering leading to the degree of Master of Engineering are offered to graduates of recognized undergraduate curricula.

The general requirements for the masters’ degrees are stated in the Graduate Catalog.

DOCTORAL PROGRAM

Graduate work leading to the degree of Doctor of Philosophy with a major in civil engineering is offered. Major fields of study include environmental engineering, geotechnical/materials, structural engineering, transportation, and water resources.

The general requirements for the doctoral degree are stated in the Graduate Catalog.

Civil Engineering (254)

2260 Engineering Surveys (4) Mensuration through the application of surveying techniques; the theory of errors and their analysis; fundamental concepts of horizontal, vertical, and angular measurement; basic surveying operations and computations. 3 hrs. lectures and one 3 hr. lab. Prereq: Math 1850.

2310 Seminar (1) Presentation and discussion of topics related to civil engineering.

2360 Route Surveying (3) Emphasis on basic principles and practical applications of horizontal and vertical surveying.oured simple, compound, reverse and parabolic curves and spirals. Earthwork computations. Prereq: 2260.

3210 Stresses in Framed Structures (3) Reactions, moments, shears, and stresses in trusses and framed structures from fixed loads; influence lines and reactions, moments, and shears. Prereq: Engr. Science Mech. 3311.

3230 Design of Framed Structures (3) Selection of rolled beams; design of compression and tension members for axial and combined axial and bending stresses. Prereq: 3210.


3315 Soil Mechanics II (3) The compressibility of fine and coarse-grained soils; the rate of consolidation. Shear strength of soils. Failure theories. 2 hrs. lecture and 1 lab.

3320 Computer Applications in Civil Engineering (1) Programming projects through the use of digital computers. Prereq: Basic Engr. 1410.

3360 Surveying Practice (3) Route surveying procedures. Two 3-hr. labs. Coreq: 2360.

3800 Transportation Planning (3) Emphasis on transportation problems and perspectives, both rural and urban; use of the planning process to establish existing travel patterns, modeling of demand, proposing alternatives and their evaluation, and plan implementation. Prereq: Junior standing.

3910 Transportation Engineering (3) Introductory course on design, construction, maintenance, and operation of various transportation modes, their guidance and supervision. Coreq: Junior standing.


4110 Concrete Design (3) Reinforced concrete beams and columns; use of standard specifications. Prereq: 3210 and 3710.

4120 Concrete Design (3) Reinforced concrete continuous beams and floor slabs; footings and retaining walls. Prereq: 4110 and 4410.

4220 Foundations (3) Subsurface investigations; design of shallow and deep foundations on cohesive and cohesionless soils, on rock. Lateral earth pressure. Stability of slopes in homogeneous clay. Prereq: 3515 and Geology 2610.

4230 Legal and Ethical Aspects of Engineering (3) Legal principles underlying engineering work; laws of contracts, torts, property; problems of professional registration and ethics.

4240 Structural Design (3) Plate girders, composite steel and concrete beams, connections and details, and design of industrial building. Two 3-hr. periods. Prereq: 3220 and 4410.

4260 Photogrammetry (3) Methods of plotting maps from aerial photographs; stereoscopic plotting instruments; applications. Prereq: 2360, or Forestry Summer Camp for forestry majors.

4320-20 Seminar (1,1) Selected topics dealing with historical and modern civil engineering achievements and professional and ethical responsibilities. Prereq: Senior standing and completion of all junior level non-elective engineering courses.

4410 Deflections and Statically Indeterminate Structures (3) Deflections of beams and trusses; analysis of indeterminate beams, trusses, bents, and frames. Prereq: 3210 and 3710.

4420 Analysis of Framed Structures (3) Maximum stresses due to moving loads; influence lines; lateral forces due to earthquake and wind; analysis of portals, building frames, and space frames. Coreq: 4410.

4430 Construction Methods and Equipment (3) Fundamental operations in construction and selection of equipment; production rates, balancing of equipment, and cost estimates. Prereq: 3710.

4460 Land Surveying (3) Procedures of locating properties; evaluating evidence; procedures to describe property, to create land divisions, and to prepare plots; laws of land surveying. Prereq: 2260 or equivalent.

4510-20 Advanced Structural Design (3,3) Plastic design in steel in 4510; design of typical short span steel highway bridges in 4520. Prereq: 3220 for 4510; 3230 and 4110 for 4520.


4560 Stabilization of Soils (3) Mechanical stabilization of soils by compaction, drainage, and blending; chemical stabilization of soils with admixtures; water-proofing and modifying soils and additives. 2 hrs. of lecture and 1 lab. Prereq: 3320.

4600 Highway Engineering I (3) Design, construction, operation, and maintenance of highway facilities; includes integration of system planning and project planning to design and construction procedures. Prereq: 3800, 3910 and 3710.

4520 Airport Planning and Design II (3) Emphasis on airport master planning and development of criteria necessary for construction of airport; on the air side are runway configuration, capacity, geometry, and lighting; and on the land side are included terminal layout and design, and ground access systems and parking. Prereq: 3800, 3910.

4540 Traffic Engineering (3) Characteristics of driver, vehicle, and roadway and their interrelationship; traffic studies to provide data for design of traffic circulation and control; elements of urban transportation planning studies. Prereq: Senior Standing.

4650 Highway Engineering II (3) Integration and application of various engineering principles and techniques to process of planning, locating, and design of highway facility through comprehensive team project. 1 lecture and 2 labs. Prereq: 4650.

4660 Airport Planning and Design II (3) Integration and application of principles of airport master planning for purpose of site selection and design of an airport facility through comprehensive team project; includes environmental engineering and evaluation of design. 1 lecture and 2 labs. Prereq: 4620.

4710 Portland Cement Concrete Mix Design (3) Properties and tests of portland cement concrete, methods of concrete mix design; correlation of mixing proportions to results of concrete testing and use of concrete admixtures. 2 lectures and 1 lab. Prereq: 3710.

4720 Asphalt and Bituminous Concrete (3) Properties and tests of asphalts and asphaltic mixes, mix design and bituminous concrete paving. Emphasis on use of asphalt in transportation construction projects. 2 lectures and 1 lab. Prereq: 3710.

4731-32 Earthquake Resistant Structure I, II (4,4) (Same as Architecture 4731-32).

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: Senior standing or consent of instructor.

4850 Elementary Structural Matrix Methods (4) (Same as Architecture 4850 and Engineering Science and Mechanics 4850.)

4860 Structural Wood Design (3) The application of structural design principles to structural members of various combinations of wood products. Beams, columns, and diaphragm construction with plywood are covered in some detail. Attention is given to various types of fastenings and connections. Prereq: 3220.

4880 Civil Engineering Systems Design and Management (3) Introduction to basic systems engineering concepts within civil engineering context; discussion of the role of decision maker and use of optimal principles of engineering planning. Prereq: Computer Science 3150.

4910 Special Topics (1-3) Topics related to recent developments and current practice in civil engineering through supervised self-study. Prereq: Consent of individual instructor and approved by department head. May be repeated.

GRADUATE

5000 Thesis

5002 Non-Thesis Graduation Completion (3-15)

5110-20 Statically Indeterminate Structures (3,3)

5140 Statically Indeterminate Structures (3)

5150 Matrix Formulation of Structural Problems (3)

5160 Analysis and Design of Plate Structures (3)

5170 Introduction to Structural Dynamics (3)

5180 Finite Element Structural Analysis (3)

5220 Pavement Design (3)

5240 Advanced Properties of Materials: Bituminous Substances and Mixes (3)
5270 Planning and Transportation (3)
5310 Engineering Practice (3)
5230-30 Engineering Practice Applied to Administration of Engineering Projects (3,3)
5410 Construction Contract Law and Administration (3)
5420 Structural Model Analysis (3)
5410 Construction Contract Law and Administration of Engineering Projects (3,3)
5530-40-50 Construction Management I, II, III (3,3,3)
5560 Soil Mechanics-Elastic Behavior (3)
5570 Soil Mechanics-Seeapge (3)
5610 Behavior of Steel Structures (3)
5730 Prestressed Concrete (3)
5740 Behavior of Reinforced Concrete Members (3)
5800 Urban Systems: Engineering and Management I (3)
5805 Urban Systems: Engineering and Management II (3)
5810 Traffic Engineering-Characteristics(3)
5820 Traffic Engineering-Operations (3)
5840 Geometric Design (3)
5850 Functional Design of City Streets and Urban Freeways (3)
5860 Urban Transportation Planning (3)
5870 Public Transit Planning (3)
5880 Highway Safety I (3)
5885 Highway Safety II (3)
5890 Traffic Accident Reconstruction (3)
5900 Special Problems in Civil Engineering (1-9)
5910-20-30 Special Topics (1-6,1-6,1-6)
6000 Doctoral Research and Dissertation
6110 Research Development (3)
6120 Research Management (3)
6140 Behavior of Steel Bridges and Buildings (3)
6740 Behavior of Reinforced Concrete Beams and Frames (3)
6750 Behavior of Reinforced Concrete Slabs (3)
6830 Traffic Flow Theory (3)
6860 Statewide Passenger Transportation Planning (3)
6870 Future Transit Technology and Research (3)
6880 Planning Models for Transportation Systems I (3)
6890 Planning Models for Transportation Systems II (3)
6910-20-30 Special Topics in Civil Engineering (3,3,3)

Environmental Engineering (344)
3120 Hydraulics (3) Application of basic and developed principles of hydraulics. Flow measurement, flow in closed conduits; uniform and nonuniform open channel flow; pumps and turbines; basic hydrodynamics; flow similitude and models. Two lectures and one 3-hr. lab. Prereq: Engr. Mech 3110.
4000 Environmental Protection (3) A rationale is developed for managing water resources, bodily wastes and wastewaters, air environment, solid wastes, commensal insects and rodents, food and exacerbation of physical energy to prevent the impairment of health, to promote efficiency and comfort, and to safeguard the balances in natural ecosystems. The principles of environmental protection are emphasized. Includes objectives of design and practice without detailed design or practice methods. Prereq: Senior standing.
4030 Environmental Engineering Chemistry (3) Fundamentals of chemistry which relate to generation, formation, analysis, and removal of environmental contaminants. Prereq: Chemistry 1130 and senior standing.
4120 Water Resources Engineering Design (3) Elements of water resource structures and systems, including reservoirs, dams, control works and open channel design. Dam safety control; environmental impact of reservoir projects. Prereq: 3330 or consent of instructor.
4220 Water Resources Engineering Development (3) Multi-objective evaluation procedures for comparing and selecting among water resources development alternatives; achieving project optimality; single and multi-objective projects; special topics in new developments in water resources engineering. Prereq: 3330 or consent of instructor.
4330 Hydrologic Design (3) Application of frequency and regression analysis to hydrologic design of water resources system: steady-state surface runoff and streamflow modeling; urban peak runoff using kinematic wave theory; evaluation of effects of land use changes on stream flow quantity and quality. Prereq: 3330.
4510 Elements of Water and Wastewater Transport Systems (3) Introduction to theory and design of water transportation and distribution systems and wastewater collection systems. Prereq: 3120 and 3330.
4520 Elements of Water and Wastewater Treatment Systems Design (3) Introduction to unit operations and processes employed in physical, chemical, and biological treatment of water and wastewater. Application of unit operations and processes in design of water and wastewater treatment plants. Prereq: 3120.
4525 Water and Wastewater Treatment Plant Design (3) Detailed process design of water and/or municipal industrial wastewater treatment plants; sludge handling systems, and ultimate disposal of residuals. Prereq: 4520 or equivalent.
4530 Environmental Engineering Laboratory (3) Standard analytical techniques for evaluation of specific air, water, and solid waste pollutants. 2 hrs. and 1 lab. Prereq: 4030.
4600 Solid and Hazardous Waste Management (3) Magnitude and characteristics of solid and hazardous waste problems; collection systems; disposal systems including landfill, incineration, composting, bacterial, source recovery, and proposed new technologies; current and future regulations. Prereq: Junior standing.
4700 Air Pollution-Air Resource Management (3) Introductory course on concepts of air pollution; analysis of relationship among emission sources, meteorology and topographic factors, and adverse effects on receptors; engineering approaches for air pollution control. Prereq: Senior standing.
4820 Environmental Engineering Law (3) Legal aspects of water and air pollution, drainage, land use controls, and environmental impact statements with emphasis upon federal-state relations, recent legislation and court decisions, and enforcement. Prereq: Senior standing.
4910-20-30 Special Topics (1-3,1-3,1-3) Topics relating to recent developments and current practice in environmental engineering through supervised self-study. Prereq: Consent of individual instructor and approved by department head. May be repeated.

GRADUATE
5000 Thesis
5002 Non-Thesis Graduation Completion (3-15)
5150 Water and Urban Welfare (3)
5230 Surface Water Transport Processes (3)
5232 Sediment Transportation (3)
5240 Flood Control Hydraulics (3)
5261 Basic Principles of Remote Sensing (3)
5262 Remote Sensing Data Acquisition (3)
5263 Remote Sensing Data Analysis and Interpretation (3)
5301 Stormwater Modeling I (3)
5302 Stormwater Modeling II (3)
5310 Groundwater Transport Systems (3)
5320 Descriptive Hydrology (3)
5400 Introduction to Environmental Systems (3)
5501 Water and Wastewater Treatment Theory I (3)
5502 Water and Wastewater Treatment Theory II (3)
5503 Advanced Water and Wastewater Treatment Systems (3)
5530 Environmental Engineering and Natural System Behavior (3)
5551 Water Quality Management (3)
5582 Microbiology for Sanitary Engineers (3)
5593 Advanced Environmental Engineering Laboratory (3)
5620 Solid Waste Collection Systems (3)
5630 Design of Solid and Hazardous Waste Disposal Systems (3)
5700 Planning and Air Pollution Control (3)
5710 Air Pollution Control Engineering (3)
5715 Ambient Air Monitoring (3)
5720 Air Pollution Particle Collection Theory (3)
5725 Air Quality Modeling and Impact Assessment (3)
5730 Air Pollution Control Device Design (3)
5735 Industrial Source Sampling (3)
5745 Ambient Air Chemistry (3)
5750 Diffusion in the Atmosphere (3)
5900 Special Problems in Environmental Engineering (1-9)
5910-20-30 Special Topics (1-6,1-6,1-6)
5990 Environmental Engineering Seminar (3)
6110-20 Advanced Topics in Fluid Mechanics and Convective Transfer (3,3)
6230 Kinematic Wave Theory (3)
6510 Industrial Waste Unit Operations and Processes (3)
6520 Industrial Waste Management (3)
6530 Rate Processes in Environmental Pollution (3)
6820 Advanced Theory and Applications in Water Resources Energy Systems I (3)
grad point average, grades earned in
courses required in the lower-division curricula of the College of Engineering, and
seriousness of purpose and interest in
department. Admission is limited by regular and orderly progress through the
prescribed curriculum without abuse of
withdrawal and course repeat privileges.

Students will be evaluated during the
eral requirements for Electrical Engineering
2030. Transfer students may take nine (9)
quarter hours in departmental courses before
evaluation if EE 2030 transfer credit is given.

Those who complete the upper-
division program of the department will not be
permitted to register for any upper-
division courses within the department. Such students
will also be counseled and advised of certain
educational alternatives.

**MASTER OF SCIENCE PROGRAM**

Graduate work leading to the Master of
Science degree may be completed during one
academic year of full-time study or the degree
may be obtained in two or three years of
study thereafter.

Graduate assistantships and scholarships are available for outstanding students.
Graduate assistants may obtain the master's
degree in one year.

Course work leading to the degree of
Master of Science in Electrical Engineering is
offered in the evening. Each course meets for
two and one-half hours each week.

**THE DOCTORAL PROGRAM**

Graduate work leading to the degree of
Doctor of Philosophy with a major in electrical
engineering is offered. The department also participates in the engineering science
doctoral program.

General policies of the Graduate School, residence, language, research, examinations,
and admission to candidacy requirements are explained in the Graduate Catalog.


2020 Circuits II (3) Elementary transient analysis of circuits with one storage element. Networks in series and parallel. Complex algebra. Power and power factor. Phasors and transforms. Transform of networks, and complex im-
pedances. Rascence. Coreq: 2010, Math 2840 con-
currently. 3 hrs. including biweekly lab.

2030 Circuits III (3) Polyphase networks considered as networks with more than one source. Magnetically

coupled circuits. Transient analysis of circuits containing more than one storage element using classical methods. Steady-state analysis of networks containing sinusoidal sources of more than one frequency. Coreq: Math 2860 concurrently. 3 hrs. including biweekly lab.

3010 Transient Analysis (3) Analysis of transient response of networks and systems; Laplace transform methods and algebraic differential equation methods for system analysis; complex frequency and pole-zero concepts; application to engineering problems. Coreq: 2030.


3050 Basic Field Theory (3) Forces between charges, electric and magnetic fields Gauss' law and
divergence, potential and line integrals, material bod-
ies; polarization, magnetic circuits. Maxwell's equa-
tions, dynamic potentials. Coreq: Math 2860.

3060 Propagation I (3) Propagation of waves in trans-
mission lines, impedance methods and admis-
pedance and reflection analysis of waves, standing
twave and traveling wave measurements. Introduc-
tion to guided wave transmission and propagation,
waveguide circuit construction, graphical and com-
puter aided design methods. 3 hrs. including bi-weekly lab.

3080 AC Power (3) Magnetic circuits, iron cored coils;
transformers, construction, calculation of performance from the equivalent circuit, parameters for the equiva-
 lent circuit, 1-phase and 3-phase connections, the "per unit" notation; induction motors, constructional
features, analysis of performance using equivalent circuits, 1-phase and 3-phase applications. Coreq:
2030, Physics 2310. Includes bi-weekly lab.

3090 Energy System Operation (3) Power system modeling and system structure. Basic
analysis techniques in loadflow, economic dispatch,
transient stability, faults, and system protection.
Coreq: 3080.


3119 Basic Electrical Engineering—Circuits and Fields (3) For non-electrical engineering majors. Coreq: Math 2850, Physics 2310-20. 3 hrs. including biweekly lab.

3120 Basic Electrical Engineering—Electronics (3) For non-electrical engineering majors. Coreq: 3110. 3 hrs. including biweekly lab.

3130 Basic Electrical Engineering—Machinery (3) For non-electrical engineering majors. Coreq: 3110. 3 hrs. including biweekly lab.

3180 Logic Design of Digital Systems (3) Introduction to boolean algebra and design of combinational circuits. Present gate and flip-flop characteristics. Design of clocked sequential circuits and other systems containing memory. Introduction to minicomputer architecture and system components to include basic structure and function of Arithmetic, Storage, Input/Output, and Control Systems. Instruction set capabilities and machine language programming. Coreq: 3010, Computer Science 3150 or 2710. (Same as Computer Science 3180).

3190 Plasma I (3) Engineering applications of physical plasma, plasma effects and devices. Topics include electrostatic precipitators and plasma light sources, laser operation and applications (electro-
genesis, MHD, controlled thermonuclear, and other techniques of advanced power propulsion. 3 hrs. in-

3720 Linear Systems Analysis (3) Steady-state and transient response, log-frequency, gain-phase, and polar plots, block diagram transformation, signal flow
graphs; analogous systems, properties of second order system, introduction to feedback theory, stability
criteria. Coreq: 3010 and Math 3150, coreq: 3180. 3 hrs. including occasional labs.

3810 Basic Electronics I (3) Band theory fundamentals; theory and applications of p-n junctions; simple bipolar transistors and applications in simple circuits. Coreq: 2030. 3 hrs. including project laboratory.

3820 Basic Electronics II (3) Electromagnetic field analysis of bipolar transistors and vacuum tubes with applications in basic amplifiers. Integrated circuit fundamentals. Coreq: 3810. 3 hrs. including project laboratory.

3830 Basic Electronics III (3) Frequency and trans-
ient response of operational amplifier transistors. Fundamentals of folded casese, Miller compensation, operational amplifiers and applications in basic feedback configurations. Basic digital switching circuits. Coreq: 3820. 3 hrs. including project laboratory.

4020 Direct Energy Conversion (3) Background physics; conversion devices including photovoltaic
power sources, thermoelectric generators and heat pumps, magnetohydrodynamics, fuel cells, and related aspects of AC-DC inversion and energy storage. Prereq: 3810, 3090.

4080 Microwave Circuits and Electronics (3) Scattered wave description of circuits, to include isolators and circulators, coupled resonators, divider combiners, filters, phase shifters, loading and interconnection of systems. Power generation and amplification by vacuum tubes and by solid state (bulk and junction) devices. Microwave switching, filtering and multiplexing. Prereq: 3960. 3 hrs. including bi-weekly lab.

4090 Propagation II (3) Metal tube, dielectric rod, and strip-line waveguides. Waveguide resonators and other loading components. Design of structures utilized for microwave power transmission and for microwave integrated circuits. Prereq: 3060. 4 labs.


4210 Introduction to Artificial Intelligence (3) (Same as Computer Science 4210.)


4381 Introduction to Applied Modern Control Theory (3) Project-oriented course stressing applications of optimal control theory. Topics include: state-space representation of systems, controllability and observability, minimum principle, dynamic programming and the calculus of variations, discrete and analog optimal control theory, linear quadratic regulators, minimum variance control, etc. Prereq: 3190.

4400 Power System Components and Control (3) Mechanical transmission tors and cables, R,I,C, calculations and power flow limitations. Control of real and reactive power flows in interconnected power systems; the PF and QV control problems. Prereq: 3090.


4430 Transmission, Distribution, and Protection (3) Studies in underground and d. c. transmission; consideration of types; properties and tests. Synthesis of L-C system protection against faults. Prereq: 3060. 3090.

4460 Lasers and Masers (3) Principles of laser and maser operation based on classical concepts and electrical engineering analogies. Consideration of practical devices and applications. Prereq: Senior standing.


4500 Electro-Optic Detection and Instrumentation (3) Sensitivity, resolution (frequency response) and noise concepts of and practical engineering data for both spatial and recording media (e.g. photographic emulsions) and temporal detectors (e.g. photodiodes) will be given. Last third of the course will be devoted to selection of detectors for specific applications (e.g. laser light scattering, optical data processing, holographic interferometry).


4570 Electro-Acoustics (3) Wave equation for sound, radiation from pistons, impedance of a piston, loudspeakers, horns, speaker systems, phonograph recording and reproduction, tape recording and reproduction, noise reducing systems. Prereq: senior standing.

4600 Analog Signal Processing Circuits for Electronic Instrumentation (3) Use of operational amplifiers, instrumentation amplifiers, and other integrated circuits in signal processing. Design examples such as inverting and non-inverting function generators, active rectifiers, and synchronous demodulators. Analysis of interfacing problems between transducers and electronic circuits. Prereq: 3180. 3 hrs. including project laboratory.

4610 Analog-Digital Systems (3) Principles of analog computing components. Applied to analog computing to include studies of operational amplifier characteristics, design of analog multipliers, dividers, and function generators. Presents comparators, digital to analog conversion, and analog to digital conversion techniques. Prereq: 3180 and 3380. 3 hrs. including biweekly lab.


4630 Digital System Organization and Design (3) System organization of digital systems including minicomputer and microprocessor architectures and comparisons. Characteristics of ALU and CPU structures, storage systems (RAM, ROM, and PROM building blocks), and I/O systems. Control-Unit organization to include serial-parallel modes of operation, synchronous/asynchronous time sequencing, and microprogramming/microprogramming of computer functions. Prereq: 3180. 3 hrs. including biweekly lab.

4660 Bioelectric Instrumentation (3) Nature and origin of bioelectric potentials, transducers, amplifier requirements, recording systems, and noise problems. Prereq: Senior Standing.

4680 Electric Amplifiers (3) Feedback amplifier principles. Wideband linear amplifiers. Audio and radio-frequency power amplifiers. Prereq: 3850. 3720. 3 hrs. including project laboratory.

4690 Communications Electronics (3) Receiver and transmitter circuits for communications. Prereq: 3040, 3850. 3 hrs. including project laboratory.

4700 Digital Integrated Electronics (3) Comparators, logic gates, flipflops, registers, counters, memories, analog switches, A/D and D/A conversion, clipping, clamping, and sweep circuits. Prereq: 3830, 3160. 3 hrs. including project laboratory.

4740 Integrated Circuits (3) Processing and fabrication of active and passive components for monolithic and hybrid circuits. Design techniques for linear and digital circuits. Prereq: 3830. 3 hrs. including project laboratory.

4750 Interactive Computer Graphics (3) (Same as Computer Science 4750 and Geography 4750.)

4780 Synchronous Machines (3) Construction and application of synchronous machines, analysis of paralleling from equivalent circuit models for round rotor and salient pole machines; Park's transformation to the 2-axis model, use of this model in transient studies; extension of the 2-axis concept to the general theory of electrical machines. Prereq: 3060.

4790 Controllable Motor Drives (3) Constructional features and design parameters for the usual variations of the d.c. motor; A.C. servomotor, stepping motor; development of transfer functions and examples of their application in control system. Prereq: 3090.

4800 Hardware-Software Interface in Minicomputer and Microprocessor System Design (3) Minicomputer and microprocessor interface design. Hardware-software interaction and trade-off. Priority interrupt structures. Telecommunications. Project oriented, contract course. Completion of two projects, one utilizing a minicomputer and the other a microcomputer, are minimal course requirements. Prereq: 3180.

4810 Discrete-Data Systems (3) Introduction to analysis and design of discrete data control systems using frequency domain techniques. Realtime digital filtering techniques; application of digital computers in closed-loop feedback systems. Prereq: 3720.

4820 Introduction to Pattern Recognition (3) Role of pattern recognition within framework of artificial intelligence. Design of learning and adaptive machines. Typical applications of pattern recognition to problems of practical significance. Computer simulation of elementary pattern recognition problems. Prereq: Either 3100 and Computer Science 3150, or Statistics 3450 and Computer Science 1510. (Same as Computer Science 4820.)

4830 Digital Image Processing (3) Principal methods of edge detection, feature detection, and processing images by means of digital computers. Computational algorithms for image operations, Prereq: 3100 and Computer Science 3150, or Statistics 3450 and Computer Science 1510. (Same as Computer Science 4830.)

4850 Small Computer Systems (3) Basic structure of small computer systems, input-output techniques, interrupt structures, peripheral devices, system software, and assembly language programming. Course is project oriented. Prereq: Basic Eng.: 1410, Computer Science 1510 or 3150, or consent of instructor. (Same as Computer Science 4850.)

4910-20-30 Special Electrical Engineering Problems (3,3,3) Problems in electrical engineering involving library and experimental research. GRADUATE

5000 Thesis

5040-50-60 Electrical Engineering Research (3,3,3)

5070-60 Modern Transform Methods (3,3)

5110 Introduction to Network Analysis (3)

5120 Network Synthesis and Design (3)

5130 Advanced Network Analysis (3)

5150 Bioengineering Systems I: Models, Systems Analysis, and Simulation (3)

5175 Introduction to Logic Design (3)

5180 Bioengineering Systems II: Bioelectric Phenomena (3)

5190 Bioengineering Systems III: Instrumentation and Analysis (3)

5210-20 Advanced Electrical Machinery (3,3)

5230 Advanced Electrical Machinery Applications (3)

5240-50-60 Control Systems Design I, II, III (3,3,3)

5271 Modern Systems Theory I (3)

5281 Modern Systems Theory II (3)

5291 Modern Systems Theory III (3)

5310 Basic Requirements for Plasma Fusion (3)