Specialized Professional Physical Education

4870, and 4880.

From the above and/or the following:

One of the following area courses and lab:

Educ. Major activity courses; Physical Educ.

Professional Education....10 hours

3550, 3720, 4140, and 4340, and 4350.

General Electives....20 to 28 hours

Maximum of 6 hours in 1000 and 2000-level Physical Educ. Major activity courses and/or Physical Educ. 2700-level courses (which must be different from the Physical Educ. Major activity courses); also excluded are Physical Educ. 2730, 2734, 2756, 2757, 2792, and 2794.

Total Minimum Required....200 hours

C. Kinesiology/Biomechanics Area of Concentration

General Education...79 to 87 hours

English 1010 and 1020 and 1033; Speech 2311 or 2331; Humanities electives (minimum of four courses and three areas, 12 to 16 hours) selected from the following: anthropology, art, music, philosophy, religious studies, English literature, foreign languages (any level), and history (3000 and 4000-level only); Social Science electives (minimum of four courses and three areas, 12 to 16 hours) selected from the following: anthropology, economics, geography, history, political science, and sociology; Chemistry 1110-20 or 1510-20; Zoology 2920, 2930 and 4940; Math 1840; Psychology 2500; Physics 1310; and any five 1000 and 2000-level Physical Educ. Major activities.

Physical Education Core...22 hours

Physical Educ. 1000, 2600, 3210, 3320, 3550, 3720, 4170, and 4220.

Professional Education....10 hours

Psychology 3150, Computer Science 4310; English 4140.

Professional Physical Education...16 hours

Any five 1000 and 2000-level Physical Educ. Major activity courses; Physical Educ. 3560 and 4330.

Specialized Professional Education

35 Physics 1320, 1330; Math 1850-60; Anthropology 3900; Zoology 2980 and 3060.

Specialized Professional Education...

9 Physical Educ. 3250, 4110, 4115, and 3570.

General Electives....21 to 29 hours

Maximum of 6 hours in 1000 and 2000-level Physical Educ. Major activity courses and/or Physical Educ. 2700-level courses (which must be different from the Physical Educ. Major activity courses); also excluded are Physical Educ. 2730, 2734, 2756, 2757, 2792, and 2794.

Total Minimum Required....200 hours

d. Sport Philosophy Area of Concentration

General Education...79 to 87 hours

English 1010 and 1020 and 1033; Speech 2311 or 2331; Humanities electives (minimum of four courses and three areas, 12 to 16 hours) selected from the following: anthropology, art, music, philosophy, religious studies, English literature, foreign languages (any level), and history (3000 and 4000-level only); Social Science electives (minimum of four courses and three areas, 12 to 16 hours) selected from the following: anthropology, economics, geography, history, political science, and sociology; Chemistry 1110-20 or 1510-20; Zoology 2920, 2930 and 4940; Math 1840; Psychology 2500; Physics 1310; and any five 1000 and 2000-level Physical Educ. Major activities.

Physical Education Core...22 hours

Physical Educ. 1000, 2600, 3210, 3320, 3550, 3720, 4170, and 4220.

Professional Education....10 hours

Psychology 3150, Computer Science 4310; English 4140.

Professional Physical Education...16 hours

Any five 1000 and 2000-level Physical Educ. Major activity courses; Physical Educ. 3560 and 4330.

Specialized Professional Education

35 Physics 1320, 1330; Math 1850-60; Anthropology 3900; Zoology 2980 and 3060.

Specialized Professional Education...

9 Physical Educ. 3250, 4110, 4115, and 3570.

General Electives....21 to 29 hours

Maximum of 6 hours in 1000 and 2000-level Physical Educ. Major activity courses and/or Physical Educ. 2700-level courses (which must be different from the Physical Educ. Major activity courses); also excluded are Physical Educ. 2730, 2734, 2756, 2757, 2792, and 2794.

Total Minimum Required....200 hours

4. Sports Management Track

General Education...81 to 89 hours

English 1010 and 1020 and 1033; Speech elective; Humanities electives (minimum of four courses and three areas, 12 to 16 hours) selected from the following: anthropology, art, music, philosophy, religious studies, English literature, foreign languages (any level), and history (3000 and 4000-level only); Social Science electives (minimum of four courses and three areas, 12 to 16 hours) selected from the following: anthropology, economics, geography, history, political science, and sociology; Chemistry 1110-20 or 1510-20; Zoology 2920, 2930 and 4940; Math 1840; Psychology 2500; Physics 1310; and any five 1000 and 2000-level Physical Educ. Major activity courses or 2700-level courses.

Physical Education Core...22 hours

Physical Educ. 1000, 2600, 3210, 3320, 3550, 3720, 4170, and 4220.

Professional Education....10 hours

Psychology 3150, Computer Science 4310; English 4140.

Professional Physical Education...16 hours

Any five 1000 and 2000-level Physical Educ. Major activity courses; Physical Educ. 3560 and 4330.

Specialized Professional Education

35 Physics 1320, 1330; Math 1850-60; Anthropology 3900; Zoology 2980 and 3060.

Specialized Professional Education...

9 Physical Educ. 3250, 4110, 4115, and 3570.

General Electives....21 to 29 hours

Maximum of 6 hours in 1000 and 2000-level Physical Educ. Major activity courses and/or Physical Educ. 2700-level courses (which must be different from the Physical Educ. Major activity courses); also excluded are Physical Educ. 2730, 2734, 2756, 2757, 2792, and 2794.

Total Minimum Required....200 hours

5. Physical Education/Career Area

General Education...79 to 87 hours

English 1010 and 1020 and 1033; Speech 2311 or 2331; Humanities electives (minimum of four courses and three areas, 12 to 16 hours) selected from the following: anthropology, art, music, philosophy, religious studies, English literature, foreign languages (any level), and history (3000 and 4000-level only); Social Science electives (minimum of four courses and three areas, 12 to 16 hours) selected from the following: anthropology, economics, geography, history, political science, and sociology; Chemistry 1110-20 or 1510-20; Zoology 2920, 2930 and 4940; Math 1840; Psychology 2500; Physics 1310; and any five 1000 and 2000-level Physical Educ. Major activities.

Physical Education Core...22 hours

Physical Educ. 1000, 2600, 3210, 3320, 3550, 3720, 4170, and 4220.

Professional Education....10 hours

Psychology 3150, Computer Science 4310; English 4140.

Professional Physical Education...16 hours

Any five 1000 and 2000-level Physical Educ. Major activity courses; Physical Educ. 3560 and 4330.

Specialized Professional Education

35 Physics 1320, 1330; Math 1850-60; Anthropology 3900; Zoology 2980 and 3060.

Specialized Professional Education...

9 Physical Educ. 3250, 4110, 4115, and 3570.

General Electives....21 to 29 hours

Maximum of 6 hours in 1000 and 2000-level Physical Educ. Major activity courses and/or Physical Educ. 2700-level courses (which must be different from the Physical Educ. Major activity courses); also excluded are Physical Educ. 2730, 2734, 2756, 2757, 2792, and 2794.

Total Minimum Required....200 hours

TOTAL MINIMUM REQUIRED....200 hours

The following courses are selected from the following:

Anthropology, art, music, philosophy, religious studies, English literature, foreign languages (any level), and history (3000 and 4000-level only); Social Science electives (minimum of four courses and three areas, 12 to 16 hours) selected from the following: anthropology, economics, geography, history, political science, and sociology; Chemistry 1110-20 or 1510-20; Zoology 2920, 2930 and 4940; Math 1840; Psychology 2500; Physics 1310; and any five 1000 and 2000-level Physical Educ. Major activities.
Sociology 1510 or 1520 plus 4 hours of related courses.

**Health and Safety** (3 hours)
School Health 3210.

**Cultural Arts** (32 hours)
Music 1200-20, 2111, 2221 or 2231; Theatre 1000, 1200, 2390, 2390, 2430 or 2430.

**DANCE**
Physical Education 1050, 2040-60, 2070, 3010-20, 3040-41, 3060-61, 3070-75, 3300 or 4360, 3320, 4020, 4050, 4060-69, 4590, 4590.

**CONCENTRATION AREAS** (12 hours)
Dance: Physical Education 4000, 4005, or Modern Dance: Physical Education 3300, 4010.

**ELECTIVES**
20 hours

**TOTAL MINIMUM REQUIRED** 200 hours

*Students are not permitted to audit any dance class. All classes must be taken on letter grade or S/NC basis.*

**D. Minor in Dance**

*Option I.* Physical Education 2070, 3040, 3070, 4080, 4090; 4040-50-60 or 3080-61-62; 4 hours selected from 3070 and/or 3090; 6 hours selected from 3075 or 4000 or 4005.

*Option II.* Physical Education 2070, 3010, 3040, 4080, 4090; 4040-50-60 or 3080-61-62; 4 hours selected from 3070 and/or 3075; 5 hours selected from 3020 or 3030 or 4010.

*Option III.* Physical Education 1052, 2070, 3010, 3070, 4080, 4090, 4150, 4550, 3060-61-62; 4 hours selected from 3075-4000-4005 or 4 hours selected from 3020-3030-4010.

*Students are not permitted to audit any dance class. All classes must be taken on letter grade or S/NC basis.*

**E. Major in Recreation**

**GENERAL EDUCATION** 68 hours
Selection of specific courses in each area below dependent on career goals in recreation. Consult advisor.

**Natural Sciences** (16 hours minimum)
4 hours selected from biology, geology, astronomy, and Geography 1810, 1820, 3590. 4 hours selected from: biology or botany, zoology, the anatomy or physiology. At least 8 additional hours selected from any or a combination of the above.

**Mathematics** (3-4 hours)

**Social Sciences** (16 hours minimum)
Sociology 1510 and 4530; at least eight additional hours selected from Sociology 1520, 3110, 3120, 3130, 3190, and/or 3200.

**C. Major in Dance**

**GENERAL EDUCATION** 91 hours

**Communications** (13 hours)
English 1010 or 1011; 1020 and 1031, or 1031, 1032, 3211. Speech 2211.

**Humanities** (15 hours)
Art 1815-25; English literature 2000 and above; one elective from philosophy, foreign language, upper division history, or religious studies.

**Mathematics** (4 hours)

**Natural Science** (8 hours)
Any electives selected from biological and/or physical sciences.

**Psychology** (8 hours)
Psychology 2500 plus 4 hours of electives.

**Social Sciences** (8 hours)

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, 1550-60, 2510-20, 2350, Anthropology 2530, Geography 3660, Classics 2810-20, 2910-20, 2310-20-30, 3010-30-40, Philosophy 1510-20, 2310, 3100, 3915, 3630, 3910, Religious Studies 2610, 2611.

**Cultural Arts** (12 hours minimum)
4 courses from at least 2 of the following arts: Music 1210-20, 3210-11-12, 3350, 4230, 4241, 4270, Theatre 2352-53-54, 3262-63, Art 2715, 2725, 2735-36, 2765-66, 1815-25, P. E. 2070, 3090, 3151.

**PROFESSIONAL RECREATION EDUCATION** 24 hours
Recreation 1100, 3100, 3140, 3200, 3220, 3880, 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 (0-12 hours) in each:

**Arts and Crafts:** Art 1115-25-35, 2105, 2115, 2205, 2215, 2250-60, 2275, 2315, 2450-60, 2515-16, 2545-55-65, 2605, 2617, 2850-60-70, 3260, 3710, 4150; Art Education 2100, 2210-20, 3110, 3920-30, 4130, 4150 4410.

**Dance:** P.E. 2711-12-13, 2726, 2747-48-49-50, 2762, 2778-79, 4310, 4310-20-30-40, 4310, 4320, 3070.

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

**Music:** Music Education 4410, 2100, 1010-20, Music 1500 through 1595 applied music series.

**Outdoor Recreation and Camping:** Forestry 4440, 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

**F. Major in Public Health**

**GENERAL EDUCATION** 67 hours

**Communications** (13 hours)
English 1010 or 1011; 1020 and 1032; Speech 2211.

**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 (4, 4, 4); Biology 1210-20, Zoology 2920-30.

**Psychology** (4 hours)
Psychology 2500.

**Social Studies** (19 hours)
Economics 2500; Geography 2110 or 2120 or Political Science 2510 or 2520; History 1510-20 or 2510-20; Sociology 1510,
CORE PROFESSIONAL EDUCATION. 9 hours
G. Major in School Health Education

EDUCATION C & I 4750
Education C & I 4720 and Public Health
4700-10-20 or
Public Health 4110, 4700-10-20 (9) and
Public Health 4740 (9) - Non-Teacher
Certification
School Health 3650
Educational Psychology 3810.
Special Education 3335

SPECIALIZED PROFESSIONAL EDUCATION*
28 hours
Education C & I 4750
Education C & I 4720 and Public Health
4700-10-20 or
Public Health 4110, 4700-10-20 (9) and
Public Health 4740 (9) - Non-Teacher
Certification

Health and Physical Education (18 hours)
Communications (9 hours)
Mathematics (9 hours)
Psychology (4 hours)
Natural Science (20 hours)
Computer science (12 hours); physical education (9 hours).

VI. SPECIAL EDUCATION
A. Concentration in General Special Education

GENERAL EDUCATION

COMMUNICATIONS (13 hours)
English 1010-20-33; Speech 2311.
Health and Physical Education (11 hours)
School Health 3000, 3210, Physical education electives.
Humanities (16 hours)
English—any 4 hours from literature; Anthropology 2530; Philosophy or religious studies elective; Art or music elective.

MATHEMATICS (4)

NATURAL SCIENCE (20 hours)
Chemistry or physics sequence; Biology 1210-20 or Zoology 2920-30.

PSYCHOLOGY (4 hours)
Psychology 2500.

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

CORE PROFESSIONAL EDUCATION

9 hours
Ed. C & I 3010*-20*-30*.

SPECIALIZED PROFESSIONAL EDUCATION
28 hours
Education C & I 4750, 4710 and 4720; Education Psychology 3810; School Health 3650, 4100; Special Educ. 3335.

TEACHING AREAS AND ELECTIVES

66 hours

G. Major in School Health Education

Ed. C & I 4750, 4710 and 4720; Education Psychology 3810; School Health 3650, 4100; Special Educ. 3335.

SPECIALIZATION IN GENERAL SPECIAL EDUCATION

H. Minor in Driver and Traffic Safety Education

RENIRED COURSES

17 hours
Safety 3520, 4410, 4420; School Health 2510.

ELECTIVES

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

SPECIAL EDUCATION STUDENT TEACHING
15 hours
Special Education 4880, 4881, 4882.

ELECTIVES

13 hours

TOTAL MINIMUM REQUIRED

190 hours

SPECIALIZED PROFESSIONAL EDUCATION

39 hours

SPECIALIZED PROFESSIONAL EDUCATION

6 hours

SPECIALIZED PROFESSIONAL EDUCATION

28 hours

B. Concentration in Combined General Special Education and Elementary Education

GENERAL EDUCATION

COMMUNICATIONS (12 hours)
English 1010-20 and 1031 or 1032 or 1033; Speech 1211 or 2021 or 2311 or any speech elective. (Some students may be required to take English 1019 based on placement scores.)

Health and Physical Education (20 hours)
P. E. 3450, School Health 3510, School Health 3610, Psychology 2500, P. E. 410 and 3430, and four elective hours.

Humanities (12 hours)
Literature (6) and electives from foreign language above the introductory level, philosophy, religious studies, art, or music (4 hours).

Mathematics (9 hours)
Math 2110, 2120, 2130.

SOCIAL STUDIES (18-20 hours)
History 2510; electives from anthropology, economics, geography, political science and sociology. Minimum of three areas to be represented (14-16 hours).

TOTAL MINIMUM REQUIRED

189 hours

SPECIALIZED COURSES

36 hours
Ed. C & I 3260, 3270, 3280, 3281, 3350, 3361, 3720, 3511-12-13 or Special Education 4361, 4810*, 4820.

SPECIALIZED COURSES

18 hours

SPECIAL EDUCATION STUDENT TEACHING

15 hours
Special Education 4880, 4881, 4882.

ELECTIVES

13 hours

TOTAL MINIMUM REQUIRED

190 hours

SPECIALIZED PROFESSIONAL EDUCATION

42 hours
Special Education 3333, 4520, 4110, 4120*, 4130*, 4150*, 4351*, 4410*, 4420*, 4430*, 4440*, 4470*, 5260, 5620, and 6 hours psychology or educational psychology electives.

STUDENT TEACHING WITH EXCEPTIONAL CHILDREN

15 hours
Special Education 4880, 4881, 4882.

SPECIALIZED COURSES

18 hours
Art Music 2100, 2110, LIS 3510.

SPECIAL EDUCATION COURSES

42 hours

SPECIAL EDUCATION COURSES

28 hours
Special Education 3333, 4520, 4110, 4120*, 4130*, 4150*, 4351*, 4410*, 4420*, 4430*, 4440*, 4470*, 5260, 5620, and 6 hours psychology or educational psychology electives.

SPECIALIZED COURSES

18 hours

SPECIAL EDUCATION COURSES

42 hours

SPECIAL EDUCATION COURSES

28 hours
Special Education 3333, 4520, 4110, 4120*, 4130*, 4150*, 4351*, 4410*, 4420*, 4430*, 4440*, 4470*, 5260, 5620, and 6 hours psychology or educational psychology electives.

TOTAL MINIMUM REQUIRED

209 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 will be considered:
   a. cumulative grade point average.
   b. completion of these courses: Special Education 2110-20, 3333 and 9 additional

*SPECIALIZED PROFESSIONAL EDUCATION* requires admission to Teacher Education Program.

*Requires admission to Teacher Education Program.

*Requires admission to Teacher Education Program.

*Requires admission to Teacher Education Program.
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 practicum 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 7-8 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 Sciences (20 hours)

8-12 hours in one 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 (17-20 hours)

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

CORE PROFESSIONAL COURSES..................9 hours

ED. C 3010*, 3020*, 3030*.

ELEMENARY EDUCATION COURSES...........18 hours


SPECIALIZED COURSES........................12 hours

Educational Psychology 2430, Art Education 2100, Music Education 2100, Educ. C & I 3510.

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 3521-22-23), 4870, 4871, and pre-student teaching seminar, Sp. Educ. 4100 (1).

TOTAL MINIMUM REQUIRED...............189 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 (8 electives from philosophy, art, religious studies, or music.

Mathematics (3 hours)

Mathematics 2110.

Natural Sciences (16 hours)


Social Studies (18 hours)

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

CORE PROFESSIONAL COURSES...............9 hours

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

SPECIALIZED PROFESSIONAL EDUCATION ......6 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 2110-20-30, 3333, 4190, 4200, 4210*-20*-30, 4250, 4280*, 4290*, 4351*, 4361*, 4371*, (or Educ. C & I 3521-22-23), 4870, 4871, and pre-student teaching seminar, Sp. Educ. 4100 (1).

MAJOR AREAS....................................30-45 hours

NOTE: 30 quarter hours are required for graduation and Council on the Education of the Deaf Certification. For Tennessee State Certification for Teaching Non-handicapped Students, additional credit hours are required.

TOTAL MINIMUM REQUIRED...............187 hours

4. Specialization in Multiple Handicapped

GENERAL EDUCATION ...........................75 hours

Communications (8 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 one science: 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 hours)

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

CORE PROFESSIONAL COURSES...............9 hours

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

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 3521-12-13), 3333, 4190, 4200, 4210*-20*-30, 4250, 4280*-90*, 4351-61-71, 4870, 4871, and pre-student teaching seminar.

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)

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

Mathematics (4 hours)

Mathematics 2012.

Natural Science (20 hours)

If major in Special 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,

*Requires admission to Teacher Education Program.

**Requires admission to Teacher Education Program.
ELECTIVES

30`, 4150'-60, 4440*, 4610-20, 4840, 5400, 5401, 5620, and special education electives.

TOTAL MINIMUM REQUIRED....181 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

Ed. C&I 3010*, 3020*, Special Ed. 4030.

SPECIALIZED PROFESSIONAL EDUCATION...........................19 hours

Psychology 2520 or 2530, Psychology 3550 or 2540 or Ed. Psych. 2430 or 3810, 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, 4043, 4310, 4400, 4720, 4930. 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

The following area of endorsement requires completion of requirements of the elementary (K-8) or secondary education curriculum.

E. Concentration in Partially Seeing

a. Completion of requirements of Elementary (K-8) or Secondary Education Curriculum;

b. Special Education and Rehabilitation 3333, 4180, 4850, 4922;

c. Six quarter hours selected from the following: Special Education and Rehabilitation 4520, 4110, 4120, 4150, 4250;

d. Office Administration 2110 (for those lacking high school credits in typewriting).

TOTAL MINIMUM REQUIRED:

Total hours required for endorsement in the above Special Education program appear on curriculum sheets available from the faculty advisors.

NOTE: Effective September 1, 1987 the College of Education requires all persons seeking Tennessee Certification in Speech and Hearing to complete the M.A. degree in speech pathology. Students may obtain further information about this requirement from the Department of Special Education and Rehabilitation.

VII. Vocational-Technical Education

A. Business Education

See curricula for Secondary Education (7-12) p. 98 for General Education and Professional Education requirements.

63 quarter hours in business and economics to meet five business endorsement areas approved by the department advisor. 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 electives.

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 2510-20; plus 4 additional hours in any social studies other than economics.

PROFESSIONAL EDUCATION........42 hours

Ed. C&I 3010*, 3020, 3030*; VTE 4300, Educ. Psych. 3810; VTE 4460-70-80, 4450, 4410-20, 4430-31-32 (3 hours); Ed. C & I 4750; Special Education 3333.

SPECIALIZED COURSES..................42 hours

Business Adm. 1110; Office Adm. 4310, 4320; Accounting 2110; Marketing 3110-20, 4140, 4150, 4150; Finance 3120; Management 3010; Business Law 4110; Textiles and/or Advertising elective (6 hours) VTE 4440 (9 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, 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 3010*, 3020, 3030* (select any two); Special Education 3333; Ed. Psych. 3810.

PROFESSIONAL INDUSTRIAL EDUCATION

42 hours

Vo. Tech. Ed. 3830, 3860, 3880, 3870, 4010, 4810, 4830, 4840, 4850, 4870, 4795.

OCCUPATIONAL COMPETENCY........45 hours

Vo. Tech. Ed. 3810, 3811, 3812.

*Requires admission to Teacher Education Program.
ELECTIVES ..............................................20 hours

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

PROFESSIONAL INDUSTRIAL EDUCATION

GENERAL EDUCATION...............67 hours

Communications (12 hours)

English (6 hours); speech (3 hours).

Health and Physical Education (6 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. 3010*, 3020*, 3030* (select one);

Special Education 3333; Ed. Psych. 3000, 3810.

PROFESSIONAL INDUSTRIAL EDUCATION

Vo. Tech. Ed. 3830, 3850, 3860, 4840, 4810, 4811.

TEACHING AREAS (Drafting, Graphic Arts)

Vo. Tech. Ed. 1620, 2620, 3620, 3672,

Journalism 3910.

Power and Transportation (Prime Movers, Electricty/Electronics)

Vo. Tech. Ed. 1610, 1650, 2611, 2630, 3620.

Construction and Manufacturing

Vo. Tech. Ed. 1640, 1651, 2641, 2652, 2660, 3640, 3651, 3652, 4660, 4662, 4670.

ELECTIVES ........................................16 hours

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

Option 3. Concentration in Industrial Training

GENERAL EDUCATION...............67-68 hours

Communications (12 hours)

English (9 hours); speech elective.

Health and Physical Education (9 hours)

Health and Safety 3210, First Aid and Emergency Care, electives.

Humanities (15 hours)

Two of the following areas must be represented: philosophy, anthropology, art or art education, literature, foreign language, music or religious studies.

Mathematics (3-4 hours)

Natural Science (12 hours)

Psychology (4 hours)

Psychology 2500 or Ed. Psych. 3100.

Social Studies (12 hours)

Two of the following must be represented: history, anthropology, economics, geography, political science, sociology.

SPECIALIZED COGNATE ..........16 hours

Ed. Psych. 2230, Sociology 3610, Cont. & Higher Educ. 3960 and electives taken from an approved list with approval of advisor.

* Requires admission to Teacher Education Program.

PROFESSIONAL INDUSTRIAL EDUCATION

GENERAL EDUCATION...............45 hours

VTE 3830, 3860, 4010, 4820, 4830, 4840, 4850, 4851, 4880, 4815, 4896.

TECHNICAL COMPETENCY..........45 hours

VTE 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 80 for this program.

E. Home Economics Education

See page 138 for this program.

Departments of Instruction

Art and Music Education

Professors:


Associate Professors:


Assistant Professor:

J. P. Watkins, M.S. Tennessee.

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. F, W, S.

3100 Introduction to Art in Education (3) Philosophy, 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. E.

3110 Crafts in the Elementary School (3) Prereq: Art. Ed. 3100 and 9 hours art education. S.

3120 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. S.

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. F, W, S.

3200 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. W.

3220 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. F.

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

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. F, W, S.

4100 Pre-Student Teaching Seminar (1) Orients student teachers to the credit only. May not be repeated for credit. S/NC. W.

4100 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. W.

4200 Designing Teaching Aids for Art (3) Resources for art teaching—identifying, locating, and using; development of slide-tape presentation and other teaching aids for art teaching. Prereq: Art. Ed. 3100 and 9 hours art education. S.

4300 Learning through Appreciation and History of Art (3) Review of historical periods; criticism and dialogical application in teaching art. Prereq: Art. Ed. 3100. F.

4500-60-70 Problems in Art Teaching (3, 3, 3) Prereq: Consent of instructor. E.

4400 Strategies for Teaching Art (3) Readings on teaching art and planning for teaching; development of lesson plan in an actual classroom experience. Prereq: Art. Ed. 3100 and 9 hours art education. S.

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. A.

GRADUATE

Consult the Graduate Catalog for listing of graduate level courses.

Music Education (707)

The curricula in music education provide for five areas of concentration: vocal music (voice principal), vocal music (piano or organ principal), 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 for teaching; preparation for teaching in classrooms. Prereq: Art. Ed. 3100 and 9 hours art education. S.

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. F, W, S.

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

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

2411-12-13 Methods, Materials, and Techniques of String 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 instrument instructional materials. 2 hours per week. 2411-F, 2412-W, 2413-S.

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 institutional 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 institutional 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 institutional 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, rhythm, instrument, listening, creative, and music reading activities; evaluation; materials appropriate for Grades K-3. For elementary education majors only. PreReq: 2100 or 2110; Educ. Psych. 2420, upper-division standing.

3130 Teaching Music in the Elementary School (3) Singing, rhythm, instrumental, 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, community relations. Pre Req: Two years of music theory; coreq: 3511. S.

3410 Teaching Instrumental Music (3) Problems and techniques, materials, instrument and equipment selection. PreReq: 6 hours of credit from 2411-21-31; coreq: for 3410: 3511. F.

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

3511 Field Experiences 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. F, W, S.

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 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. F, W, S.

4350-60-70 Problems in Music Teaching (3, 3, 3) E.

4420-30 Choral and Instrumental Conducting (3, 3) Reading, conducting, and interpretation of vocal and instrumental music, skills necessary for conducting suitable for school, church, and community groups. 4420—vocal music. 4430—instrumental music. PreReq: 1010-20 and 3 hours of credit from 4410-20-31, 1 year of music theory. Must be taken in sequence. 2 hours and 1 lab.

4411-42-43 Teaching Class Piano (1, 1, 1) For majors in music, music education, or elementary education. PreReq: Approval of instructor. A.


4460 Marching Band Techniques (3) Functions, organization, and direction of a school marching band. PreReq: Senior standing and approval of instructor; coreq: 3511. F.

4510 Choral Methods and Materials (3) Organization and administration, teaching techniques, choral literature, and interpretation. PreReq: 1010-20, 4420, one year of voice instruction, two years of music theory; 2 lecture hours and 2 one-hour labs, labs meet with 1010-20. W.

GRADUATE Consult the Graduate Catalog for listing of graduate level courses.

Assistant Professor: W. D. Burks, J. B. Blank, Ph.D. Ed.D. Tennessee.

3960 Introduction to Adult Education (3) Adult education as a profession including diversity and scope of clientele and programs.

4554-55-56 Student Leadership Workshops (1, 1, 1) Small group and individualized experiences to develop knowledge and skills in leadership roles. Sections are designed for resident assistants, student government leaders, student organizations, and other student organizations. PreReq: Consent of instructor; S/NC only.

GRADUATE Consult the Graduate Catalog for listing of graduate level courses. (Also see course listings under the Departments of Curriculum and Instruction, Educational Administration and Supervision, and Educational Psychology and Guidance.)


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

*Associate Distinquished Service Professor.

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

1410 Efficient Reading and Study Skills (2, 1) Improvement of reading rate, comprehensive vocabulary, and study skills as they relate to content area subjects. May be repeated for a maximum of 1 hour credit for individual laboratory attention. S/NC. F, W, S.

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 the elementary classroom. Methods of teaching, curriculum materials, school-community relationships, and school organizations.

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

3200 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. E.

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

3500 Analysis of Teaching (3) Use of interaction analysis to describe and classify verbal interactions between teacher and student in the classroom; non-verbal behavior techniques. PreReq: Consent of instructor. S.

3700 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 and instructor evaluate the teaching behaviors recorded on the tape. Pre Req: Consent of instructor. F.

3920 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 CJS 3280. PreReq: Educ. Psych. 3430 or equivalent, admission to Teacher Education. E.

3928 Developing Social Studies Content Concepts for Elementary School (3) Study of content of social studies and development of concepts relevant to elementary social studies. PreReq: Admission to teacher education program. E.

3929 Teaching Social Studies in the Elementary School (3) Methods and materials. Undergraduate credit only. PreReq: Educ. Psych. 3430 or equivalent, admission to Teacher Education. E.

3930 Teaching Developmental Reading in the Elementary School (3) First course in sequence designed to teach content and skills of teaching reading in the elementary school. PreReq: Educ. Psych. 3430 or equivalent and admission to Teacher Education. E.

3931 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: 3280. E.

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

3350 Teaching Elementary School Mathematics (3) Enables preservice teachers to develop skills and understandings necessary for operation of successful developmental reading program in the elementary school. PreReq: Educ. Psych. 3430 or equivalent, Mathematics 2110-30-30, admission to Teacher Education. Must be taken prior to student teaching. E.

3351 Teaching Elementary School Mathematics (3) Methods of teaching elementary school mathematics. PreReq: 3350 or credit, admission to Teacher Education. E.

3510 Books and Related Materials for Children (3) (Same as Library and Information Science 3510.) E.
3511 Field Experience in Teaching Elementary (Primary Level K-3) (2) Field experience in which students perform tasks related to teaching and teacher roles that may be taken prior to 3512 and student teaching. Prereq: Admission to Teacher Education. F, W.

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

3513 Field Experience in Teaching Elementary (2) 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. F, W, S.

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

3521-22-23 Field Experiences in Teaching: Secondary (5-12, 4-12) (2) 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. W.


3561 Teaching of Speech and Drama, Grades 7-12 (3) For description, see 3635. Prereq: Admission to Teacher Education. W.

3562 The Teaching of Foreign Languages: Grades 7-12, Part I (3) Beginning course in sequence; methods, lesson planning, peer-teaching, commercial and teacher-made materials for teaching the foreign language linguistic skills. This course and Ed. C&l 3563 are required for certification in modern foreign languages and Latin. Prereq: Completion or near completion of foreign language hours for certification required. Admission to Teacher Education. W.

3563 The Teaching of Foreign Languages: Grades 7-12, Part II (3) Second course in sequence; implementation of foreign language evaluation techniques, advanced methods and teacher-made materials in peer-teaching and field settings. This course and Ed. C&l 3562 are required for certification in modern foreign languages and Latin. Prereq: Admission to Teacher Education. W.

3630 History and Philosophy of Afro-American Education (4) (Same as Afro-American Studies 3630).

3640 Contemporary Issues in Afro-American Education (4) (Same as Afro-American Studies 3640).

3653 The Teaching of Social Studies, Grades 7-12 (3) (Same as Library and Information Science 4150.)

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: Teaching experience or student teaching.

4215 Teaching Elementary School Science (3) Methods and materials used in teaching of science in elementary school. Developmental and diagnostic/ corrective programs. Prereq: Admission to Teacher Education. S/NC. F.

4216 Teaching Elementary School Mathematics (3) Methods and materials used in teaching of mathematics in elementary school. Developmental and diagnostic/ corrective programs. Prereq: Admission to Teacher Education. S/NC. F.

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 programs. Prereq: Admission to Teacher Education. S/NC. F.

4230 Introduction to Diagnosis and Correction of Classroom Arithmetic Difficulties (3) Classroom strategies for diagnosing and correcting arithmetic difficulties, focusing upon content typically presented from grades 1-8. Prereq: 3590 or 3715 or equivalent.

4240 Classroom Instructional Organization (3) Developmental and diagnostic/ corrective programs. Prereq: Admission to Teacher Education. W.

4280 Orientation to Corrective Practices for Classroom Reading Problems (3) An orientation to the basic practices in diagnosing and correcting reading problems in the classroom. Prereq: Admission to Teacher Education. W.

4290 Orientation to Corrective Practices for Classroom Reading Problems (3) An orientation to the basic practices in diagnosing and correcting reading problems in the classroom. Prereq: Admission to Teacher Education. W.

4300 Developmental Reading in Secondary School and Community College (3) An introductory course covering approaches and materials for teaching basic reading skills and reading, language, and literature at the middle school, junior high school, and high school level. F, S, SU.

4301 Elementary School Language Arts (3) Classroom strategies for diagnosing and correcting difficulties, focusing upon content typically presented from grades 1-8. Prereq: 3590 or 3715 or equivalent.

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

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.). F.

4430 Practicum in Teaching in the Elementary School (3) Practicum experience in elementary school classroom teaching designed for students seeking elementary education certification in areas other than elementary education and who have obtained degrees and certification in areas other than elementary education. May be repeated. Prereq: Admission to Teacher Education. F, W, S.

4500 Teaching in Kindergarten: Overview (3) Relationship of kindergarten to total elementary program; historical settings and current developments. E.

4540 Practicum in Teacher Education (3-6) Coopera- tion with other programs and teachers. May be repeated. Undergraduate credit only. Maximum credit 6 hours. S/NC.

4550 Special Topics (1-6) Topics of current interest and of special interest to students and teachers. May be repeated. Prereq: Consent of instructor. Undergraduate credit only. Maximum credit 6 hours. S/NC.

4720 Special Topics (1-6) Topics of current interest and of special interest to students and teachers. May be repeated. Prereq: Consent of instructor. Undergraduate credit only. Maximum credit 6 hours. S/NC.

4750 Student Teaching, Grades 7-12 (6) Coopera- tion with other programs and teachers. May be repeated. Undergraduate credit only. Maximum credit 6 hours. S/NC.

4790 Coopera- tion with other programs and teachers. May be repeated. Undergraduate credit only. Maximum credit 6 hours. S/NC.

4820 Classroom Stores and Materials (3) Classroom and institutional stores and materials. Prereq: Admission to Teacher Education. W.

4920 Supervised Research (1-6) Prereq: Consent of instructor. Undergraduate credit only. Maximum credit 6 hours. S/NC.

4990 Special Topics (1-6) Topics may be repeated. Prereq: Consent of instructor. Undergraduate credit only. Maximum credit 6 hours. S/NC.

4999 Independent Study (1-6) Topics of current interest and of special interest to students and teachers. May be repeated. Undergraduate credit only. Maximum credit 6 hours. S/NC.

5000 Practicum in Teaching in the Elementary School (3) Practicum experience in elementary school classroom teaching designed for students seeking elementary education certification in areas other than elementary education and who have obtained degrees and certification in areas other than elementary education. May be repeated. Prereq: Admission to Teacher Education. F, W, S.

5425 Elementary School Teaching: Minicourse (1-3) Minicourse focusing on various aspects of teaching in elementary school. Topics vary. Prereq: Student teaching. May be repeated. E.

5430 Home and School Relations (3) Study of need and techniques which can develop closer relationships between the home and school at both elementary and secondary levels. Prereq: Senior standing.

5640 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. Prereq: Admission to Teacher Education. W.

5710 Coopera- tion with other programs and teachers. May be repeated. Undergraduate credit only. Maximum credit 6 hours. S/NC.

5720 Coopera- tion with other programs and teachers. May be repeated. Undergraduate credit only. Maximum credit 6 hours. S/NC.

5750 Utilization of Instructional Media (3) Intro- duction to the role of instructional media in the elementary classroom. Prereq: Admission to Teacher Education. W.

8100 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: 3010-20-30, 3350.
4850 Student Teaching in the Elementary School (6) Must be taken with 4810. Undergraduate credit only. S/N/C: F, W, S.

4850 Student Teaching in Early Elementary School (K-3) Application filed no later than second quarter of junior year with placement at least one quarter prior to quarter of graduation. PreReq: Educ. C&I 3260, 3270 or 3280, 3350, 3720; Educ. Psych. 3100 or equivalent. Written consent of instructor. S/NC: F, W, S.

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

4870 Applications of Computers for Instructional Purposes (3) Computer concepts for teachers at all levels; applications of computers for teachers; and current classroom uses of computers. Letter grade only. PreReq: 3350 or consent of instructor.

GRADUATE
Graduate instruction in the Department of Curriculum and Instruction provides opportunities to improve the effectiveness of educational service in a number of areas. Consult the Graduate Catalog for listing of graduate level courses.

Education (289)
Consult the Graduate Catalog for listing of graduate level courses.

Educational Administration and Supervision (292)

Associate Professors: G. W. Harris, Jr., Ph.D., Michigan; P. M. Husen, Ed.D., Stanford; B. Lilly, Ed.D., Tennessee.

Assistant Professor: N. T. Mertz (Adjunct), Ed.D., Columbia.

GRADUATE
Consult the Graduate Catalog for listing of graduate level courses.

Educational Counseling and Psychology (311)
Professors: M. J. Patton (Head), Ph.D., Ohio State; K. L. Davis, Ed.D., Georgia; D. J. Dickinson, Ed.D., Oklahoma; S. C. Dietz, Ed.D., Arizona State; T. W. George, Ed.D., Tennessee; M. A. Hector, Ph.D., Michigan State; S. W. Huck, Ph.D., Northwestern; E. W. McClain (Emeritus), Ph.D., Texas; N. M. Meara, Ph.D., Ohio State; W. A. Poppen, Ph.D., Ohio State; C. L. Thompson, Ph.D., Ohio State; R. L. Williams, Ph.D., George Peabody.

Associate Professors: L. M. Kindall, Ed.D., Tennessee; M. Peterson, Ph.D., Ohio State; S. C. Smith, Ph.D., Florida.

Assistant Professor: P. A. Matuszek, Ph.D., Texas.


4110 Psychology of Sex Role Development (3) Examinations, from both a theoretical and research base, of factors that 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 undergraduate or graduate student with minimal background in behavioral sciences. (Same as Psychology 4110.) F, S, SU.

4120 Mental Health (3) Studies and exploration of positive mental health. Application of mental health criteria to study of one's self based on a battery of personality assessment instruments. F, S, SU.

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 introduction to psychology or the consent of the instructor. W, SU.

4350-50-70 Special Topics and Problems (1-6, 1-4) May be offered for letter grade or S/N/C and may be repeated. E.

4440 General Evaluation Procedures for Public Schools (3) PreReq: 2430 or equivalent. A.

4511-52-53 Student Leadership Workshops (1, 1, 1) Seminar for 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/N/C: E.

4640 Standardized Testing (3) Uses and interpretation of standardized group instruments in assessment of intelligence, aptitude, achievement, vocational interests and personality adjustment. F, W, SJ.

4650 The Construction of Classroom Tests (3) Concerned with teacher-made classroom lessons; instructional objectives, principles of test construction, item analysis, evaluating a test's reliability and validity, interpretation of test scores, relationship between testing and grading. S.

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

4760 Advanced Child Study (3) PreReq: 3350 or 3810 or consent of instructor. F, S.

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

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. A.


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

GRADUATE
Consult the Graduate Catalog for listing of graduate level courses.

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 (Chairperson), Ed.D., Colorado State College; J. D. Gorski, Dr. P.H., U.C.L.A.; R. H. Kirk, H.E.D., Ch.T.; etc.
Associate Professors: R. J. Purifoy, Ph.D. Iowa; A. F. Thompson, Ph.D. Michigan.


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. E.

4010-20-30 Problems in Safety (1-3, 1-3, 1-3) Individual identification and study of current problems in safety. E.

4410 Driver and Traffic Safety Education (5) Preparation 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. E.

4412 Cardiopulmonary Resuscitation (2) (Same as School Health 4412) F, W, S.


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. S.

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

GRADUATE
Consult the Graduate Catalog for listing of graduate level courses.

School Health (898)
1110 Principles of Personal Health (5) To develop ability to approach health scientifically and to develop justified confidence in judgments affecting personal health. F, W, S.

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

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. E.

3000 Foundation of Health Science (3) In-depth study of content areas relating to personal health and contemporary health problems, i.e., mood modifying products, consumer health, international health, personal health practices, reciprocal relationships involving man, disease, and environment. F, S, SU.

3210 First Aid and Emergency Care (4) Theory and practice of first aid and emergency care. Instruction in medical self-help. Course leads to Red Cross Certification as an Advanced First Aid for Emergency Care Instructor. Applicant must be at least 21 years of age. Instructor: 3-20 or valid Advanced First Aid and Emergency Care Certificate.

4411 Instructor's Advanced First Aid and Emergency Care (3) Designed to teach First Aid. Satisfactory completion qualifies one for American National Red Cross Certification as an Advanced First Aid for Emergency Care Instructor. Applicant must be at least 21 years of age. Instructor: 3-20 or valid Advanced First Aid and Emergency Care Certificate.

4412 Cardiopulmonary Resuscitation (2) Theory and Skills to implement basic cardio life support following cardiac arrest due to such conditions as heart attack, drowning, electrocution, suffocation, poisoning, drug intoxication, and vehicular and other accidents. Educational and preventive aspects of controlling cardiovascular disease. (Same as Safety 4412) F, W, S.

420 Drug Abuse Education (3) Drug abuse problem and suspected causes; pharmacology of drugs and effects on society and methods of drug abuse education.

4430 Women's Health (3) Study of factors influencing women's health and women as consumers of the nation's health service delivery systems. E.

4500-20-30 Field Practice in Health Education (3-5, 3-4, 3-4) Off-campus health education internship; field practice in educational or other agency with qualified professional. E.

4710 Workshop In School Health Education (3-4) For advanced students, teachers, school administrators, nurses, and other paramedical school personnel. Lectures, demonstrations, films, field trips, and supervised research in special health problems. May be repeated for 3-4 hours of 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. E.

Physical Education (764)
Professors: G. F. Brady (Emeritus), Ph.D. Iowa; E. K. Capen (Emeritus), Ph.D. Iowa; B. D. Francs, Ph.D. Illinois; E. T. Howell, Ph.D. Wisconsin; A. J. Kozar, Ph.D. Michigan; N. E. Lay, Ph.D. Florida State; W. P. Lippman, Ph.D. Iowa; H. M. Potash, Ph.D. Iowa; H. B. Watson (Emeritus), Ph.D. Michigan; H. G. Welch, Ph.D. Florida.

Assistant Professors: P. A. Beitel, Ed.D. North Carolina; R. J. Crokeley, M.A. SMU; R. E. Jones (Chairperson), Ph.D. Toledo; B. J. Mead, Ph.D. Purdue; W. J. Morgan, Ph.D. Minnesota; C. A. Winsberg, Ph.D. Michigan.

Assistant Professors: P. A. Beitel, Ed.D. North Carolina; R. J. Crokeley, M.A. SMU; R. E. Jones (Chairperson), Ph.D. Toledo; B. J. Mead, Ph.D. Purdue; W. J. Morgan, Ph.D. Minnesota; C. A. Winsberg, Ph.D. Michigan.


1600 Orientation to Physical Education (1) Special emphasis on theoretical and practical aspects of physical education. Letter grade. F, W, S.

1922 Physical Education Major: Basketball (2) The introduction and development of basic fundamental skills, general rules, and strategy related to the game of basketball with particular emphasis on acquisition of skill. W.

1932 Physical Education Major: Tennis (2) The introduction and development of skill, general rules, and strategy related to the game of tennis with particular emphasis on acquisition of skill. F, S.

1942 Physical Education Major: Gymnastics I (2) Development of skills in tumbling and on selected men's and women's gymnastics apparatus. Tumbling skills will include forward, backward, and balance skills. Apparatus will include vaulting, balance beam, and pommel horse. Special emphasis will be placed on safety and progression. F, W.

1952 Physical Education Major: Folk and Square Dance (2) The introduction to basic folk and square dance skills, patterns, and designs. Emphasis on acquisition, principles, terminology, and etiquette. W.

1962 Physical Education Major: Track & Field (2) The introduction and development of basic fundamental skills and knowledge in track and field with particular emphasis on development of skill. F, S.

1600 Field Experience I (1) Student observation in selected elementary, middle and secondary public school physical education programs.

2012 Physical Education Major: Soccer (2) The introduction and development of basic fundamental skills, general rules, and strategy, related to the game of soccer with particular emphasis on acquisition of skills. F, S.

2022 Physical Education Major: Volleyball (2) The introduction and development of basic fundamental skills, general rules, and strategy, related to the game of volleyball with particular emphasis on acquisition of skill. W.

2032 Physical Education Major: Golf (2) The introduction and development of basic fundamental skills, general rules, and strategy, related to the game of golf with particular emphasis on acquisition of skill. F, S.

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

3070 Physical Education Major: Football (2) Development of skills in tumbling and on selected men's and women's gymnastics apparatus. Tumbling skills will include twisting skills, kips, and combinations of both. Prereq: 3070. Available to dance majors and minors or with consent of instructor. May be repeated Maximum credit 6 hrs. F, W, S.

3110 Coaching of Football (2) The theoretical and practical application of various coaching techniques in football for the prospective secondary/college coach. Topics will include the analysis and selection of appropriate game plans, specific conditioning and training programs, practices organization, player evaluation, scouting, individual and team offensive and defensive strategies. Prereq: 1062 or consent of instructor. F.

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: Consent of instructor. W.

3130 Coaching of Track and Field (2) Examination of current coaching methods and training techniques for various track and field events, including experience observing and working at track and field meets and practices. Prereq: 1062 or consent of instructor. S.

3190 Coaching of Gymnastics (2) Techniques used in the coaching and judging of men's and women's gymnastics. Additional emphasis will be placed on safety and spotting of selected gymnastics' skills. Prereq: Consent of instructor. A.

3200 Coaching of Baseball/Softball (2) The theoretical and practical application of various coaching techniques in baseball/softball for the prospective secondary/college coach. Topics will include the analysis and selection of appropriate game plans, specific conditioning and training programs, practices organization, player evaluation, scouting, individual and team offensive and defensive strategies. Prereq: 2072 or consent of instructor. F.

3210 World History of Sport and Physical Education (3) An introductory survey of the influence to past socio-cultural events on the development of sport and physical education from ancient primitive to twentieth century civilization. Prereq: At least junior standing.

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

3265 Practicum in Pre-School Aquatics (2) Planning and teaching aquatic experiences to 3- to 5-year-old children. Prereq: Intermediate level swimming ability. A/F or S/NC. W, S.

3300 Tap Dance (2) Instructions, practice, and student teaching. F, W, S.

3320 Applied Anatomy (3) Bones, joints, ligaments and muscles involved in human movement. Prereq: At least junior standing.

3350 Introduction to Movement Education (3) Planning and teaching by themes with application to dance, gymnastics, and games for children. Prereq: Admission to Teacher Education.

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

3460 Educational Dance for Children (3) The theme approach to dance forms for children. Prereq: 3350 or consent of instructor.

3470 Educational Games for Children (3) The theme approach to games for children. Prereq: 3350 or consent of instructor.

3480 Educational Gymnastics for Children (3) The theme approach to gymnastics for children. Prereq: 3350 or consent of instructor.

3550 Social-Psychological Aspects of Sport and Physical Education (3) An overview of major topics dealing with social and psychological influences, with an emphasis upon understanding movement performance as a product of interaction of biophysical, percepto-motor, and psychological factors. Prereq: Permission to Teacher Education or consent of instructor.


3720 Philosophy of Sport and Physical Education (3) Introduction to form and content of philosophy of physical education and sport; specific emphasis on examination of metaphysical, epistemological and axiological status of physical education and sport. Prereq: At least junior standing.

3910 Psychology of Coaching (3) An analysis of the non-physical influences upon athletic performance. Emphasis on practical implications and applications to coaching. Prereq: 3550 or consent of instructor. F, W.

4000 Intermediate Advanced Ballet Technique (2) Emphasis on styles and methods of intermediate/advanced classical ballet technique, including advanced pointe work, batterie, and jetti allegro. Prereq: 3075. Available to dance majors and minors or with consent of instructor. May be repeated. Maximum credit 6 hrs. F, W, S.

4005 Advanced Ballet Technique (2) Emphasis on styles and methods of advanced classical ballet technique, including multiple pirouettes, batterie, jetti allegro, and advanced concept work. Prereq: 4000. Available to dance majors and minors or with consent of instructor. May be repeated. Maximum credit 6 hours. Senior standing or graduate status required for graduate credit. There is a different level of performance expected of those registered for graduate credit. F, W, S.

4010 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. Prereq: 3300. Available to dance majors and minors or with consent of instructor. F, W, S.

4020 Practicum in Dance Production (2) Prereq: Consent of instructor. A.

4050 Rhythmic Analysis (3) The basic nature and principles of music, rhythm, and rhythmic notation with emphasis on their correlation with dance movement and composition. Prereq: Consent of instructor. Senior standing or graduate status required for graduate credit. There is a different level of performance expected of those registered for graduate credit. A.

4060 Advanced Composition (4) Application of compositional, production, and administrative skills culminating in the presentation of two complete choreographic works. Prereq: 3062, 4020.

4080 History of Dance (3) A survey of the dance of various societies and cultures from pre-history through the twentieth century. Prereq: Senior standing or graduate status required for graduate credit. There is a different level of performance expected of those registered for graduate credit. F.

4090 History of Dance II (3) A survey of the development of dance in the modern era, beginning with movement during the 20th century. Senior standing or graduate status required for graduate credit. There is a different level of performance expected of those registered for graduate credit. W.

4100 Pre-Student Teaching Seminar (1) Orients student teachers to the off-campus centers and the student teaching program; describes the responsibilities 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 pre-student teaching seminars sponsored by Prereq: full admission to the Teacher Education Program. Undergraduate credit only. May not be repeated for credit. S/NC only. (Same as Ed. C&L 4100; Art Ed. 4100; Music Ed. 4100; Ed. & Counseling Psych. 4100, School Health 4100, Public Health 4100, and Bus. Ed. 4100.) F, W, S.

4110 Adapted Physical Education (3) Classification of atypical students who require modified programs in physical education; activities and class organization suitable for required or special physical education classes. Prereq: At least junior standing. F, W, S.

4115 Adapted Physical Education Laboratory (1-2) Practical work, including student teaching, supplementing 4110. F, W, S.

4140 Measurement and Evaluation in Physical Education (3) Relationship of measurement and evaluation in physical education. Administration and critique of appropriate measures of physical fitness, sports skills, and knowledge. Prereq: At least junior standing. W, S.

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

4160 Athletic Coaching Field Experience (2) Practical experience in coaching and related responsibilities. Must be repeated. Maximum credit 4 hours. Prereq: Approval of instructor. F, W, S.

4170 Physical Activity and Fitness (3) Theoretical knowledge and practical experience in principles and methods of activities related to health related aspects of physical fitness. 2 hrs. and 1 lab. Prereq: At least junior standing. W.

4200 Motor Behavior Teaching Methods (2) Application of theory and styles of teaching of the teacher environment, planning, presenting, and evaluating lessons concerning knowledge, strategies, and skills for physical activity, games, and sport. Prereq: 3900, minimum of 16 hrs. P.E. Major activity courses and admission to Teacher Education.

4220 Applied Kinesiology (3) Analysis of movement and muscle group involvement; application of the laws of physics to human movement; exercise programs for specific muscle group involvement. Prereq: 3320, Physics 1450, 1310 or consent of instructor.

4230 Program Planning in Physical Education (3) Curriculum building, course construction, and lesson planning for public schools and colleges. Prereq: 4200.

4240 Designing and Implementing Movement Programs for Young Children (3) Approaches to the design and implementation of preschool, elementary, and middle school movement programs. Prereq: Admission to teacher education and consent of instructor.

4260 Practicum for Physical Education Majors (1-16) Experiences in the community to support and clarify career goals. Prereq: Consent of instructor.

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

4330-40:50 Specialization Study in Physical Education (1-3, 1-5, 1-3, 1-5). E.

4350 Techniques of Games Forms (2) Study of non-competitive games which involves personal skill development with application to teaching techniques. Prereq: At least junior standing.

4360 Techniques of Folk, Square, and Ballroom Dance (3) Development of intermediate level of skills in folk, square and ballroom dance with application to techniques of teaching. Prereq: 1052 and 2052. Prereq. or coreq: 4200.

4370 Techniques of Gymnastics (2) Development of skills beyond the beginning level on men's and women's apparatus and tumbling. Emphasis will be placed on spotting and teaching techniques. Prereq: 1042 and 2042; prereq. or coreq: 4200.

4375 Techniques of Track and Field (2) Development of intermediate to advanced level of skill in track and field with application to techniques of teaching. Prereq: 1062; or prereq. or coreq: 4200.

4380 Techniques of Tennis (2) Development of intermediate to advanced level of skill in tennis with application to techniques of teaching. Prereq: 1032; or prereq. or coreq: 4200.

4385 Techniques of Golf (2) Development of intermediate to advanced level skills in golf with application to teaching techniques. Prereq: 2032; or prereq. or coreq: 4200.

4390 Techniques of Basketball (2) Development of intermediate to advanced level of skills in basketball with application to techniques of teaching. Prereq: 1022; or prereq. or coreq: 4200.

4395 Techniques of Volleyball (2) Development of intermediate to advanced level of skill in volleyball with application to techniques of teaching. Prereq: 2022; or prereq. or coreq: 4200.

4420 Administration of Physical Education (3) Selected topics in organization and administration problems related to physical education programs in schools. Emphasis placed on human relations approach to solving problems in administration. Prereq: 4200.

4500 Elementary Field Experience II (2) A micro-student teaching experience at the elementary or middle school level. Prereq: Admission to Teacher Education and consent of instructor. S/NC.

4550 Methods of Teaching Dance (3) Principles and methods for the teaching of dance with practical application in a mini-teaching experience. Prereq: Upperclass or graduate standing and approval of instructor. Senior standing or graduate status required for graduate credit. There is a different level of performance expected of those registered for graduate credit. A.

4560 Movement Notation (3) Fundamentals of movement notation with emphasis on the notation and reading of elementary movement studies. Senior standing or graduate status required for graduate credit. There is a different level of performance expected of those registered for graduate credit. A.

4670 Practicum in Pre-School Motor Development (4) Study/review of selected motor development and movement education concepts, and application through assessing performance and designing and presenting developmental movement tasks to pre-school children. Prereq: 3350 and 3570 or consent of instructor. W, S.

GRADUATE
Consult the Graduate Catalog for listing of graduate level courses.

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.

2700 Special Topics (2)
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)
2722 Flag Football (2)
2726 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)
2737 Handball Elementary (2)
2738 Handball Intermediate (2)
2741 Ice Skating Elementary (2)
2742 Ice Skating Intermediate (2)
2743 Ice Skating Advanced (2)
2747 Modern Dance Elementary (2)
2748 Modern Dance Intermediate (2)
2750 Modern Jazz (2)
2752 Paddleball Elementary (2)
2755 Racquetball Elementary (2)
2756 Physical Conditioning: Jogging (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)
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 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)
2792 Exercise and Weight Control (2)
2794 Weight Training Elementary (2)
2795 Weight Training Intermediate (2)
2797 Wrestling Elementary (2)
Recreation (853)

Professor: M. L. Peters (Chairperson), Ph.D., Idaho.
Assistant Professor: K. L. Krick, Re.D., Indiana.

4000-2000-3000 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 interrelationships of delivery systems for recreation and park services. F, W.

3100 Recreation Leadership Procedures (3) Principles and practice 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. F.

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. S.

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

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

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

3302 Outdoor Recreation Skills and Techniques II (3) Instruction in safe conduct of outdoor recreational activities such as sailing, skin diving, hiking, camping, angling, powerboating, and backpacking. Emphasis: enjoyment of natural environment without disturbance or destruction of plant and animal habitats. Prereq: Consent of Instructor. F, A.

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

3880 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. F, W.

4000 Practicum in Recreation (15) Full-time practice in an approved recreation agency. Emphasis on supervisory and administrative procedures. Prereq: 1000, 2000, 3000, senior standing. S/N/C. E.

4120 Recreation Administration (3) Introduction to recreation administration, including planning, personnel, areas and facilities, program services, finances, and public relations. Prereq: 3140, 3200, 3880 or consent of instructor. F, S.

4200 Survey of Recreation for Special Populations (3) Responsibilities of recreational agencies for various to minority groups whose leisure opportunities and needs may require special service. Prereq: 3140, 3200, 3880 or consent of instructor. F.

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

4500 Specialized Study in a Selected Area of Recreation (1-9) Comprehensive study in a selected special area within the field of recreation. For recreation students only. May be taken for variable credit up to 9 hours. May be repeated for a maximum credit of 9 hours with consent of the division. Prereq: Consent of instructor. E.

GRADUATE Consult the Graduate Catalog for listing of graduate level courses.

Special Education and Rehabilitation (933)


Assistant Professor: S. M. Bynner, Ed.D., Columbia; K. H. Kopp, Ph.D., Peabody; S. W. Mulkey, Ph.D., Florida State.


Lecturers: O. E. Fleece, B.S., Memphis State.

The undergraduate programs in the Department of Special Education and Rehabilitation provide the general professional courses for the preservice education of candidates for certification in meeting the needs of exceptional children. Facilities are available for continuous observation and participation in direct relationships with exceptional children who are hospitalized, homebound, in residential schools, special classes, or regular classes.

Course sequences may be 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, 4390, 4440, 4450, 4520, 4610, 4740, 4880, 4881, 4882, 5260, 5620.

The Hearing Impaired: 2110, 2120, 3333, 4190, 4200, 4210, 4220, 4250, 4260, 4590, 4351, 4361, 4371, 4470, 4480, 4970, 5320, 5240, 5260, 5310, 5320, 5330, 5820.

Speech and Hearing: 3300, 3333, 3710, 4030, 4040, 4150, 4170, 4320, 4330, 4342, 4400, 4420, 4930. Other courses from Audiology and Speech Pathology: 3010, 3050, 3065, 3200, 4610, 4650.

Rehabilitation Counselor Education: 5100, 5110, 5115, 5120, 5130, 5140, 5145, 5146, 5147, 5150, 5160, 5170, 5220, 5260, 5270, 5710, 5720, 5730, 5740, 5750, 5760, 5770, 5780.

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

2120 Field Experience (3) Students observe, tutor, and perform teacher-related tasks in special education programs. S/N/C. F.
114 College of Education

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

3333 Education of the Exceptional Child (3) Prin-
ciples and practices of working with children with special needs; local and state programs for diagnosis and care; educational provisions in regular or special classes; home teaching; social and vocational guidance. E.

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, F, S.

4030 The Professional Aspects of Speech/Lan-
guage/Hearing Programs in the Schools (3) Com-
prehensive study of the organization, administration of school programs. Also, other settings, hospitals, institutions, private practice, professional certification levels, legislation, careers. W.

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.: Courses required for Tennessee certification in Special Education. F, W, S.

4110 The Nature and Concept of Mental Retarda-
tion (3) Identification, description, and study. W, S.

4120 Education of the Mentally Retarded Child (3) Philosophy and rationale underlying the teaching and guidance of retarded, methods and materials in special and regular classes. Prereq.; or Coreq. 4140 and admission to Teacher Education. F, W, S.

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

4150 Education of Children with Crippling and Special Health Conditions (3) Medical and educa-
tional characteristics of children with crippling and special health conditions; appropriate educational modifications and associated services. Prereq. Coreq. 3335 or consent of instructor and admission to Teacher Education. F, W.

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. Rela-
tionship of hearing to speech development. Theories and techniques of speech development and improvement for hearing impaired children. Prereq.: Speech 2050. (Same as Audiology and Speech Pathology 4190.) F.

4200 Practicum in Speech Development of Hearing Impaired (3) Application of theories and techniques of speech development and improvement with hearing impaired children. Prereq.: 4190 and consent of instruc-
tor. (Same as Audiology and Speech Pathology 4200.) W.

4210 Language Development of Hearing Impaired (3) Systems by which formal language is presented. Prereq.: Admission to Teacher Education. (Same as Audiology and Speech Pathology 4210.) F.

4220 Language Development for the Hearing Impaired II (3) Techniques; various systems by which formal language is presented. Prereq.: 4210 or consent of instructor and admission to Teacher Education. (Same as Audiology and Speech Pathology 4220.) W.

4230 Communication Processes for the Hearing Impaired (3) Various communicative skills required by hearing impaired person; speech and language develop-
ment; auditory training, speech reading, manual language, and related forms of communica-
tion. Observation practicum. (Student must acquire a degree of proficiency in use of manual language.) Prereq.: Consent of instructor. E.

4231 Communication Processes for the Hearing Impaired II (3) Intermediate courses in manual commu-
unication skills and techniques with emphasis on vocabulary development with receptive and expres-
sive fluency. Prereq.: Spec. Ed. 4250 or consent of instructor.

4240 Nature of Hearing Impairments (3) Basic prin-
ciples of audiology: anatomy and physiology of hear-
ing, nature and causes of hearing loss, methods and instrumentation for assessment of hearing loss; interpretation of audiograms; selection and use of hearing aids; role of audiological services to medical and other rehabilitative disciplines. Observations and prac-
tices. F, S.

4250 Introduction to the Psychology and Educa-
tion of the Hearing Impaired (3) Offered for those planning to enter field of teaching the deaf and hard-
of-hearing. Review of history of education of the deaf. Research studies relating to psychology, social adjust-
ment, and learning of the deaf. Survey of professional literature in area of deaf child and adult. (Same as Audiology and Speech Pathology 4250.) F, W, S.

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. Prereq.: Admission to Teacher Education. S.

4265 The Teaching of Reading to Hearing Impaired Children (3) Readiness activities, developmental ap-
proaches, theories, and specialized materials for cur-
ricula in teaching reading. Prereq.: Admission to Teach-
er Education. W.

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 (3) Prereq.: Audiology and Speech Pathology 4320-30-40, Special Ed. 4030, and consent of instructor. S/NC. F, C, F.

4342 Seminar in Communication Disorders in Schools (3) Prereq.: Audiology and Speech Pathology 4320-30-40, Special Ed. 4030, and consent of instruc-
tor. F, S.

4350-60-70 Problems in the Education of Excep-
tional Children (3, 3, 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. Prereq.: Admission to Teacher Education. 4351-F, W, S; 4361-E; 4371-F, W, S.

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

4440 High School Program for the Mentally Retard-
ed (3) Trends, issues, and research relating to care and work study programs. Prereq.: Admission to Teacher Education. W, S.

4520 Language-Speech Handicapped Child in the Classroom (3) Language, speech, and hearing characteristics, development of communication disorders; information on referral procedures, agencies, legislation; incorporation of speech improvement-language development activities into regular curriculum. For students not majoring in speech-language pathology or audiology. F, W.

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 other. Relationships with respect to: Personality, characteristics, developmental factors interpreted through behavioral and psychodynamic theory as well as practical situations in which learning and behavior disorders may occur. F, W, S.

4620 Education of the Emotionally Disturbed Child (3) Managing behaviors, models for instruction, teach-
ing techniques and materials, and teacher-pupil-family interpersonal 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 dis-
turbing behaviors; initiating behavior changes regard-
ing academic and social behaviors; to performing in a tutorial capacity within a residential classroom; take in 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/aid capacity within regular classrooms. Particular emphasis and practice in individualizing instruction for learning and behavior problem children within the regular classroom setting. Discussion and evaluation of relevant methods and materials unique to 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 evaluation criteria and testing. Prereq.: Sp. Ed. & Reh. 3333 or consent of instructor and admis-
sion to Teacher Education. W.

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 Palsied Child at Home and School (3) Physical, social, and educational needs of cerebral palsied, educational tech-
tiques, related services.

4850 Eye Problems Encountered by the Teacher (3) Eye anatomy and hygiene; common diseases and dysrhythmia; testing and treatment; educational adjust-
ments for specific eye conditions; related service re-
sources.

4870 Student Teaching with Hearing Impaired Children (9) Supervised practicum with preschool, day school, and residential pupils. S/NC. W, S.

4871 Practicum with Hearing Impaired Children (6) S/NC. W, S.

4880 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 academic year in which the student expects to be accepted. Prereq.: 4110, 4120, 4130, 4150, 4351, 4351, 4351, 4361, 4740. S/NC. F, W.

4881 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, 4150, 4351, 4351, 4361, 4740. S/NC. W, S.

4882 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, 4150, 4351, 4351, 4361, 4740. S/NC. W, S.

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

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

4924 Student Teaching of the Emotionally Distur-
turbed (3-9) Individual tutoring and classroom observ-
ation and teaching. Prereq. or cons. Educ. 4620 or 4820. S/NC.

4910 Aural Rehabilitation: Speechreading and Au-
diology Training (3) (Same as Audiology and Speech Pathology 4910.)

4940 Introduction to the Verbo-Tonal System (4) (Same as Audiology and Speech Pathology 4940.)
GRADUATE  
Consult the Graduate Catalog for listing of graduate level courses.

Vocational-Technical Education (988)

Professors: J. I. Matthews (Head), Ph.D., Arizona State; R. J. Woodin (Emeritus), Ph.D., Ohio State; W. A. Cameron, Ph.D., Ohio State; C. A. Campbell, Ed.D., Maryland; G. D. Cheek (Coordinator Ind. Ed.), Ph.D., Kansas State; C. B. Cockley (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; K. O. McCullough, Ph.D., Florida State; J. M. Peters, Ed.D., North Carolina State; J. L. Reed (Emeritus), M.S., Oklahoma; G. A. Wagner (Emeritus), M.S., Indiana; G. W. Wiegler, Jr., Ed.D., Missouri.


Assistant Professors: R. H. Pierce, 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, trades and industries, and industrial arts education. S/N/C only.

3000 Introduction to Vocational Education (1) Introductory and exploratory experiences concerned with teaching careers in areas of vocational education. Includes visitation 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 approved by supervising instructor and the service area coordinator or supervisor. 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&I 4750 and Information Science 4750.)

GRADUATE

Consult the Graduate Catalog for listing of graduate level courses.

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, 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 Agri-business Education (1-6, 1-6, 1-6) Total not more than 6 hours.

4240-41-42 Seminar in Agricultural Education (1, 1, 1) Prereq: 4350 or consent of department head.

4350-60 Student Teaching in Agricultural Education (9-6) Offered in off-campus centers. Application must be filed not later than final quarter of junior year. Courses must be taken concurrently. Prereq: 3450, 3460, 3470, consent of instructor. Undergraduate credit only. S/N/C.

GRADUATE

Consult the Graduate Catalog for listing of graduate level courses.

Business Education (207)

4300 Principles of Business Education (3) Historical background and present status; principles of vocational education applied to business education; guidance activities of business teachers.

4310 Pre-Student Teaching Seminar (1) Orient 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 seminars 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/N/C only.

4320 Teaching Basic Business Subjects (2) Materials, evaluation procedures, and recent research in subject fields.

4330 Teaching Typewriting and Word Processing (2) Materials, methods, evaluation procedures, and recent research in subject fields.

4340 Teaching Shorthand (2) Materials, methods, evaluation procedures, and recent research in subject fields.

4345 Microcomputer Business Programming Applications (3) An introductory course in operating and programming personal computers. BASIC languages is used, and programming examples are oriented to business applications. Data processing and word processing applications are included. Open lab available for required hands-on experience. Letter grade only.

4350 Teaching Accounting and Data Processing (2) Materials, methods, evaluation procedures, and recent research in subject fields.

4370 Seminar in Business Education (3) Current business education problems, viewpoints of leaders in field, special attention to problems of those enrolled. S/N/C only.

4390 Special Topics (1-9) Topics to be assigned. May be repeated for maximum of 9 hours total. May be offered for letter grade or for S/N.C.

4450 Areas of Distribution (3) Marketing, product or service technology, social skills, basis skills, and distribution as these areas affect the distributive education curriculum in secondary and postsecondary programs.

4460 Organization and Operation of Distributive Education Programs (3) Background and development needs, federal and state legislation; curriculum implications; establishing, evaluating, reporting, and improving the programs.

4470 Methods and Materials in Distributive Education (3) Prereq: 4460 or consent of instructor.

4480 Coordination Techniques in Distributive Education (3) Selecting training agencies, job analysis; selecting and briefing the training supervisors; advisory committees, adult education and other community services. Prereq: 4460 and 4470.

GRADUATE

Consult the Graduate Catalog for listing of graduate level courses.

Home Economics Education (490)

2240 Introduction to Home Economics Educational Programs (4) Introductory and exploratory experiences concerned with a teaching career in school-based and community-based home economics programs. Field experience included. F.

3240 Strategies of Teaching Home Economics (4) Teaching strategies, methods, techniques, and use of media. Field experience included. Prereq: 2240. F.

4240 Curriculum Development in Vocational Home Economics (4) Planning of curriculum and design of instruction for the classroom. Prereq: 2240, 3240. To be scheduled one of the two quarters immediately preceding student teaching. W.

4400 Teaching in Community-Based Home Economics Programs (4) Planning and implementing community-based home economics education programs-methods, curriculum, delivery systems, evaluation, includes a field experience. Senior standing required. W.

4500 Field Experience in Home Economics Community-Based Programs (6) Supervised field experience in appropriate related community-based programs. Includes seminar. S/N/C. S.

4509 Field Experience in Home Economics Related Occupations (4) Supervised field experience and seminar in teaching of occupations which utilize home economics skills and knowledge. Prereq: Consent of instructor. S/N/C. May be repeated.

4510 Teaching Occupational Home Economics (2) Methods, organization and curriculum development for Home Economics Related Occupational programs. Prereq: or coreq: 4460 and 4509.

4610 Student Teaching in Vocational Home Economics (9) Off-campus teaching centers. Prereq: 2240, 3240, and 4240. S/N/C.


4715-25-35 Honors: Home Economics Education (3, 3, 3) For juniors and seniors showing special ability and interest in home economics education. Prereq: Consent of department head.

GRADUATE

Consult the Graduate Catalog for listing of graduate level courses.

Industrial Education

1610 Engine Analysis (3) Designed to give experimental laboratory experience in automotive technology. Emphasis is on "hands-on" type of manual techniques and procedures are studied and practiced.

1620 Graphic Communications (3) Drafting as a means of communication in technology. Orthographic and multi-view drawing, conventional practices, pictorial techniques, and application of photography.

1630 Basic and Applied Electricity (3) Operation and characteristics of electrical systems and devices. Con-
struktion of demonstration apparatus and various electrical projects involving function of different types of circuits.

3640 General Metals (3) An introductory course dealing with processes, equipment, materials, products, and organization of metal-working industries. Involves processes for metals, machine shop practice, sheetmetal, forging, heat treatment, arc and gas welding, fabrication, and the use and care of common metalworking tools.

3642 Welding and Cutting Practices (3) Prereq: 1640.

1661 General Woodworking (3) Basic course dealing with processes, tools, equipment, products, organization of woodworking industry. Stresses importance in safety and using hand tools and basic machinery.

2611 Power Mechanics (3) Includes various prime movers, methods of utilization, and transmission of power with internal combustion engines. Maintenance and repair of small engines is stressed.

2620 Industrial Graphics (3) Auxiliary views, sections, conventional practices, fasteners, dimensioning, working drawings, and machine drafting. Prereq: 1620.

2630 Fundamentals of Applied Electronics (3) Electrical circuit analysis and introduction to semi-conductor and IC applications, including amplifiers, switching and timing circuits, and oscillators. Prereq: 1630.

2632 Electronics Technology (3) Basic principles and applications of electronics. Undergraduate credit only.

2641 Machine Tool Processes (3) Introductory course dealing with the function, care, setup, operation, and theory of basic machine tools. Prereq: 1640.

2652 General Plastics (3) Characteristics of thermoplastics and thermal setting materials, methods of determination, and resin conversion to finished products.

2660 Furniture and Cabinet Construction (3) Comprehension of woodworking industry. Stresses importance in safety and using hand tools and basic machinery.

2800-01-02 Basic Experiences in Trade and Industrial Education (3,3,3) Methods and materials of instruction. 3 periods.

3080-81 Machining of Metals (3, 3) Introduction to machine shop theory and practice in using basic machine tools. Undergraduate credit only.

3081 Automotive Mechanics (3) Advanced laboratory experience in tune-up, overhaul, transmission, and the suspension system. Prereq: 1610.

3620 Architectural Graphics (3) Introduction to fundamentals of graphic representation and residential architecture. Light construction principles are stressed and working drawings for a residential building are developed. Prereq: 1620.

3630 Digital Electronics Technology (3) Basic principles and application of digital electronics. Prereq 2630 or permission of instructor.

3640 Advanced General Metals (3) Provides experiences in areas of hot and cold forming of metals, molding and metal finishing, tool grinding, heat treatment, fabrication, and precision measurement. Prereq: 2641.

3650 Welding, Brazing, Cutting, and Related Processes (3) Various types of welding equipment and fusion and welding techniques of welding. Undergraduate credit only.

3651 Plastic Processing (3) Plastics, production equipment and related product design and processing of plastics. Prereq: 2652 and 1661.

3662 Construction Methods and Materials (3) Materials, methods, and equipment used in residential construction, including location and excavation, foundry, framing, roofs, interior and exterior finishes, installation, and acceptable practices in assembly. Prereq: 1661.


3692 Photographic Processes for Planographic Printing in Industrial Arts (3) Principles of basic photographic processes for planographic printing, letterpress typography and practice in SLR work, camera copy preparation, line photography, halftone photography, layout, striping, platemaking and printing. Prereq: 3630.

3810 Related Science, Mathematics, and Technology in Occupations (15) Prior department approval 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.

3811 Manipulative Skills in Occupations (15) Prior department approval 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.

3820-21-22 Physical Testing Technology (3, 3, 3) Skills and techniques involved in radiography, metallography, tensile and compression testing, and other destructive and non-destructive testing methods. Undergraduate credit only.

3830 History and Philosophy of Industrial Education (3)

3840-41-42 Part-time Programs in Cooperative Industrial Training (3, 3, 3) Principles of organization, methods, and materials.

3850 Shop Organization and Management (3)

3860-81 Materials and Methods for Teachers of Shop and Related Subjects (3, 3)

3870 School Shop Safety (3)

4620 Special Topics in Drafting (3) Industrial practices in specialized areas of drafting selected for the individual student. Prereq: 6 hours of drafting.

4630 Industrial Electronics and Digital Equipment Controls (3) Applications of digital and analog electronics in industrial and control circuitry. Emphasis is placed on circuit analysis, troubleshooting, and synthesis of systems, including microprocessor applications. Prereq: 3630.

4660 Vocational Technical Laboratory Equipment Maintenance (3) Understanding of preventive maintenance, the care of precision instruments, and the use and power equipment used in industrial education shops.


4670 Manufacturing Processes (3) The manufacturing processes of industry and their relationship to careers. Prereq: 3621, 2641, 2650, 3651, or consent of instructor.

4671 Materials and Processes (3) Organic and inorganic materials and processes used to produce finished products. Content, curriculum, and techniques of laboratory operation. Prereq: Consent of instructor.

4682 Power and Energy (3) Development, control, transmission, conversion, and interaction of power sources. Content, curriculum, and techniques of laboratory operation. Prereq: Consent of instructor.

4690 Visual Communications in Industrial Arts (3) Methods of developing and transmitting ideas and information as related to industry and society. Content, curriculum, and techniques of laboratory operation. Prereq: Consent of instructor.

4691 Course Construction in Industrial Arts (3) Advanced work in the selection and arrangement of course content and activities. Emphasis upon instructional objectives, project selection and informational assignments and evaluation. Prereq: Consent of instructor.

4801-02-03 Tools and Machine Design (3, 3, 3) Tool and machine design, calculations, design systems, and designing procedures. Undergraduate credit only.

4810 Directed Teaching (9) Guided observation and teaching in trade, industrial, and/or technical programs. Preparation of lesson plans and supervised teaching in at least two types. Prereq: Senior standing in industrial education. Prereq, or coreq: 4120, 1 hour and 5 periods. Undergraduate credit only. S/NC.

4811 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: 4120, 1 hour and 5 periods. Undergraduate credit only. S/NC.

4815 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, training, implementing work methods, industrial safety and instructional skills for trainers and supervisors. Prereq: Senior standing.

4820 Foremanship Training by the Conference Method (3)

4830-31 Job Analysis (3, 3) Principles, practice, instructional methods.

4840 Methods of Teaching Shop and Related Subjects (3) Undergraduate credit only.

4850-51 Curriculum Building in Trade and Industrial Subjects (3, 3) Arranges course material in trade subjects, following up results of job analyses, preparing checking sheets and individual job sheets in both trade and related subjects. Prereq: or coreq: 4120.

4860-81-82 Problems in Industrial Education (3, 3, 3)

4870 Numerical Control (3) Tooling, manual programming, automatic programming, automatic programming language, and use of automatic programmer as a computer. Undergraduate credit only.

4875 Microcomputer Programming for Education and Industry (3) This course is an introduction to the application of microcomputers for education and industry and the implications and impact of microcomputers on industrial education. Open lab available for required hands-on experience in operations and programming. Letter grade only.

4890-91-92 Seminar in Industrial Education (3, 3, 3) Educational innovations, current events, problems, and other topics associated with the field of industrial education.

4895 Organization and Development of Vocational Industrial Clubs of America (VICA) (3) Designed to give industrial education, maintenance, and calibration of industrial education, and to give the industrial education teacher experiences and an understanding of the organization and operation of VICA. Prereq: Undergraduate degree and 3 year teaching experience when taken for graduate credit.

4890 New Developments in Industrial Education (2) 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 coordinating 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 (6,8,15) 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

Consult the Graduate Catalog for listing of graduate level courses.
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 pursue advanced study in graduate industry, government, or private practice, or the college may enter directly a position in fulfillment of their responsibilities as professional social understanding that will enable them to the high levels of technical competence and actions that they recommend will be truly beneficial. 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.

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. The cooperative program is open to all students in good standing in the college.

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 in 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. A basic engineering lecture room, four engineering drawing laboratories, and engineering drawing staff offices are located on the second floor. Offices of the Co-Op and Minority Engineering Programs are located on the first floor.

**Perkins Hall.** This building houses the Departments of Civil Engineering, Engineering Science and Mechanics, Engineering Experiment Station, and the Offices of the Dean of the College of Engineering. The building contains laboratories, 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 portion of this building houses offices, 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, located 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. J. D. Froula, secretary-treasurer, and his staff.

Cooperative Engineering Program
The five-year Cooperative Engineering Program is offered to students in the college in order to provide an 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 quarters—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 world of work, the college and the facilities of industry join together to offer a broader and richer preparation for postgraduate employment and for life in general than can be provided by a conventional academic program alone in a classroom. Industrial and professional environment contributes to the student's maturity, increases the scope of acquaintances and contacts, and enables the student to define more clearly educational and career interests and objectives. Some of the experience received is at a professional level not available to an engineer after graduation, yet is of great significance in total education and effectiveness.

Admission to the Cooperative Engineering Program is open to academically qualified freshman and sophomore students. A fall application period is conducted in early October. The source of most candidates placed for the following summer or fall is the suite of offices, located in Dougherty Hall, is occupied by Mr. J. D. Froula, secretary-treasurer, and his staff.

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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 program leading to a liberal arts degree and an engineering degree. Ideally, the program requires five years, three at the liberal arts college and the last two in the College of Engineering at UT. The actual time required depends upon how closely the first two years of the chosen engineering program at UT can be matched to courses taken during the first three years at the originating school.

Current academic standards for transfer into the desired program at UT must be met at the end of the initial three years. A baccalaureate science degree in one of the engineering degree programs will be awarded when all UT graduation requirements have been met.

Any student at a participating school who is interested in such a program should discuss the match between courses at the two institutions before beginning. Questions about engineering courses should be directed to the Academic Advising Office. 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. 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 an organization formed by many engineering societies and known as the Accreditation Board for Engineering and Technology (ABET). Currently accredited engineering curricula at UT include aerospace, agricultural, chemical, civil, and
and professionally. For this purpose, a part of their interaction with society, both personally and professionally, whereby students gain greater insight into complex interactions between technology and the appreciation of and the ability to deal with the human aspects of the practice of engineering; to enrich the student's humanities and social science electives.

The college assumes an obligation to include the use of correspondence course credit to count in this limit. Courses administered by any department in the college. However, the structure and course offerings and needs change. They are selected by the committee with revisions as guidelines, the Humanities and Social Studies 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 Science 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, these electives serve 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 Committee 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 Culture, 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 courses offered 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 list is intended to eliminate paperwork for the most commonly-chosen electives and to illustrate the kinds of suitable courses. The list is not all inclusive, 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 advisor. Courses which are primarily skill development courses, involve mathematics or science, are intended for students 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
- Economics
- History
- Political Science

IB. Economics
- Economics
- History
- Political Science

IC. Sociology and Psychology
- Sociology
- Anthropology

ID. Human Values
- Philosophy
- Religious Studies
- Zoology

IIA. Culture
- American Studies
- Anthropology

IIB. Culture
- American Studies
- Anthropology

IIC. History
- Art
- Geography

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IID. Literature
Classics 3210-20-30, 3510-20-30
Comparative Literature 2010
English 2510-20-30-40, 2560-70-80, 1690, 3010-30-30, 3070-80, 3410-20-40, 4610-20-30, 4651-52
German 3110-20-30
Religious Studies 3710-11
Russian 3610-20-30

III. Anthropology
Anthropology 2510-20-30, 3410, 3450, 3710, 4420
Asian Studies 3120-20
Geography 1910, 3860
History 1950-60, 3740, 4250-60-70, 4860-50-60, 4670

Area III. Technology and Society

IIIA. Human Habitat
Geography 3530, 3600, 3910, 4075
Political Science 4940
Psychology 1510-20, 3180, 3410-20, 3610, 4030, 4110, 4390

IIIB. Technology Assessment
Geography 4075
Philosophy 2750
Rural Sociology 4450
Sociology 3610, 4330
University Studies 2010

IIIC. Communication
Journalism 3110, 4110
Sociology 4330

IIID. Resources
Economics 4260
Forestry 2500
Geography 2120, 3490
University Studies 2010

American History Requirement.
Engineering students, regardless of national origin, must fulfill the American history requirement described on page 26 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, 2551, 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 a choice of such electives is indicated, and regulations in regard to their selection are stated.

The Voluntary ROTC Program.
Engineering students may participate in the ROTC Program. 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. Very few ROTC courses can be used as humanities/social studies electives. 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 to 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. Intention to such matters may delay graduation.

CURRICULA: 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 that course; questions about a particular curricula should be directed to the major department.

Prerequisites Before registering for any engineering course, a student should make certain that any necessary background work has been completed. Refer to the course descriptions to determine what is needed. In addition to specific prerequisites listed, it is assumed that a student taking sophomore or junior year engineering courses has completed all freshman courses, whether specifically listed as a prerequisite or not. When this is not the case, a student should seek advice from the advisor or department responsible for the course in question before registration so as to minimize the chances of academic difficulty. Students who do not have prescribed prerequisites may be dropped from a course at any time during a quarter when the lack of prerequisites is discovered.

Aerospace Engineering

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*Humanities/social studies electives: 3 - 3
*Industrial Engr. 4520: 3

TOTAL: 104 hours

Agricultural Engineering

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*Humanities/social studies electives: 3 - 3
*Industrial Engr. 4520: 3

TOTAL: 144 hours

Biomedical Engineering

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*Technical electives: 3 - 3
*Humanities/social studies electives: 3 - 3
*Industrial Engr. 4520: 3

TOTAL: 114 hours
Chemical Engineering

**Hours Credit**

### Freshman
- Math 1840-50-60
- Chemistry 1110-20-30
- English 1010-20-33
- Graphics 1410-20
- Basic Engineering 1310-30-20
- Basic Engineering 1410

### Sophomore
- Chem. Engr. 2010-20-30
- Chem. Engr. 2011
- Chem. Engr. 3410
- Chemistry 2140-49
- Math 2840-50-60
- Chemistry 3211-19

### Junior
- Chem. Engr. 3420-40
- Chem. Engr. 4110, 4160
- Chem. Engr. 3050
- Chem. Engr. 3921-29
- Math 3150
- Chemistry 3410-20-30
- Elect. Engr. 3110-20 or 3130

### Senior
- Chem. Engr. 3620, 4220
- Chem. Engr. 4410-20
- Chem. Engr. 3450, 4530
- Chem. Engr. 3140-20
- Met. Engr. 3520
- Chemistry 4110
- Met. Engr. 4150
- Met. Engr. 3150
- Major electives
- Technical electives
- Humanities/social studies electives
- Humanities/social studies electives

**TOTAL: 201 hours**

Civil Engineering

**Hours Credit**

### Freshman
- Math 1840-50-60
- English 1010 or 1011; 1020, 1033
- Chemistry 1110-20-30
- Graphics 1410-20
- Basic Engineering 1310-20-30
- Basic Engineering 1410

### Sophomore
- Civil Engr. 2280, 2360
- Civil Engr. 2370
- Civil Engr. 3210
- Engr. Sci. & Mech. 3311, 2720, 3110

### Junior
- Civil Engr. 3310, 3315, 4220
- Civil Engr. 3320, 4430, 4800
- Civil Engr. 3650, 3610
- Civil Engr. 3710, 4110, 4140
- Computer Science 3150
- Elec. Engr. 3110
- Engr. Engr. 3220, 3330
- Engr. Engr. 4520, 4510
- Mech. Engr. 3520

### Senior
- Civil Engr. 4320, 4320
- Math/science elective
- Math/science elective
- Technical electives
- Humanities/social studies electives

**TOTAL: 205 hours**

Electrical Engineering

**Hours Credit**

### Freshman
- Math 1840-50-60
- Chemistry 1110-20-30
- English 1010-20-33
- Graphics 1410-20
- Basic Engineering 1310-30-20
- Basic Engineering 1410

### Sophomore
- Math 2840-50-60
- Physics 3310-20-30
- Elect. Engr. 2010-20-30
- Met. Engr. 2110
- Engr. Sci. & Mech. 3710 or Met. Engr. 3130

### Junior
- Elect. Engr. 3810-20-30
- Elect. Engr. 3040-50-60
- Elect. Engr. 3010, 3720, 3100
- Elect. Engr. 3190, 3190
- Mech. Engr. 3520-30-40
- Elect. Engr. 3080-90

### Senior
- Math 5150
- During the third quarter of the junior year, the student, in consultation with the advisor, should choose one of the following areas of interest. Courses marked with footnote 1 may be replaced by other courses approved by the student's area advisor.

**Notice that any given senior course is two lines)-the remaining three of these first six may be any engineering course without filing a substitution form.**

**Electromagnetic Fields and Communications**

- Elect. Engr. 4540
- Elect. Engr. 4550
- Elect. Engr. 4100
- Elect. Engr. 4570
- Elect. Engr. 4780
- Elect. Engr. 4980
- Elect. Engr. or math electives
- Economics 2510
- Humanities/social studies electives

**TOTAL: 204 hours**

Civil Engineering

**Hours Credit**

### Freshman
- Math 1840-50-60
- English 1010 or 1011; 1020, 1033
- Chemistry 1110-20-30
- Graphics 1410-20
- Basic Engineering 1310-20-30
- Basic Engineering 1410

### Sophomore
- Civil Engr. 2280, 2360
- Civil Engr. 2370
- Civil Engr. 3210
- Engr. Sci. & Mech. 3311, 2720, 3110

### Junior
- Civil Engr. 3310, 3315, 4220
- Civil Engr. 3320, 4430, 4800
- Civil Engr. 3650, 3610
- Civil Engr. 3710, 4110, 4140
- Computer Science 3150
- Elec. Engr. 3110
- Engr. Engr. 3220, 3330
- Engr. Engr. 4520, 4510
- Mech. Engr. 3520

### Senior
- Civil Engr. 4320, 4320
- Math/science elective
- Math/science elective
- Technical electives
- Humanities/social studies electives

**TOTAL: 204 hours**

Systems and Networks

**Hours Credit**

- Elect. Engr. 4460
- Elect. Engr. 4740
- Elect. Engr. 4670
- Elect. Engr. 4610
- Elect. Engr. 4630
- Elect. Engr. 4620
- Elect. Engr. 4800
- Elect. Engr. 4820
- Elect. Engr. 4850
- Elect. Engr. 4650 or 4750
- Elect. Engr. 4800
- Elect. Engr. 4810
- Non-tech. electives

**TOTAL: 204 hours**

Electronics and Instrumentation

- Elect. Engr. 4550, 4690
- Elect. Engr. 4370
- Elect. Engr. 4700
- Elect. Engr. 4690
- Elect. Engr. 4800
- Elect. Engr. 4740
- Elect. Engr. 4610
- Economics 2510
- Elect. Engr. 4650
- Elect. Engr. 4850
- Elect. Engr. 4360
- Non-technical electives

**TOTAL: 204 hours**

Bioelectric Option

- Biology 1210-20-30
- Chemistry 2230
- Elect. Engr. 4660
- Zoology 3069-3069
- Elect. Engr. 4850
- Elect. Engr. 4690
- Elect. Engr. 4820
- Economics 2510
- Humanities/social studies electives

**TOTAL: 206 hours**

- Students entering the Computer Engineering Senior Year Option must successfully complete Computer Science 3150 rather than Math 3150.
- Course will usually be required; however, a student's major advisor may substitute another 4000-level electrical engineering course without filing a substitution form.
- A student must take any of the first six courses (top two lines)-the remaining three of these first six may be any 4000-level or higher course in electrical engineering.

**Engineering Physics**

**Hours Credit**

### Freshman
- Mathematics 1840-50-60
- English 1010-11-20-33
- Non-technical elective
- Chemistry 1110-20-30
- Graphics 1410-20
- Physics 1310-20-30

### Sophomore
- Mechanics 2840-50-60
- Mathematics 2840-50-60
- Humanities/social studies electives

**TOTAL: 204 hours**

- Elect. Engr. 4810
- Economics 2510
- Humanities/social studies electives

**TOTAL: 204 hours**

- Plasma and Electro-Optics
- Electrical Engineering
- Electrical Engineering
- Chemical Engineering
- Chemical Engineering
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- Electrical Engineering
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TOTAL: 206 hours

### Metallurgical Engineering

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TOTAL: 200 hours

### Nuclear Engineering

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TOTAL: 199 hours

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TOTAL: 200 hours

### Metallurgical Engineering
BACHELOR OF SCIENCE PROGRAM

Separate complete curricula are offered in chemical engineering and in metallurgical engineering. However, the first two years of these curricula are nearly identical and a decision as to choice can be made in the second year. The 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.

Effective Fall 2000, Humanities and Social Studies.

Both chemical and metallurgical engineering curricula require a minimum of 24 quarter-hours of humanities—social courses which are selected from the list on pages 130-131. A minimum of 12 hours must be taken from a single sub—group under one of the three major headings.

Graduation in either chemical or metallurgical engineering requires a minimum grade point average of 2.00 for all departmental courses.

PROGRESSION TO UPPER-DIVISION PROGRAMS

Progression of chemical or metallurgical engineering students to departmental Upper-Division courses is competitive and is based on capacity. Factors considered include overall grade point average, performance in selected lower-division courses and evidence of satisfactory and orderly progress through the prescribed curriculum.

UPPER-DIVISION STATUS: A Lower-Division student may apply for progression to Upper-Division Status after completing 80 quarter hours of Lower-Division engineering curriculum course work with an overall GPA of at least 2.4. This must include Chemical and Met. Eng. 2010 and 2020 for Chemical Engineering majors, and 2010 and 2030 for Metallurgical Engineering majors.

PROVISIONAL STATUS: Students who have completed 80 quarter hours of Lower-Division engineering curriculum course work with an overall GPA between 2.0 and 2.4 may apply for provisional status. The granting of PROVISIONAL UPPER-DIVISION STATUS is based on the availability of space in the departmental programs after UPPER-DIVISION STATUS students have been accommodated. Provisional students are required to demonstrate their abilities to perform satisfactorily in upper-division courses by attaining a minimum GPA of 2.0 in at least 12 hours of 3000-level required courses specified by the department. Further progression to upper-division courses is dependent upon this minimum level of performance.

Any chemical or metallurgical student with an overall GPA below 2.0 will not be admitted to upper-division Chemical or Metallurgical Engineering courses. Students who have not been admitted to an Upper-Division Status will be dropped from departmental class rosters.

TRANSFER STUDENTS at the Upper-Division level are admitted on a Provisional Status basis only. Any student presenting more than 42 hours of Lower-Division engineering curriculum course work by transfer credit is considered to be a transfer student.

GRADUATE STUDY PROGRAMS

Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy are offered in chemical engineering, metallurgical engineering, or polymer engineering; and in chemical engineering.
in tubes, piping systems, and packed beds; metering, mixing, and pumping. ChMe. Engrg. 2200. Math 2850. 3 hrs. and 1 lab. W, S.

3420 Heat Transfer (4) Differential and overall energy balances; steady and unsteady state, heat conduction in one and two dimensions; convection to fluid in tubes and exchangers; condensation and boiling radiation. Prereq: 3410. 3 hrs. and 1 lab. F, W.

3440 Stagewaise Operations (3) Analytical and graphi- cal methods to stagewise separation operations. Prereq: Chem. Engrg. 3040. F.

3450 Diffusional Operations (3) Diffusion simultaneous heat and mass transfer, applications including humidification, gas absorption, extraction. Prereq: 3420, Chem. Engrg. 3040. F, W.

3610 Introduction to Process Dynamics and Control (3) Process modeling and introduction to control system design. Mathematical models for several industrial processes are developed from a mass, component, and energy balance basis. The models are compared to both industrial and laboratory data. Model linearization, Laplace transfer analysis techniques, block diagram algebra, transfer function models, industrial sensors and values. Lab. Prereq: Math 2840, CheMet. 2020. 3, SU.

3620 Industrial Process Control (3) Design theory and practical implementation of control systems. Experimental process modeling (process identification), feedback control, cascade control, feedforward control, degrees of freedom, and controller tuning. Control systems will be designed for a number of typical industrial unit operations. Lab. Prereq: 3610. F, W.

4010-20 Thesis (3,3) Investigation and report of ele- mentary chemical engineering problem. E.

4110 Chemical Engineering Data Analysis (3) Ana- lytical methods for the evaluation, analysis, and presentation of system ex- perimental data; statistical properties of samples and source systems; empirical modeling of processes; statistical process control. Prereq: 3420, Math 3120. F, W.

4120 Probabilistic Chemical Engineering Systems (3) Experiment designs, simulation of stochastic sys- tems, predictive techniques, and analysis of networks in the process industries. Prereq. 4110.

4130 Introduction to Optimization (3) Principles and applications of optimization techniques to chemical process design; unconstrained optimization, equality constrained optimization, inequality constrained op- timization, and dynamic programming. Prereq. Math 2840.

4230 Chemical Engineering Laboratory (3) Lab- oratory investigations of controlling factors in chemical engineering operations. Prereq. 3440-50, 3620, 4530. F.

4230 Project Laboratory (3) Laboratory investigations of chemical engineering problem, stressing techniques of group effort. May be repeated. E.

4410 Design of Separation Processes (4) Mass and heat transfer fundamentals applied to design of materi- als separation processes. Prereq. 3440-50, W, S.

4420 Process Design and Economic Analysis (4) Development of process information into an integrated plant design. Product specifications, equipment characteristics, capital investment, operating costs, and economic merit. Prereq. 4410, 4530. S, F.

4430 Special Problems in Design and Economics (3) Extension of 4420 for student participation in A.J. Cn. E. annual contest problem; other advanced design projects. Prereq. 4420.

4480 Hydrocarbon Processing (3) Study of special- ized characterization of physical properties of fossil fuel raw materials and products, and of processes for conversion of fossil fuel raw materials into products needed in industrial energy, industrial raw material and consumer markets. Prereq. 3449.

4470 Sulfur Removal from Coal and Associated Problems (3) Chemical and physical properties of coal and sulfur. Surveys removal methods, including both physical and chemical methods; fluidized bed combustion with both natural and synthetic SOx sor- bents; coal-gas streams. Prereq. Consent of instructor.

4480 Coal Processing to Liquid Fuels (3) Charac- terization of process solids with respect to current li- quification methods; modeling of conversion pro- cesses and estimation of maximum yields; water and oxygen requirements for catalytic hydrocarbon hy- drogenation; reactor design considerations; review critique of selected references. Suggested for students of varied backgrounds and interests in refining art. Prereq. Consent of instructor.


4730 Mass and Energy Flow in Biological Systems (3) Basic principles of mass and energy flow that are applicable to biological systems. Derivations of gener- al equations of biomass and energy transfer. Ther- modynamics of both biological and biochemical systems. Discussion of Volterra's equation and biologi- cal clocks. E. Prereq: Consent of instructor.

4740 Introduction to Transport Phenomena in Bio- logical Systems (3) Derivation of basic principles of in- port phenomena to biological systems. Transfer of chemical energy and various cellular active transports; structure and rheology of physiological fluids, mem- brane and interfacial phenomena; analysis and design of artificial organs. Prereq. 3440 and 3450, or consent of instructor.

4750 Microbiological Process Engineering (3) Ap- plication of chemical engineering principles and design concept to microbiological processes; continuous cul- ture of microorganisms, food processing and pharma- ceutical processes. Prereq. 3440, 3450, or consent of instructor.

4760 Principles of Biochemical Separation (3) Fun- damental aspects and similarities of modern biochemi- cal separation methods; classroom demonstrations, 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 research. Prereq. Consent of instructor. May be re- peated. Maximum credit 9 hours.

4910-20 Engineering Internship in Industrial Prob- lems (0, 6) Selected students work in small groups on real industrial problems. Work will be directed by a faculty instructor and by engineers from a host compa- ny. Internship will require two quarters participation. 4910 S/NC. Prereq. 3610-20 and consent of instructor.

GRADUATE Consult the Graduate Catalog for listing of graduate level courses.

Metallurgical Engineering (679)

2040 Experimental Methods in Metallurgy (4) Lec- tures provide subject bases for laboratory experi- ments. Experiments include thermocouple calibra- tion, metallography, electron microscopy, computer experimental data acquisition and readout, dilatometer study, electrical resistivity measurements, microscope calibration, X-ray diffraction, and photomicrography. 2 hrs. and 2 labs. Prereq. 2030. S, W.

2110 Engineering Materials I (3) Introductory course correlating the atomic, crystal, and microstructure of solids and mechanical, physical, and chemical proper- ties of engineering significance. 3 hrs. or 2 hrs. and 1 lab. Prereq. Sophomore standing in engineering, E.

2210 Electron Microscopy (1) Presents to science and engineering students a brief introduction to the operation of the electron microscope and its applica- tion to scientific problems. Prereq. Physics 2310-20; 3 hrs. lab. S, NC.

3010 Industrial Inspection Trips (1) Technology of metalurgical industries, emphasis on Tennessee in- dustry, plant trips. S, NC.

3040 Metallurgical Thermodynamics (4) Applica- tions of laws of thermodynamics to problems of metal- lurgical engineering; phase equilibria and energetics, activation energy functions; relationship between free energies and phase diagrams; reaction equilibria in gasses and be- tween gasses and condensed phases. Use of heat capacity and free energy data in calculations. Con- cepts of activity and activity coefficient and their varia- tion with T, P, and composition. Prereq. Chem. Engrg. 2020, Chemistry 1130; coreq. Math 2840. 3 hrs. and 1 lab period. F.

3050 Production Metallurgy (3) Principles of roasting, smelting, and refining. Gas; liquid equilibria, slag- metal processes and solution behavior, correlation with phase constitution. Kinetics of reactions, rate laws, activated complex theory, adsorption and analy- sis and applications. Prereq. 3040. Chem. Engrg. 3410 and 3420 or equivalent. 3 hrs. or 2 hrs. and 1 lab. W.

3110 Engineering Materials I (4) Introductory course covering the atomic, crystal, and microstructure of solids with mechanical, physical, and chemical proper- ties of engineering significance. 3 hrs. and 1 lab.

3120 Engineering Materials II (3) Extension of 3110 with emphasis on control of mechanical properties of materials by specific composition, thermal, and mechanical treatment; correlation of resultant proper- ties with service performance. Suggested for mechani- cal, civil, and industrial engineering students.

3130 Engineering Materials III (3) Extension of 3110 with emphasis on control of electrical and magnetic properties of materials by specification of composition, thermal, and mechanical treatment; correlation of resultant properties with service performance. Suggested for electrical engineering students.

3140 Engineering Materials IV (3) Extension of 3110 with emphasis on materials processing, specification, and evaluation. Suggested for mechanical and indus- trial engineering students.

3150 Engineering Materials V (3) Extension of 3110 with emphasis on mechanisms and control of reac- tions of engineering materials with aqueous, non- aqueous, and gaseous environments. Prereq. 2110 or 3110 or Chem. Engrg. 2030. W, S, SU.

3160 Engineering Materials VI (3) Extension of 3110 with emphasis on materials of significance in nuclear engineering, nuclear fuels, nuclear fuels, nuclear fuel materials, and interaction of radiation with solids to produce changes in engineering properties. Suggested for nuclear engineering students.

3170 Engineering Materials VII (3) Extension of 3110 to biomedical applications of materials. Engineering materials in biomedical applications; metals, polymers, and ceramics; prosthetic devices; dental applications; corrosion problems; failure analysis; fabrication. Prereq. 2110 or equivalent.


3220 Diffusion and Annealing (3) Introduction to solid state kinetic phenomenon, diffusion, solutions, dissolu- tion equations and mechanisms, annealing of cold worked structures. Prereq. 3040. W.

3230 Phase Transformations (4) Thermodynamic and structural factors governing binary equilibrium and multiphase systems; theories of precipitation and phase transformations in simple and complex systems. Prereq. 3230. 3 hrs. and 1 lab. S.

3310 Biomedical Applications of Materials for Life Support (3) Properties of selected metallic, nonme- tallic, polymers, and ceramics; methods of fabrication of components; corrosion; applications of prosthetic de- vices to dentistry and surgery. Chemistry 1110- 20-30 or equivalent.
4940 Plastics Fabrication Operations (3) Lecture and laboratory course treating unit operations of plastics industry. Types and mechanisms of operation of machinery used and structure and properties of fabricated parts. Operations include extrusion, co-extrusion, injection molding including structural foam, thermofoming, blow molding, rotational molding, etc. Prereq: Senior standing in engineering or science. S.

GRADUATE

Consult the Graduate Catalog for listing of graduate level courses.

Civil Engineering

Including Environmental Engineering

Professors:

Associate Professors:

Assistant Professors:
R. M. Bennett, M.S. Illinois; E. C. Drum, M.E. South Carolina, P.E.; R. B. Robinson, Ph.D. Iowa State, P.E.

Fred N. Peabody Professor
*Tenure Professor
*Granger Professor
*Condra Professor
**IM Professor

*Space Institute, Tuscaloosa.

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 elective study (27 hours maximum), a student can specialize as primary or secondary areas of study in construction, environmental engineering, geotechnical/materials, structures, 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.

Electives

The department maintains lists of acceptable technical electives and humanities/social science electives at the departmental office. Students must consult these lists prior to registering for elective courses.

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 or 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) Munsuration through the application of surveying techniques; the theory of error and 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 alignment of transportation routes, specifically covering simple, compound, reverse and parabolic curves and spirals. Earthwork computations. Prereq: 2260.


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, coreq: 4410.


3320 Computer Applications in Civil Engineering (1) Solution of Civil Engineering problems through the use of digital computers. Prereq: Basic Engr. 1410.

3360 Surveying Practice (3) Route surveying procedures. Two 3 hr. labs. Coreq: 2260.

5600 Transportation Planning (3) Emphasis on transportation problem statements and perspectives, both rural and urban; use of the planning process to establish existing travel patterns, modeling of demand, proposing feasible and cost-effective plans, and plan implementation. Prereq: Junior standing.

3610 Transportation Engineering (3) Introductory course on design, construction, maintenance, and operation of various transportation modes, their guideways and terminals. Prereq: Junior standing.

3710 Materials of Construction (3) Physical and mechanical properties of specific construction materials, behavior of materials and structures under load, ferrous and nonferrous metals, cements, concrete, asphalt, and wood. 2 lectures and 1 lab. Prereq Engr, Science Mech. 3311.

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. Pressure and settlement on rock, foundations, stability of slopes in homogeneous clays. Prereq: 4310 and Geology 2610.

4230 Legal and Ethical Aspects of Engineering (3) Legal principles underlying engineering work, laws of
classical and professional and ethical responsibilities. Prereq:

4240 Structural Design (3) Plate girders, composite steel and concrete beams, connections and details, and design of reinforced concrete industrial building. Two 3-hr.
periods. Prereq: 3220 and 4410.

4250 Photogrammetry (3) Methods of plotting maps from aerial photographs; stereoscopic plotting instru-
m ents; applications. Prereq: 2360, or Forestry Summer Camp for forestry majors.

4310 Soil Mechanics II (3) The compressibility of fine
grain soils and the theory of time rate of consolidation. Shear
strength of soils. Failure theorems. 2 hrs. lecture and 1 lab.

4320 Seminar (1,1) Selected topics dealing with histor-
ical and modern civil engineering achievements and professional and ethical responsibilities. Prereq:
Senior standing and completion of all junior level non-
effective engineering courses.

4410 Deflections and Statically Indeterminate Structures (3) Deflections of beams and trusses; analysis of indeterminate beams, trusses, bents, and frames. Prereq: 3210.

4420 Analysis of Framed Structures (3) Maximum stresses due to moving loads; uses of influence lines; lateral stability 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 methods and production rates, balancing of equip-
ment, and cost estimates. Prereq: 3710.

4450 Land Surveying (3) Procedures of locating properties; evaluating evidence; procedures to de-
scribe property, to create land divisions, and to prepare plots; laws of land surveying. Prereq: 2260 or equivalent.

4520-20 Advanced Structural Design (3,3) Plastic
design in steel in 4520; design of typical short span steel highway bridges in 4520. Prereq: 3220 for 4510; 3230 and 4110 for 4520.

4540 Computer Utilization (3) Computer use, eco-
nomic justification, and extent of use by industry. Utilization of computers for solution of civil engineering
problems. Prereq: 3320.

4550 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: 3310.

4600 Highway Engineering I (3) Design, construc-
tion, operation, and maintenance of highway facilities; includes integration of system planning and project planning, and cost estimation and construction procedures. Prereq: 2360, 3600 and 3610.

4620 Airport Planning and Design I (3) Emphasis on
airport master planning. Included for consideration on
the air side are runway configuration, capacity, geometrics, and lighting; and on the land side are included terminal layout and design, and ground access systems and parking. Prereq: 3620, 3610.

4640 Traffic Engineering (3) Characteristics of driver,
vehicle, and roadway and their interrelationship; traffic
studies; basic considerations 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 tech-
niques to process of planning, locating, and design of highway facility and on congestive team project. 1 lecture and 2 labs. Prereq: 4600.

4690 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 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, non-destructive con-
crete evaluation testing, use of concrete admixtures. 2 lectures and 1 lab. Prereq: 3710.

4720 Asphalt and Bituminous Concrete (3) Proper-
ties and analysis of asphalt mixes, asphalt design and bituminous concrete. Emphasis on use of asphalt in transportation construction projects. 2 lec-
tures 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 management and design of 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, col-
umns, 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 Man-
agement (3) Design process and systems engineer-
ting concepts within civil engineering context; discus-
sion of the role of decision maker and use of optimal principles of engineering planning. Prereq: Computer Science 3150.

4910 Special Topics (1-3) Topics relating to recent
developments and current practice in civil engineering through research or self-study. Prereq: Consent of indi-
vidual instructor and approved by department head. May be repeated.

GRADUATE Consult the Graduate Catalog for listing of
graduate level courses.

Environmental Engineering (344)

3120 Hydraulics (3) Application of basic and de
developed principles of hydraulics. Flow measurement; flow in closed conduits; uniform and nonuniform open
channel flow; pumps and turbines; basic hydrodynam-
ics; flow similitude and models. Two lectures and one 3-hr. lab. Prereq: Engr. Mech. 3110.

3330 Elementary Hydrology (3) Elements of hydrolo-

4520-20 Advanced Structural Design (3,3) Plastic
design in steel in 4520; design of typical short span steel highway bridges in 4520. Prereq: 3220 for 4510; 3230 and 4110 for 4520.

4540 Computer Utilization (3) Computer use, eco-
nomic justification, and extent of use by industry. Utilization of computers for solution of civil engineering
problems. Prereq: 3320.

4550 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: 3310.

4600 Highway Engineering I (3) Design, construc-
tion, operation, and maintenance of highway facilities; includes integration of system planning and project planning, and cost estimation and construction procedures. Prereq: 2360, 3600 and 3610.

4620 Airport Planning and Design I (3) Emphasis on
airport master planning. Included for consideration on
the air side are runway configuration, capacity, geometrics, and lighting; and on the land side are included terminal layout and design, and ground access systems and parking. Prereq: 3620, 3610.

4640 Traffic Engineering (3) Characteristics of driver,
vehicle, and roadway and their interrelationship; traffic
studies; basic considerations 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 tech-
niques to process of planning, locating, and design of highway facility and on congestive team project. 1 lecture and 2 labs. Prereq: 4600.

4690 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 evaluation of design, 1 lecture and 2 labs. Prereq: 4620.

4710 Portland Cement Concrete Mix Design (3) Properties and tests of portland cement concrete,
Graduate assistantships and scholarships are available for outstanding students. Graduate assistants may obtain the master's degree in one calendar 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 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.


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. Stability analysis of circuits containing sinusoidal sources of more than one frequency. Prereq. 2020; Math 2850 concurrently. 3 hrs. including biweekly lab. E.

3010 Basic Field Theory (3) Forces between charged, electric and magnetic fields. Gauss' law and divergence, potential and line integrals, material bodies. Polarization, electric potential, fixed and variable electric fields. Relativistic invariance, electric energy, and dynamic potentials. Prereq. Math 2000. E.


3060 Optical Systems (3) Propagation of waves in transmission lines and in other guiding systems. Impedance and reflectance analysis of waves, standing wave and travelling wave measurements. Introduction to impedance matching, transmission line filtering, microstrip circuit construction, graphical and computer aided design methods. 3 hrs. including bi-weekly lab. E.

3070 AC Power (3) Magnetic circuits, iron cored coils; transformers, construction, calculation of performance from the equivalent circuit, parameters for the equivalent 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. Prereq. 2030, Physics 2310. Includes bi-weekly lab. E.

3900 Energy System Operation (3) Power system component modeling and system structure. Basic analysis techniques, network theories, load flow, transient stability, faults, and system protection. Prereq. 3060. E.


3110 Basic Electrical Engineering—Circuits and Fields (3) For non-electrical engineering majors. Prereq. Math 2860, Physics 2310-20. 3 hrs. including biweekly lab. E.

3120 Basic Electrical Engineering—Electronics (3) For non-electrical engineering majors. Prereq. 3110. 3 hrs. including biweekly lab. E.

3130 Basic Electrical Engineering—Machinery (3) For non-electrical engineering majors. Prereq. 3110. 3 hrs. including biweekly lab. E.

3180 Logic Design of Digital Systems (3) Introduction to boolean algebra and design of combinational circuits. Presents 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. Prereq. 2010, Computer Science 3160 or 2710. (Same as Computer Science 3180). E.

3190 Plasma (3) Engineering applications of physical electronics, plasma effects and devices. Topics include electrostatic precipitators and plasma light sources, laser operation, plasma (diode lasers, gas lasers, and solid state), semiconductors (diode, transistor, and field-effect), and MHD, controlled thermonuclear, and other technical applications of advanced plasma systems. Prereq. Physics 2310-20. 3 hrs. including biweekly lab. E.

3720 Linear Systems Analysis (3) Steady-state and transient response; low-frequency, gain-phase, and polar plots; block diagram transformation; signal flow graphs; analogous systems, properties of second order systems; introduction to feedback theory; stability criteria. Prereq: 3010 and Math 3150; coreq: 3180. 3 hrs. including occasional labs. E.

4010 Basic Electronics I (3) Band theory fundamentals; theory and applications of p-n junctions; simple power supplies; theory of operation of field-effect transistors and applications. Prereq. Coreq. 2030. 3 hrs. including project laboratory. E.

4200 Basic Electronics II (3) Physical operation of bipolar transistors and vacuum tubes with applications in basic amplifiers. Integrated circuit fundamentals. Prereq. 3110. 3 hrs. including project laboratory. E.

4360 Basic Electronics III (3) Frequency and transient response of op-amp transistor amplifiers. Fundamentals of integrated-circuit operational amplifiers and applications in wideband amplifiers, operational amplifiers. Basic digital switching circuits. Prereq. 3260. 3 hrs. including project laboratory. E.

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 do-as-dc inversion and energy storage. Prereq. 3190, 3030.

4080 Microwave Circuits and Electronics (3) Scattered wave description of circuits, to include isolators and amplifiers, couplers and power dividers, circulators, phase shifter, microwave and millimeter wave systems, Power generation and amplification by vacuum devices and by solid state (broad band and junction) devices. Microwave wave sharing, filtering and multiplexing. Prereq. 3060. 3 hrs. including bi-weekly lab. E.

4090 Propagation II (3) Metal tube, dielectric rod, and stripe waveguides. Waveguide resonators and other loading components. Design of structures utilized for microwave power transmission and for microwave integrated circuits. Prereq. 3060. 4 labs.

4100 Digital Communications Systems (3) Principles of pulse and digital communication systems. Sampling, modulation and detection, sampling and position modulation methods. Quantization, coding, and pulse code modulation. Generalized digital signals and modulated circuits, including binary delta, adaptive delta, delta-sigma, and delta PCM systems. Prereq. 3190.

4210 Introduction to Artificial Intelligence (3) (Same as Computer Science 4210.)

4370 Introduction to Feedback System Design (3) Mathematical formulation of control systems; steady-state error and error constants; root-locus methods; optimum gain adjustment; compensation networks; introduction to compensation. Prereq: 3720. Lab optional.

4381 Introduction to Applied Modern Control Theory (3) Project-oriented course stressing applications of control theory. Topics include state-space representation of systems; controllability and observability; minimum principle, dynamic programming and the Hamilton-Jacobi equation for deterministic systems; optimal linear systems design with quadratic criteria; pole placement and observers for linear systems; stability theory. Prereq: 3720. Computer Science 3150, Math 2860 and 4120.

4391 Introduction to Applied Optimal Estimation (3) A project-oriented course stressing applications of optimal estimation theory. Course topics include: the state-space representation of systems, probability theory and stochastic processes, uncertain systems, least squares estimation, Kalman filtering, the Kalman filter. Prereq: Electrical Engineering 3720, Computer Science 3150, Math 2860. Math 4120 recommended.

4410 Power System Components and Control (3) Modeling of transmission lines and cables; RLC calculations and losses. Control of reactive and reactive power flows in interconnected power systems; the PF and QV control problems. Prereq: 3900. 3 hrs.


4430 Transmission, Distribution, and Protection (3) Studies in underground and above transmission; consideration of overvoltages and insulation requirements; system protection against faults. Prereq: 3090, 3060. 3 hrs.

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. 3 hrs.

4470 Plasma II (3) Magnetohydrodynamics. Prereq: 3180. 3 hrs.

4480 Plasma III (3) Macroscopic plasma equations, particle orbits, interactions, oscillations, and waves. Prereq: 3190. 3 hrs.


4500 Electro-Optic Detection and Instrumentation (3) Sensitivity, resolution (frequency response) and noise concepts of and practical engineering for both spatial and temporal data (e.g. photographic emulsions). Prereq: Senior standing. 3 hrs.


4570 Electro-Acoustics (3) Wave equation for sound, radiation from pistons, impedance of a piston, loudspeakers, horns, speaker systems, phonograph records, economics of hearing, perception, reproduction, noise reducing systems. Prereq: Senior standing. 3 hrs.

4600 Analog Signal Processing Circuits for Electronic Instrumentation (3) Use of operational amplifiers, instrumentation amplifiers, and other integrated circuits in signal processing. Design example: active filters, amplifiers, attenuators, function generators, active rectifiers, and synchronous demodulators. Analysis of interfacing problems between transistors and active signal processes. Prereq: 3830. 3 hrs. including project laboratory.


4630 Digital System Organization and Design (3) System organization of digital systems including microcomputer and microprocessor architectures and computers. Characteristics of ALU and CPU structures, storage systems (RAM, ROM, and PROM building blocks), input/output systems. Computers. Control Unit organization to include serial-parallel modes of operation, synchronous-asynchronous time sequencing, and microprogramming and program 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. 3 hrs.

4680 Electric Amplifiers (3) Feedback amplifier principles. Wideband linear amplifiers. Audio and radio-frequency power amplifiers. Prereq: 3830, 3720. 3 hrs. including project laboratory.

4690 Communications Electronics (4) Receiver and transmitter design. Prereq: 3040, 3830. 3 hrs. including project laboratory.

4700 Digital Integrated Electronics (3) Comparator, logics, flipflops, registers, counters, memories, analog switches, A/D and D/A conversion, clipping, clamping, and sweep circuits. Prereq: 3830. 3 hrs. including project laboratory.

4740 Integrated Circuits (3) Fabrication and formation 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.)

4750 Synchronous Machines (3) Construction and application of synchronous machines; analysis of performance 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 generalised theory of electrical machines. Prereq: 3090. 3 hrs.

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. 3 hrs.

4800 Hardware-Software Interface in Minicomputer and Microprocessor System Design (3) Minicomputer and microprocessor interface design. Hardware/software trade-off, optimization of interrupts. Telecommunications. Project oriented, contract course. Compilation of two projects, one utilizing a minicomputer and the other a microcomputer, are minimal course requirements. Prereq: 3180. 3 hrs.

4810 Discrete-Data Systems (3) Introduction to analysis and design of discrete data control systems using frequency domain and time domain digital filtering techniques; application of digital computers in closed-loop feedback systems. Prereq: 3720. 3 hrs.

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 coding, storing, 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 Engr. 1410, Computer Science 1510, 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 Consult the Graduate Catalog for listing of graduate level courses.

Engineering Science and Mechanics


1Space Institute, Tullahoma

BACHELOR OF SCIENCE PROGRAM

The curriculum in engineering science provides students with an opportunity for education with breadth in engineering science, mathematics, and physical (or biological) science. Such a program will prepare students for further study in engineering science and research, professional education at the M.S. level, or additional graduate study leading to the master's or the doctoral degrees. The curriculum will provide students a broad engineering education which permits a strong emphasis on engineering principles and basic science.

In the first two years students in the engineering science program study engineering, science, and mathematics. The engineering science program in the upper-division years is essentially an elective curriculum which can provide for those special
interests of students that cannot be accommodated in other programs. Examples of special interest elective groups presently available in the engineering science program are biomedical engineering, engineering mechanics, engineering analysis and synthesis, environmental sciences, engineering materials, and non-destructive evaluation. Other elective groups are currently being developed and will be available in the future.

The biomedical engineering elective group provides the basic background for an engineer to contribute to the fields of biology and medicine. It is designed as the design of research and diagnostic equipment, the development of artificial organs, and the application of the engineering sciences to further the basic understanding of biological systems. With some modifications, the program can emphasize other areas such as the use of computer systems to automate hospital operations, to analyze medical data, and to contribute to the broad area of health care delivery systems. Interested and qualified students may choose to use this program as a background for graduate study in engineering or the life sciences. The program includes the courses required for entrance into most medical schools, including The University of Tennessee Center for the Health Sciences in Memphis.

The engineering mechanics elective group focuses on analytical and experimental methods used in investigating the interaction of forces and matter. It is designed especially to develop engineers capable of engaging in research and development in industrial and governmental research laboratories. Because such preparation involves emphasis on the link between the basic sciences and engineering fundamentals, the engineering mechanics elective group provides a good theoretical background for students wishing to pursue engineering graduate studies.

The engineering analysis and synthesis elective group affords a concentration on the application of such mathematical techniques as numerical analysis and simulation for the solution of practical engineering problems. As such, heavy emphasis is placed on the use of digital computers.

The environmental sciences elective group introduces the student to some of the areas of knowledge and some of the basic skills involved in engineering efforts aimed at solving environmental and ecological problems. This program gives the necessary background in both stress/structural analysis for a higher level of competence in this specialty during professional practice or through formal graduate study.

The engineering materials elective group provides background in the use of materials in the solution of engineering problems. This includes the selection of the proper materials to support the anticipated loads and consideration of the environmental conditions that are expected to exist during the design life of the system. There is a special need in industry for individuals with background in both stress/structural analysis and materials properties. The engineering materials elective group provides the student an opportunity to acquire this background.

The non-destructive evaluation elective group provides background in the application of non-destructive techniques for evaluating material properties and determining material flaws. Demand for this background is increasing in high technology industries such as the nuclear industry. Techniques studied include ultrasonics, X-rays, dye penetration, photoluminescence, and eddy current methods.

The basic engineering sciences curriculum provides an opportunity to study significant blocks of the engineering science areas recognized by the American Society for Engineering Education. (1) Mechanical and thermal mechanics; (2) electrical science, electric and magnetic fields, circuits, and electronics; (3) thermodynamics and statistical mechanics; (4) materials science; (5) information science; (6) transfer and rate processes such as heat, mass, and momentum transfer. Other modern engineering fields which may be studied in the engineering science option are the space sciences and the environmental sciences. It is not expected that a student will study all the engineering sciences but will structure a course plan to provide depth in some of the engineering sciences.

Because of the large number of elective courses to be selected in the engineering science degree program, faculty advising plays an essential role in the process of developing the student's course of study. Before the end of the sophomore year, students in the engineering science program are required to develop, in concert with a faculty advisor, a statement of objectives and a course plan for the upper-division years. This course plan must be filed with the Office of Admissions and Records before students with more than 90 quarter hours can register for courses, and before a student's senior standing sheet can be prepared.

Masters of Science and Doctoral Programs

Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy with a major in engineering science are available to graduates of recognized curricula in engineering, mathematics, or one of the physical or biological sciences. Program options include solid mechanics, fluid mechanics, biomedical engineering, and other engineering sciences. In the biomedical engineering science option, interdisciplinary programs are arranged to meet individual needs or interests. Each applicant will be advised as to any prerequisite courses before entering a program; the student's program of study must be approved by his or her advisory committee, and must comply with the requirements of the Graduate School. The student's major professor may be selected from a department other than the Department of Engineering Science and Mechanics.

The flexibility and interdisciplinary aspects of the program options are intended to be of particular interest to professional engineers currently employed in research, development, or design activities and whose interests in continuing education (either full-time or part-time) lie at one of the interfaces between science and engineering, or can best be met by interdisciplinary study in engineering. The department's course offerings and research activities are also intended to meet the needs of students who seek preparation for employment in engineering areas requiring specialization in mechanics, or in related interdisciplinary studies such as biomechanics.

General policies of the Graduate School relating to admission, residence, examinations, and research are described in the Graduate Catalog.

Engineering Science and Mechanics (335)

2720 Dynamics (3) Absolute and relative kinematics of rigid bodies; kinetics of rigid bodies using Newton's laws, work-energy, and impulse momentum. Prereq: Basic Engr. 1320, Math 2640.

3010 Seminar (1) Discussions of engineering professionalism. Field trips and career planning. S/NC.

3110-20 Fluid Mechanics (3,3) Basic laws of fluids, effects of viscosity and compressibility; empirical analysis. Navier-Stokes equations; boundary-layer concepts; potential flow. Must be taken in sequence. Prereq: 2720 or 3700, Math 2840, coreq for 3110; Mech. Engr. 3511 or equivalent.

3310-20 Mechanics of Materials (3) Concepts of stress and strain, stress strain relations, and Mohr's circle; stresses and displacements in thick-walled pressure vessels, shafting, determinate, indeterminate, and nonhomogeneous beams; column theory. Must be taken in sequence. Prereq: Basic Engr. 1310, coreq. Math 2840.

3311 Mechanics of Materials (4) Concepts of stress and strain; stress strain relations and Mohr's circle; static analysis of members; area moment of inertia; stress and displacement analysis of axially-loaded members; torsion; bending. Not for departmental graduate credit. Prereq: Basic Engr. 1310, coreq. Math 2840.

3410 Introduction to Biomedical Engineering (4) Introduces the facets and opportunities of biomedical engineering, and provides basic terminology and background knowledge for further courses in the field. Subjects include anatomy, physiology, biomaterials, biomechanical models of human systems, etc. Coreqs: Math 2840 or consent of instructor.

3420 Introduction to Clinical Engineering (3) Engi- neering applications in the clinical/hospital setting; description, analysis, and design of health care delivery systems; hospital organization and structure; clinical use of biomedical equipment; principles of safety engineering in the hospital and applicable codes, standards, and regulations. Prereq: 3410, Physics 2320, or consent of instructor.

3510 Materials of Engineering (3) Mechanical properties of engineering materials; behavior of materials under load. 3 hrs. or 2 hrs. and 1 lab. Prereqs: 3311 and Met. Engr. 2110 or 3110.

3700 Dynamics (4) Kinematics of rigid bodies; mass moments of inertia; coulomb friction; kinetics of rigid bodies using force, mass, acceleration, work-energy, impulse-momentum. Must be taken in departmental graduate credit. Prereq: Basic Engr. 1320, Math 2840.

3710 Intermediate Dynamics (3) Three-dimensional dynamics of particles and rigid bodies; dynamics of bodies with varying mass, central force motion; Lagrange's equations. Prereq: 2720 or 3700, Math 2850.

4010 Project in Design and Development (4) In- vestigation, design, and report of an engineering science project. Prereq: Senior standing and a grade of C or better in 3311, 3700, and 3110.

4020 Computer - Aided Design (3) Use of computer graphics and analysis programs for design of selected systems, structures, and components. Evaluation of design alternatives. Prereq: 4810 or consent of instruc- tor.

4011 Project in Design and Development (3) In- vestigation, design, and report of an engineering science project. Prereq: Senior standing.

4520 Biomedical Fluid Mechanics (3) Discusses objective, review foundational and present developments in biomedical fluid mechanics. Properties of human blood and blood vessels, determinants of cardiac performance, analysis of blood flow in arteries and veins in both normal and abnormal conditions, clinical aspects of circulation, biomechanics, microcirculation. Applications to areas of hemolysis, thrombosis, and fluid dynamics of
heart assist devices. Prereq: 4500 or a course in fluid mechanics or consent of instructor.

4530 Biomechanics (3) Discusses objectives, review foundations, and present developments in areas of biomechanics of living issues, biomechanics of injury and prosthesis, material compatibility of prosthetic devices, and biomechanical problems related to impaired health. Prereq: 3311 or 4500 or consent of instructor.

4540 Fracture-Safe Design (3) A critical review of mechanical properties of materials that are indicative of fracture resistance, including transition temperature, R-curves, fracture stress intensity factors, and J-integrity. Use of these properties in design. 3 hrs. or 2 hrs. and 1 lab. Prereq: 3311 and Met. Engr. 2110. (Same as Met. Engr. 4540.)

4550 Design of Artificial Internal Organs (3) Study of the design, development, and evaluation of artificial internal organs including Federal regulation and ethical considerations. Review of currently available devices and new developments. Prereq: 3110, 3410, Math 2850.

4580 Principles of Non-destructive Testing (3) (Same as Physics 4580.)

4610 Experimental Stress Analysis (3) Basic concepts: theory, techniques, and instrumentation of resistance strain gauges, theory and techniques of brittle coating methods, introduction to other stress analysis methods. Prereq: 3311, Elec. Engr. 2020 or 3110. 2 hrs. and a 3-hr. lab.

4620 Dynamic Data Acquisition (4) Instrumentation of mechanical systems, data transmission, systems and responses: signal conditioning; oscillograms, oscilloscopes, and magnetic tape recording; telemetry and data transmission; data processing. Prereq: 3311, 4719, Elec. Engr. 3120. 3 hrs. and a 3-hr. lab.

4630 Introductory Photomechanics (3) Introduction to photoelasticity, photoelastic coating method, Moiré method, interferometry, and holography. Prereq: 3311, Physics 2320. 2 hrs. and a 3-hr. lab.

4710 Fundamentals of Vibration (3) Free and forced vibrations of damped and undamped lumped parameter systems; energy methods. Prereq: 2720 or 3700, Math 2860.


4810-20 Engineering Analysis (4,3) Integration of fundamental physical laws and mathematical methods of analysis with emphasis on application to realistic engineering problems. Prereq: 3110, 3311, and Computer Science 3150.

4850 Elementary Structural Matrix Methods (4) (Same as Architecture 4850 and Civil Engineering 4850.)

4910-20 Special Engineering Science Topics (3,3) Problems related to recent developments and practice. Open to juniors or seniors with consent of instructor. May be repeated for credit once.

GRADUATE Consult the Graduate Catalog for listing of graduate level courses.

Engineering Physics

Professor W. M. Bugg (Head); Physics staff as shown on page 19.

The curriculum in engineering physics is designed to fulfill the educational requirements for professional work in various fields of applied science which are based upon a thorough knowledge of physics. The first two years are concerned with fundamental courses in engineering, science, and mathematics. In the upper division, the curriculum allows some choice of courses in engineering and in physics depending upon the interest of the student. The undergraduate program is a complete, professional program, equipping the student for entry into a variety of work in industry and research. The program also leads to graduate work in either physics or engineering.

The courses in the engineering physics curriculum are shown in tabular form on page 121. Descriptions of the physics courses are found on page 194.

Industrial Engineering (556)


Associate Professors: E. L. DePorter, Ph.D. VPI & SU; D. H. Hutchinson, Ph.D. Georgia Institute of Technology, P.E.; E. Kirby, Ph.D. Tennessee.

Assistant Professors: M. K. Goodman, M.S. Tennessee, P.E.; J. C. Hung, M.S. Ohio State.

UNDERGRADUATE

The undergraduate curriculum in industrial engineering provides a strong background in both fundamental engineering principles and the analytic methods necessary for solving the multi-faceted problems associated with the production, maintenance, and delivery of goods and services. In particular, this curriculum emphasizes the knowledge and skills necessary to design integrated systems of people, materials, equipment, and energy wherever they are found, such that the overall system functions at an optimal level and such that the needs of the human components of the system are adequately met.

This curriculum, which is built upon a strong background in mathematics and statistics, includes fundamental course work in all of the engineering sciences, introductory economics and accounting, and training in fundamental human factors which influence engineering design, the economic analysis of alternative design choices, quality control techniques, manufacturing concepts and materials, production and inventory system design and control, material handling systems and facilities design, the mathematical modeling and simulation of complex systems, and the design and installation of information acquisition and control systems. The technical and non-technical electives further allow the students to specialize in an area(s) which meets particular needs.

The solid, broad base in engineering, management, aerospace systems, research and non-technical electives further allow the student for entry into a variety of work plus a 3-hour project is available.

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

MASTER OF ENGINEERING PROGRAM

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

2310 Seminar (1) Introduction to the industrial engineering profession, its history, and current trends. Plant trips and lectures by the faculty. Prereq: Sophomore standing.


2330 Computer Applications and Analysis Methods in Industrial Engineering (3) Use of digital computer in problem solving involving matrix operations, deterministic and stochastic simulations, large scale data base manipulation, and general optimization techniques. Prereq: 2320 and Math 1660.


2340 Quality Control (3) Application of statistical methods to control industrial processes, and materials and parts, and techniques of inspection. Prereq: 2340.

3510 Introduction to Operations Research I (3) Introduction to methodology of operations research and the application of operations research to industrial problems. Topics covered include statistical inference, decision theory, and queuing theory. Prereq: 3430 and Computer Science 3150.

3520 Introduction to Operations Research II (3) Introduction to mathematical programming includes classical optimization theory, linear programming (with emphasis on the simple method), the transportation problem, and the assignment problem, and dynamic programming. Prereq: Computer Science 3150 or consent of instructor.


3600 Motion and Time Study (3) Design of work methods, including analysis, improvement, timing of work, and determining standards. Laboratory work included. For non-industrial engineering students. Prereq: Junior standing.

3610 Human Factors in Work Design I (3) Human capabilities and limitations which must be reflected in work place layout, working environment specifications,
tool, equipment, and vehicle design; and in design of industrial communication-control systems. Prereq: Junior standing in College of Engineering consent of instructor.

3620 Work Methods and Design (3) Job analysis, evaluation, design of wage structures, design of work place layouts, flow charting, activity chart analysis, and other related procedures. Laboratory work included. Prereq: 2310 and 3610.

3530 Work Management (3) Use of work measurement tools such as time study, predetermined time systems, work sampling, historical data analysis. Construction of time formulas, development of standard time data, use of learning curves, and design of wage incentive systems. Laboratory work included. Prereq: 3620 and Statistics 3450.


4060 Production Systems Planning and Control I (3) Theory and application of forecasting, capacity and materials planning, production systems design and inventory control. Prereq: 3510-20.

4070 Production Systems Planning and Control II (3) Theory and application of master scheduling, materials requirements planning systems, lot sizing and sequencing, and distribution requirements planning. Prereq: 4060.

4080 Forecasting Methods in Industrial Engineering (3) Application of technological forecasting techniques to industrial engineering problems. Includes moving-average smoothing, exponential smoothing, and polynomial regression models, autocorrelated time-series analysis, Delphi methods, and other select industrial forecasting methods. Prereq: 4060.

4150 Project Control with CPM and PERT (3) A study of project planning and control based primarily on "critical path" techniques, including resource allocation, time-cost trade off-algorithms, multi-project control, and computer programs. Prereq: 3430.


4200 Production Facilities Design (4) Design of production facilities including materials handling, plant layout, service areas, inventory control applications, and production control procedures design. Prereq: 3520, 3510-20, 4060, 4520.

4230 Scheduling Systems (3) Performance measures for job shop and flow shop scheduling, including both static and dynamic conditions, as well as techniques of generating production schedules. Deterministic and probabilistic dispatching conditions. Prereq: 3520.

4250 Work Measurement Applications (3) Application of learning curves, queuing theory, standard data methods, and incentive systems to the design of industrial work situations. Prereq: 3630.

4310 Seminar (1) Discussions, lectures, and trips to unify student's educational experience. Prereq: Senior standing in industrial engineering.


4530 Case Studies in Engineering Economy (3) Extension of basic engineering economics principles to actual problems faced by competitive firms and regulated industries taken from literature form basis of classroom discussion. Out-of-class assignment involves working with local companies to evaluate alternative courses of action, leasing versus cash purchases, equipment replacement studies, energy source economies, etc. Prereq: 4520.

4540 Industrial Development (3) Factors other than mechanical or chemical which enter into successful establishment of manufacturing enterprise. Cost and location studies and market analysis to determine the commercial feasibility of new plants or projects.

4590 Simulation (3) Generation of outcome of complex random process by computer. Models of complex systems using available simulation languages. Simulation as design tool in industrial systems. Prereq: 3430 and Computer Science 3150.

4600 Predetermined Time Systems (3) Work design and measurement techniques as a predetermined time system such as Methods Time Measurement, Basic Motion Time-Study, or Work Factor. Theory and application. Prereq: 3530.

4610 Human Factors in Work Design II (3) Human capabilities and limitations affecting work place layouts, working environments, design of tools and equipment, and communications and response in man-machine systems. Prereq: 3660, 3630, or consent of instructor.

4830 Health Systems Engineering (3) Hospital management systems and means by which they may be improved through application of modern industrial engineering principles and techniques. Prereq: 3620.

4840 Industrial Plant Problems Analysis (3) Industrial problems, application of industrial engineering, field assignment in local industry, problem definition, analysis, and presentation. Prereq: 3630, 3450, 3510, 3520, 4520, 4600.

4870 Mini-Computer Applications in Industrial Engineering (3) Introduction to computer hardware and man-computer interfaces; emphasis on small computers as an element of larger system: applications and limitations of small computers in solving industrial engineering problems. Prereq: Senior standing.

4910-20-30 Special Industrial Engineering Topics (3,3,3) May be repeated for credit. Prereq: Consent of instructor.

4950 Industrial Safety (3) Development of organizations and programs for prevention and control of accidents with emphasis on OSHA Rules and Regulations. Prereq: Senior standing.

GRADUATE
Consult the Graduate Catalog for listing of graduate level courses.

Mechanical and Aerospace Engineering


Associate Professors: R. V. Armilli, Ph.D. VPI & SU; S. E. Becker, Ph.D. North Carolina State, P.E.; C. W. Brown, M.S. Tennessee; P.E.; S. 0. Smith, Ph.D. University of Tennessee; J. W. White, Ph.D. Stanford.

Assistant Professors: P. E. George, II, Ph.D. Purdue

Space Institute, Tullahoma.

Tennessee Professor: On leave

BACHELOR OF SCIENCE PROGRAM
Separate, complete curricula are offered in aerospace engineering and mechanical engineering; however, the first two years of these curricula are identical. During the first two years, the curricula provide for training and study in the basic sciences of physics, mathematics, chemistry, and engineering common to these fields. The third year of both programs continues with the development of the particular engineering sciences of the aerospace and mechanical engineering fields. In the senior year an opportunity is provided for the student to apply this fundamental knowledge to mechanical and aerospace engineering problems. Both curricula are arranged with flexibility in the upper-division years to permit emphasis on preparation for graduate study or technical employment.

Aerospace engineering has scientific foundations close to those of mechanical engineering. The aerospace engineer, however, devotes attention particularly to the research, development, design, testing, and production of aerospace vehicles—aircraft, spacecraft, missiles; auxiliary systems—heating, cooling, guidance, control, and propulsion systems—jet engines, turbo-jets, ramjets, and rockets. Emphasis in the senior year is directed toward these topics and the program culminates in a major aerospace design project.

Mechanical engineering has its foundation in the basic sciences and requires an understanding of such areas of applied science as solid and fluid mechanics, thermodynamics, heat transfer, structures, vibrations, mechanical design, manufacturing processes, and instrumentation in order to resolve the complex engineering problems of the real world.

In the mechanical engineering curriculum the student, with the aid and approval of an advisor, must select a senior year program of mechanical engineering and technical electives. The following areas of concentration are available:

Energy. A study of energy conversion systems and the laws governing energy transformation. This option includes the design and analysis of conventional and future power generating systems utilizing various energy sources. The central courses are Mech. Engr. 4140-50-60.

Environment. A study of the systems which control the environment within enclosed spaces. The program includes the design and analysis of air conditioning, refrigeration, and heat pump systems. This option emphasizes design and analysis of HVAC systems, energy conservation, noise control, and the program culminates in a major environmental design project.

Manufacturing. A study of manufacturing methods and production processes common to mass production industries. The program includes the selection of processes, design of tooling and fixtures, and design and analysis of the total manufacturing system. The central courses are Mech. Engr. 4621-22-23-24 with related courses in metallurgy.
Machine Design. The study and application of the principles of mechanics, materials, and manufacturing processes to the design and analysis of machine elements, machines, and structures. The central courses are Mech. Engr. 4660 and Aero. Engr. 4250-60.

Propulsion. The study of propulsion devices for ground vehicles, aircraft, and spacecraft. This course covers the analysis and design of internal combustion engines, gas turbines, jets and rocket engines using conventional and non-conventional fuels. The central courses are Mech. Engr. 4610 and Aero. Engr. 4250-60.

Aerospace. The study of aircraft and spacecraft including the mechanics of flight and related systems and propulsion devices. The course includes the design and analysis of a variety of aerospace vehicles and systems. The central courses are Aero. Engr. 4240-50.

PROGRESSION TO UPPER-DIVISION PROGRAMS

Progression to Upper Division Programs is competitive and is based on departmental capacity. Factors considered include overall grade point average, performance in selected lower division courses, and evidence of satisfactory and orderly progress through the prescribed curriculum.

Full Status: A Lower Division student in the department may apply for progression to Upper Division Programs after completing 81 quarter hours of Lower Division engineering curriculum course work with an overall GPA of at least 2.4.

Provisional Status: Students who have completed 81 quarter hours of Lower Division engineering curriculum course work with an overall GPA between 2.0 and 2.4 may apply for provisional status. The granting of Provisional Status is based on the availability of space in departmental programs after Full status students have been accommodated. Provisional Status students are required to demonstrate their abilities to perform satisfactorily in Upper Division courses by attaining a minimum GPA of 2.0 in at least 12 hours of 3000 level required engineering courses (including 9 specified hours in the department). Further progression to upper division courses is dependent upon this minimum level of performance.

Any student with an overall GPA below 2.0 will not be admitted to mechanical or aerospace engineering courses with the exception of ME and Aero Engr. 2040.

Students who have not been progressed to an Upper Division Program will be dropped from departmental class rolls.

TRANSFER STUDENTS at the Upper Division level are admitted on a Provisional Status basis only. Any student presenting more than 42 hours of Lower Division engineering curriculum course work by Transfer Credit is considered a Transfer Student.

LOSS OF FULL STATUS

Students who progress to Upper Division Programs are expected to maintain an overall GPA of at least 2.0 and a concurrent GPA of at least 2.0 in departmental courses. Failure to maintain these minimum levels of performance will result in a review of the overall progress of the student through the prescribed curriculum and probable loss of Full Status.

GRADUATE STUDY PROGRAMS

Graduate programs leading to the degrees of Master of Science, Master of Engineering, and Doctor of Philosophy with specialization in mechanical engineering or aerospace engineering are available to graduates of recognized undergraduate curriculum in mechanical or aerospace engineering and to graduates of other curricula who satisfy the necessary prerequisite courses. The general requirements for advanced degrees are summarized in the Graduate Catalog.

Mechanical Engineering (650)

2040 Introduction to Mechanical Engineering (1) Presentation and discussion of topics related to mechanical engineering. S/NC. F, W, S.

3040 Seminar (1) Presentation and discussion of topics related to mechanical engineering. Prereq: Junior standing. S/NC.


3311 Engineering Thermodynamics (3) Energy and laws governing energy transformations; thermodynamic principles. Prereq: Basic Engr. 1330, Chem. 1130, and Math 2840, E.

3211-30 Engineering Thermodynamics (2,3) Properties of gases and gas mixtures; chemical reactions; equilibrium; applications to mechanical engineering problems. Prereq: 3111 and 3211 respectively. E.

3410 Fluid Flow (3) Development of continuity, momentum, and energy principles for fluid systems; applications to mechanical and aerospace engineering problems. Prereq: Math 2550; coreq: 3311. F, W, S.


3520-30-40 Thermal Sciences (3,3,3) Fundamental principles of thermodynamics and transport phenomena as applied to engineering design. For non-departmental majors. To be taken in sequence: Prereq: Math 2850 and Basic Engr. 1330, E.


3620 Mechanics of Machinery—Dynamics (3) Applications of mechanics of work, energy, and impact to machinery. Force analysis of mechanisms, balancing, gyroscopic effects, fly-wheels. Prereq: 3610, E.

3630 Mechanics of Machinery—Vibrations (3) Free and forced vibrations of single and multiple degree vibrating systems. Balancing of machinery. Prereq: 3620, 3910, E.


3660 Manufacturing Processes (3) Selection of processes as related to the design of machine parts. Casting, hot and cold forming, metal removal, and welding. Prereq: Math 2680; coreq: 3311 or AE 3620. E.

3680 Manufacturing Processes (3) Selection of processes as related to the design of machine parts. Casting, hot and cold forming, metal removal, and welding. Prereq: Math 2680; coreq: 3311 or AE 3620. E.

3910 Engineering Analysis (3) Advanced analysis techniques for problems of aerospace and mechanical engineering. Emphasis on approximate methods. Prereq: Computer Science 3150, E.

4010 Thesis (3) Problem investigation and report. Prereq: Senior standing. E.

4140 Energy Conversion Systems (3) Operating and design characteristics of energy conversion systems including new technology development; selected di-rect conversion techniques. Prereq: 3330; coreq: 4420.

4150 Energy Conversion Systems (3) Fossil fuel energy conversion with emphasis on coal technology. Prereq: 4140, A.

4160 Design of Energy Conversion Systems (3) Synthesis and design of a complete energy conversion system including economic and physical aspects. Prereq: In turn to design effort including formal presentations and design report. Prereq: 4150 and Ind. Engr. 4520.

4170 Turbo-Machinery (3) Basic principles of turbo-machinery; systematic methods of analysis, design, performance evaluation. Prereq: Aerospace Engr. 3511.

4180 Energy Production and Utilization (3) Thermodynamic constraints on energy sources and concepts; energy, and physical properties. Prereq: Senior standing in engineering or consent of instructor. A.

4310 Seminar (1) Discussion of topics related to engineering; includes inspection trips to industrial plants. Prereq: Senior standing. S/NC.

4320 Seminar (1) Formal oral presentations by students on engineering design problems and technical talks. Prereq: Senior standing, W.

4420 Heat Transfer (3) Heat transfer by free and forced convection, heat transfer in phase change, heat exchanger applications. Prereq: 3440, coreq: Aerospace 3511. E.

4450 Lubrication (3) Hydrodynamic theory of lubrication of sliding bearings of Newtonian and non-Newtonian fluids; equations to infinite and finite bearings; numerical and numerical solutions; applications to design. Prereq: 3440, Aerospace Engr. 3511, W.


4511-21 Systems and Controls I and II (3,3) Analytical models of physical systems comprised of combinations of mechanical, fluid, electrical, and thermal components; feedback control systems, transient and frequency response, stability analysis; non-linear control of linear systems; sampled data systems, digital filters. Prereq: 3630 or AE 3620, AE 3511, and Elec. Engr. 3510; coreq: 4471-91. Prereq: for 4511 for 4521, 4511-F, W; 4521-W, S.

4521 Manufacturing Processes (3) Comparison of machining methods; plastic production; metrology. Prereq: 3650 and 3660 or consent of instructor. A.

4522 Tool Design (3) Principles underlying tool and die design, design of high-volume production tools and molds, work holding fixtures. Prereq: 3650-60 or consent of instructor.


4525 Manufacturing Process Engineering I (3) Product specification: dimensional analysis of size and form; tool position and tool orientation; tolerances; and workpiece control for production to tolerance. Prereq: 3660 or Ind. Engr. 4460.

4531 Energy Methods in Mechanical Design (3) Application of strain energy principles in complex...
4660 Materials and Manufacturing Process (3) Selection of materials in design process, emphasizing relationship between stress and strain analysis, material properties, fatigue strength, failure, components, springs and sheeting, selection of sleeve and rolling element bearings. Prereq: 3650, 3660.


4710 Thermal Environmental Systems (3) Vapor compression and absorption cycles; heat pump systems; moist air processes; psychrometric processes. Prereq: 3330, 3440. A.

4720 Thermal Environmental Systems (3) Design analysis of air conditioning towers and extended surface coils; solar radiation; building heat transmission; physiological effects. Prereq: 4420, 4710.


4740 Solar Energy Utilization (3) Nature and availability of solar radiation; review of selected heat transfer topics pertinent to solar energy collection and use; design analysis of solar energy collectors and method of storage; selected applications. Prereq: 3321, 4420, or consent of instructor. A.

4770 Thermal Engineering I (3) Analysis of selected topics in thermal engineering including modeling of thermal systems and components; energy resources, environmental impact, combustion, turbomachinery, hydrodynamic lubrication. Prereq: 3330 and 4420. F, W.

4780 Thermal Engineering II (3) Analysis of selected topics in thermal engineering including modeling of thermal systems and components; multi-mode heat transfer, heat exchanger design, and second law analysis. Prereq: 3330 and 4420. W, S.

4791 Thermal Engineering Design (5) Design of a complete thermal-fluid system including economic, technical, and performance factors. Participation in team design effort including formal presentations and design report. Prereq: 4770, 4780, 4511 and Ind. Engr 4520. S.

4810 Internal Combustion Engines (3) Thermophysical phenomena in combustion and propulsion systems. Combustion, detonation; equilibrium; dissociation. Analysis of internal combustion engines using ideal and real fluids. Prereq: 3330, 3440. S.

4910-20 Selected Topics in Mechanical Engineering (3,3) Topics related to developments and practice in mechanical engineering. Prereq: Consent of instructor.

GRADUATE
Consult the Graduate Catalog for listing of graduate level courses.

Aerospace Engineering (018)

2040 Introduction to Aerospace Engineering (1) Presentation and discussion of topics related to aerospace engineering. Prereq: F, W.

3040 Seminar (1) Presentation and discussion of topics related to aerospace engineering. Prereq: Junior standing. S/NC.


3620 Mechanical Vibrations (3) Free and forced vibrations of single and multiple degree vibrating systems, and of rotating machinery. Prereq: 3610 and Mech. Engr. 3810. W.


4110 Aerodynamic Fundamentals (3) Atmosphere, dynamics and thermodynamics of perfect gases, fluid flow types, airflow theory, wing theory, drag. For non-aerospace engineering majors only. Prereq: Consent of instructor.

4120 Aircraft Propulsion and Performance (3) Propellers, propulsion systems for aircraft, static and performance and special performance problems, maneuver, control surfaces, stability, and control. For non-aerospace engineering majors only. Prereq: 4110.

4230 Compressible flow (3) One-dimensional internal flow; shock waves and expansion waves; friction and adiabatic flow. Prereq: 3511 and Mech. Engr. 3321. F.

4240 Low Speed Aerodynamics (3) Potential flow theory; kinematics and dynamics of perfect fluids; analysis and design of aerodynamic bodies. Prereq: 3511 and Mech. Engr. 3910. F.

4230 Viscous Flow (3) Boundary layer theory; laminar and turbulent flow; compressibility effects; numerical solution methods. Prereq: 3511 and Mech. Engr. 3810, 4420. S.


4261 System Design (5) Synthesis and design of a complete thermal-fluid system including economic and technical aspects. Participation in team design effort including formal presentations and design report. Prereq: 4250 and Ind. Engr. 4520. S.

4310 Seminar (1) Discussion of topics related to engineering, industry and aerospace systems. Prereq: Senior standing. S/NC. F.

4320 Seminar (1) Formal oral presentations by students on engineering topics. Evaluations of technical talks. Prereq: Senior standing. W.


4510 Aircraft Performance (3) Introduction to airfoil and wing characteristics, drag; propellers; static performance and maneuver, and theory design of control surfaces; stability. Prereq: 3511. W.

910 Selected Topics in Aerospace Science (3) Current problems in aerospace science; topics in science and engineering required for an understanding of the several areas of aerospace science. Prereq: Consent of instructor.

GRADUATE
Consult the Graduate Catalog for listing of graduate level courses.

Nuclear Engineering (716)

Professors: P. F. Pasqua (Head), Ph.D. Northwestern, P.E. de Souza, Ph.D. Massachusetts; H. L. Dodd, Ph.D. Tennessee; J. B. Fuselli, Ph.D. Georgia Institute of Technology; T. W. Kerlin, Jr., Ph.D. Tennessee; H. G. MacPherson (Emeritus), Ph.D. California (Berkeley); J. T. Mahlezo, Ph.D. Tennessee; R. B. Perez, Ph.D. University of Madrid; H. C. Poland and D. Campbell, Ph.D. Pennsylvania. W. C. Northwheat, P.E.; N. Uckan, Ph.D. University of Michigan.

Associate Professors: E. M. Katz, Ph.D. Tennessee, L. F. Miller, Ph.D. Texas A & M; B. R. Upadhyaya, Ph.D. California (San Diego).

Honorary.

BACHELOR OF SCIENCE PROGRAM

The curriculum in nuclear engineering is designed to provide basic training in many of the fields encountered in the applications of nuclear and radioactive materials. The first two years are concerned with the fundamental courses in engineering, physics, mathematics, chemistry, and English. The last two years encompass scientific and engineering courses equipping the student for entry into a variety of work in industry, research, or graduate studies.

MASTER OF SCIENCE AND MASTER OF ENGINEERING PROGRAMS

A graduate program leading to a degree of Master of Science and Master of Engineering is available to graduates of recognized undergraduate curriculum in engineering and physics. Each applicant will be advised as to the necessary prerequisite courses before entering the program.

The general requirements of the masters' degrees are summarized in the Graduate Catalog.

DOCTORAL PROGRAM

A program leading to the Ph.D. degree is available in nuclear engineering. For details, see the Graduate Catalog.

3210-20-30 Seminar (1,1,1) Presentation and discussion of topics related to nuclear engineering. S/NC.


3150 Dynamics and Controls (3) Systems differential equations; state variables; classical methods; Laplace transform transform. Frequency response, stability, and control. Coreq: 4110.


4110-20 Introduction to Nuclear Reactor Theory (3,3) Nuclear structure; radioactive decay laws; neutron interaction; fission process, chain-reacting systems; diffusion equation including multigroup diffusion theory, neutron systems. First and second laws of thermodynamic systems. First and second laws of thermodynamic systems.

4140 Thermonuclear Systems (3) Fusion reactions; properties of plasmas; plasma containment; plasma dimensions; thermonuclear devices. Prereq: 4110. W. Math 3730; Math 4550.

4210-20 Nuclear Engineering Laboratory (3,3) Radiation detection and counting instrumentation,
counting statistics, half-life and decay schemes, gamma spectrometry, cross-section measurements, analog computation, diffusion properties of neutrons, critical loading experiments, control rod calibration, statistical weight, shielding, xenon poisoning, prompt critical reactor behavior, fission density, and adjoint flux. Prereq: 4110 (or registration therein), or equivalent.


4610-20-30 Reactor Power Systems (3,3,3) Nuclear structure, decay laws, neutron diffusion, time behavior of reactors, heat removal, analysis of reactor power plants; economic, safety, and environmental aspects of nuclear power. Prereq: Math 4610; non-nuclear engineering students only.

4710 Energy Transport (4) Development of differential and integral energy conservation equations; conduction, convection, and radiation heat transfer; application of nuclear reactor fuel elements and heat exchangers. Prereq: 3730.

4720 Reactor Thermal Design (4) Hydrodynamics and heat transfer in boiling systems; boiling crises; fuel element thermal design, steam generator design. Prereq: 4710.

4730 Nuclear Reactor Design (3) First order reactor design, integration with non-nuclear heat transfer and power conversion system, economic evaluation; optimization procedures, description of typical systems. Coreq: 4130.


4820 Reactor Kinetics and Controls (3) Derivation of kinetic equations; basic kinetic parameters; transient response with feedback; control and protective systems. Prereq: 4110.

4840 Nuclear Reactor Safety (3) Presentation of reactor safety concepts and criteria; credible accidents; fission product release and transport; containment systems; accident analysis; engineered safeguards. Prereq: 4120.

4930 Nuclear Fuel Management (3) Discussion of problems associated with processing of nuclear materials; fuel cycle analysis; burn-up calculation. Prereq: 4120.

GRADUATE
Consult the Graduate Catalog for listing of graduate level courses.
College of Home Economics

Nancy H. Belick, Dean
Jay Stauss, Associate Dean, Graduate Studies and Research
Frances E. Andrews, Assistant Dean, Undergraduate Studies

The College of Home Economics is an integral part of The University of Tennessee’s academic program in its three major functions of teaching, research, and extended services. The college ranks among the top two colleges of home economics in the nation in enrollment and first in the number of master’s and doctoral degrees granted. All undergraduate programs of the college are accredited by The American Home Economics Association. Much of the qualitative and quantitative growth of the college is due to its highly qualified faculty and staff who, being aware of the current community problems and needs, have made its programs relevant to the goals and aspirations of today’s students.

Today’s students are seeking professional positions in which they can serve people—individuals, families, consumers—by helping them predict and solve problems arising from the increasingly rapid changes occurring in the society in which we live. The basis of the college’s professional programs is to prepare young men and women to serve the needs of people in their varied environments and different stages of life.

The philosophy of the college is stated best as follows: home economics does seek knowledge that describes and analyzes, but is not content with only studying “what is,” in order to enhance the quality of life and well-being of people and society, the college is concerned also with promoting “what can and should be”.

The college’s mission is twofold: its undergraduate programs prepare students to work with people in a professional capacity so that they make use of what has been learned in serving as professional agents of change; its graduate programs are geared toward research, producing alternative solutions to technical and social problems which are and will be encountered by the people who are to be served.

The University of Tennessee pioneered as one of the first institutions of higher education in the South to offer home economics and has continued to hold a position of leadership. The first class was taught in 1897.

The faculty of the college numbers 60 full-time teaching and research staff. There are three departments with curricula leading to the Bachelor of Science degree: Child and Family Studies; Nutrition and Food Sciences; and Textiles, Merchandising and Design. The undergraduate program in Home Economics Education is offered in cooperation with the College of Education. Approximately 350 courses are offered in these departments. The graduate programs leading to the Master of Science degree were begun in the summer of 1925. Programs for the Doctor of Philosophy degree were initiated in 1960. The Doctor of Philosophy degree program in home economics now includes three options: Interdisciplinary, Food Science, and Nutrition.

Special Resources

Several special programs enhance the offerings of the college: Selected students have the opportunity to study for one quarter at the Child Development Center of the Center for Health Sciences in Memphis or at the Fashion Institute of Technology in New York. Credits earned may be applied toward a Bachelor of Science degree in appropriate curricula of the college.

Model research programs for infant care and preschool day care provide home economics students the opportunity to train for careers as directors of, and teachers in, child care facilities. The need for appropriate child day care facilities staffed with well-trained, competent staff is recognized as one of the most urgent problems of today’s urban society. Opportunities for home economics graduates with special interest in preschool programs are numerous and continue to increase. The Nursery School through Grade Three program, offered jointly with the College of Education, provides certification for teachers in early childhood education.

The U.S. Department of Agriculture’s Textiles and Clothing Research Laboratory is part of the Southern Region Mid-Atlantic Area and was located at The University of Tennessee in 1967. Textiles and clothing researchers collaborate with the U.S.D.A. staff to conduct investigations that will (1) determine consumer needs for textiles and clothing and the adequacy of products available to meet these needs, (2) develop basic principles to guide consumers in selecting and caring for textiles and clothing, and (3) solve other economic and technical problems pertaining to the field. Graduate students in this area may be trained at the laboratory.

International study tours in several areas of home economics are offered when a demand is indicated. The course “Home Economics 4910 International Study Tour” is offered for 6 credit hours at the undergraduate level. The length of the tours may vary from 6 to 8 weeks and the program is under the direction of a member of the faculty.

The Department of Nutrition and Food Sciences has a cooperative arrangement in which food service systems, such as those of the University, hospitals, schools, hotels, and restaurants are available for laboratory experience for Tourism, Food and Lodging Administration students and in food industries for those in the nutrition and food sciences curriculum. During the junior and senior years, students in the Coordinated Undergraduate Program in Dietetics receive clinical experience integrated with courses in hospitals and other health care facilities. The Tourism, Food, and Lodging Administration program offers coordination of theory and experience with industry during all four years. It also provides a cooperative plan of study that combines supervised employment experience in approved tourism, food, or lodging industry facilities during the summer and fall quarters of the sophomore, junior, and senior years. Graduates of the Coordinated Undergraduate Program in Dietetics will be eligible for membership in the American Dietetics Association (ADA) and to apply for the ADA Registration Examination. The Nutrition and Food Sciences department maintains liaison with the Knox County Health Department to provide concurrent field experience for students in Nutrition and Food Sciences options. The Nutrition and Food Sciences option can be used to meet
academic requirements for membership in the American Dietetic Association. All departments of the college conduct basic and applied research that may be supported in part by the college, by special grants and contracts, and by the Agricultural Experiment Station. The University of Tennessee Atomic Energy Commission program at Oak Ridge also provides opportunities for teaching and research. Workshops on special topics of current importance are offered by the different departments in home economics. These will be of special interest to those desiring to work for advanced degrees. Announcements are sent upon request.

The Continuing Education Program provides advanced courses in all areas of home economics at centers across the state for updating and retraining faculty resources. The program includes short courses, workshops, evening courses, and special videotape and telelecture courses.

Facilities

The Jessie W. Harris Home Economics Building was dedicated in 1926. Since that time two wings have been added, one in 1937 and another in 1959. All departments have well-equipped laboratories for both graduate and undergraduate work.

The Child Development Center is a separate building especially planned as a laboratory for teaching and research with preschool children. It houses infant and preschool day care centers, a preschool curriculum laboratory, and rooms for observation and research.

A separate Child Day Care Center housed in the UT Golf Range Apartments is staffed by the college and provides a laboratory for study as well as an adequate center for group care of toddlers.

Nutrition and Food Sciences facilities include well-equipped laboratories for basic food science, experimental food science, experimental nutrition (animal), and chemistry for undergraduate and graduate students. Laboratories include instruments for the evaluation of the chemical, physical, histological, and sensory properties of food, in addition to facilities for metabolic and survey studies of human nutrition.

Home economics education offices and laboratories are located in the Home Economics Building.

The Department of Textiles, Merchandising and Design facilities include provisions for laboratory and studio experiences. Laboratories for interior design and housing studies are equipped especially for this purpose.

Textile research facilities are available to undergraduate and graduate students and to research personnel interested in textile studies that benefit fiber producers, fabric and clothing manufacturers, and consumers. Laboratories are well equipped for the physical and chemical analyses of fabrics, yarns, and fibers.

Certification in Vocational Home Economics Education

The University of Tennessee, Knoxville, is approved for teacher training in home economics. The professional curriculum in home economics education is listed on page 136.

Certification in Early Childhood Education

A joint program in Early Childhood Education—Nursery School through Grade Three is available through the Department of Child and Family Studies (College of Home Economics) and the Department of Curriculum and Instruction (College of Education). In addition to preschool education, graduates are certified to teach kindergarten through third grade.

Educational Programs for Home Economics Extension Education

Students interested in careers as home economics extension agents have many opportunities for employment in service to rural and urban families. The Extension and Community Services option in Home Economics Education is designed for individuals interested in working in community based home economics programs such as Extension. This course of study includes comprehensive study in all areas of home economics as well as in educational principles.

Students interested in this program should contact their advisor or the Dean, College of Home Economics.

Undergraduate Study in Home Economics

Curricula in the following areas lead to the degree of Bachelor of Science in Home Economics:

Child and Family Studies (CFS)

Option 1—Early Childhood Development
Option 2—Human Development and Family Studies
Option 3—Nursery School-Grade 3

Home Economics Education

Option 1—Vocational Home Economics Education
Option 2—Extension and Community Services.

Nutrition and Food Sciences (NFS)

Option 1—Nutrition and Food Sciences
Option 2—Undergraduate Program in Dietetics

Textiles, Merchandising and Design (TMD)

Option 1—Merchandising
Option 2—Textile Science
Option 3—Apparel and Textiles

The curriculum in the following major leads to the degree of Bachelor of Science in Interior Design:

Interior Design (ID)

The curriculum in the following major leads to the degree of Bachelor of Science in Tourism, Food and Lodging Administration:

Tourism, Food and Lodging Administration

Plan A
Plan B

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 their particular college or school.

For the degree of Bachelor of Science in Home Economics, students must complete the last 45 quarter hours of work (three quarters) at The University of Tennessee, Knoxville, and in association with the College of Home Economics. Seventy-two hours must be earned in courses numbered 3000 and above at The University of Tennessee, Knoxville. The prospective transfer student is advised to complete the total college program before starting any college-level work. Careful planning prior to transferring to the college is essential to maintaining a program of study with maximum credit toward the sequence of course work. All new freshman and transfer students whose majors require chemistry must enroll in the freshman chemistry course sequence until requirements are completed. It is recommended that transfer students complete the freshman chemistry requirements before transferring to the college.

Students wishing to transfer 36 or more credit hours into the College must have an average of 2.0 for association. Students with an average of less than 2.0 are not eligible for association with the college.

During the first year each student generally takes courses basic to all curricula and is assigned a faculty advisor for program planning.

A normal course load per quarter is 15-16 hours. The maximum load is 19 credit hours per quarter (18 hours maximum for the Coordinated Undergraduate Program in Dietetics) unless otherwise approved by the Assistant Dean for Undergraduate Studies.

When a student has completed one quarter in residence at The University of Tennessee, Knoxville (with at least a 2.0 average in course work), the student will be eligible to participate in self registration, except for those quarters for which the student is scheduled for mandatory advisement. Students participating in the voluntary academic registration program bear full responsibility for meeting degree requirements in the proper sequence.

Students may choose to take elective courses outside their major departments under the satisfactory/no credit grading system. (Required courses may not be taken for a satisfactory/no credit grade). The purpose of the satisfactory/no credit (S/NC) grading system is to encourage the student to explore subject matter areas outside of the requirements and to explore courses of the major by minimizing causes for the student's concern that performance may be somewhat less outstanding than that in preferred subject areas. These courses will count as hours for graduation but not for calculating the student's grade point average. A final grade of C or better will be recorded as satisfactory. The maximum satisfactory or no credit hours that can be counted toward a degree is 30 hours. When the student wishes to take a satisfactory or no credit course, the student must so indicate at the time of registration.

Proficiency examinations are offered for numerous courses. Information on courses for which proficiency examinations are offered may be obtained from departments of the college.

Field training provides opportunity for practical pre-professional experience and constitutes an integral part of many of the college's programs. Students enrolled in certain College of Home Economics courses who are involved in field experiences are required to participate in the group liability insurance plan offered through the college. The annual cost to the student for this insurance coverage is $4 (subject to change).
The first digit in course numbers indicates the student group for whom the course is primarily offered: 1000 indicates courses for freshmen, 2000 for sophomores, 3000 for juniors, 4000 for seniors, 5000 and 6000 for graduate students.

The following four courses are fundamental to home economics and are required in all curricula:

<table>
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<tr>
<th>Course</th>
<th>Hours</th>
<th>Credit</th>
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<tr>
<td>Child &amp; Family Studies 3330</td>
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<tr>
<td>Child &amp; Family Studies 3350-60</td>
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<td>Child &amp; Family Studies 3510 or 3515</td>
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<tr>
<td>Home Economics 2510</td>
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<tr>
<td>Economics 2510</td>
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<tr>
<td>Philosophy or religious studies elective</td>
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</tr>
<tr>
<td>Special Education 3333</td>
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<tr>
<td>Physical Education 3560 or 3570</td>
<td>2-3</td>
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<tr>
<td>Public Health 3210</td>
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<tr>
<td>Electives</td>
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<tr>
<td><strong>Senior</strong></td>
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<tr>
<td>Child and Family Studies 4110, 4111</td>
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<tr>
<td>Child and Family Studies 4610 or 4620</td>
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</tr>
<tr>
<td><strong>Home Economics 3510</strong></td>
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<tr>
<td>TOTAL: <strong>192 hours</strong></td>
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</table>

Profession Curricula in Child and Family Studies

The Department of Child and Family Studies is concerned with early education, human development and family interaction throughout the life span, and with resource management and consumer studies. Departmental goals and objectives are designed to contribute to the interpersonal and professional competence of men and women students, and to provide preparation for careers in the helping professions related to children, adolescents, adults, and families, depending on the option the student selects.

The curriculum is appropriate for persons oriented toward teaching and/or administrative positions in child care centers and nursery schools, in public schools, with family services, child welfare agencies, Cooperative Extension, banks, and consumer agencies. Other opportunities exist that require study beyond the bachelor’s level (for example: administration, research, and clinical services). All options provide necessary background for graduate study in child development, family relationships, early childhood education, and social work.

**OPTION 1. EARLY CHILDHOOD DEVELOPMENT**

This option is appropriate for persons interested in the following types of positions: day care teacher, nursery school teacher, worker in center for socially disadvantaged and/or handicapped children, entry level positions in social work, or preparation for graduate school.

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Hours</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
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<td>Home Economics 1520</td>
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<tr>
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<tr>
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<tr>
<td>Mathematics 1540</td>
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<tr>
<td>Philosophy 1510 or 2510 or 2520 or 2310 or upper-division foreign language</td>
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<td>Electives</td>
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<tr>
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<tr>
<td>*Nutrition and Food Sciences 1130</td>
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<tr>
<td>Physical education elective</td>
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<tr>
<td>Speech 1221 or 2021 or 2351</td>
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<tr>
<td>Physical or biological science elective</td>
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<td>History or political science elective</td>
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<td>Electives</td>
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<td><strong>Junior</strong></td>
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<tr>
<td>Child &amp; Family Studies 2410 or Sociology 3150</td>
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<td>Child &amp; Family Studies 3210</td>
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<td>Child &amp; Family Studies 3250</td>
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</tr>
<tr>
<td>Child &amp; Family Studies 3510</td>
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</tr>
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<td>Child &amp; Family Studies 3515</td>
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<tr>
<td>Child &amp; Family Studies 3520</td>
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<tr>
<td>Electives</td>
<td>16</td>
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<td><strong>Senior</strong></td>
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<tr>
<td>Child and Family Studies 3260 or 4350</td>
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<td>Child and Family Studies 4420 or 4610</td>
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<tr>
<td>Child and Family Studies 4430</td>
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<tr>
<td>Child and Family Studies 4810 or Educational Psychology 4800</td>
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<td>Electives</td>
<td>6-15</td>
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<td><strong>Education</strong></td>
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</tr>
<tr>
<td><strong>Electives</strong></td>
<td>12-21</td>
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<td>**TOTAL: <strong>192 hours</strong></td>
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</table>

1. Twelve hours selected from the following: Biology 1210-20-30, Chemistry 1510-20-30, Physics 1110-20-30, Zool 2461-71-81, Zoology 2920-30.
2. Requirement may be satisfied by Mathematics 3000 or Psychology 3150 or taken in the junior year.
3. Requirement may be satisfied by Nutrition and Food Sciences 3100 to be taken junior year.
4. Selected from at least two of the following areas: Psychology 2500, 2530, 2540, Sociology 1510-20, Anthropology 2510, 2520, 2530.

**OPTION 3. NURSERY SCHOOL-GRADE THREE**

This option is appropriate for persons interested in working with young children up to the age of eight in a variety of settings. A joint program with the Department of Curriculum and Instruction, this option provides certification for grades K-3.

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Hours</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Home Economics 1510</td>
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<tr>
<td>Home Economics 1520</td>
<td>4</td>
<td></td>
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<tr>
<td>Child &amp; Family Studies 1500</td>
<td>3</td>
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<tr>
<td>English 1010 or 1020</td>
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<td>3</td>
<td></td>
</tr>
<tr>
<td>Speech 2021 or 2351 or 2021</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Music 1210 or Art 2510 or 2520 or 2310</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td><strong>Sophomore</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Home Economics 2510</strong></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Electives</strong></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td><strong>Junior</strong></td>
<td></td>
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</tr>
<tr>
<td>Child &amp; Family Studies 3200 or 3220 or 4350</td>
<td>3</td>
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<tr>
<td>Child &amp; Family Studies 4610</td>
<td>3</td>
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<tr>
<td>Child &amp; Family Studies 4110-11</td>
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<tr>
<td><strong>Sociology</strong></td>
<td>3</td>
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<tr>
<td><strong>Electives</strong></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>**TOTAL: <strong>192 hours</strong></td>
<td></td>
<td></td>
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</tbody>
</table>

Courses should be chosen from: Chemistry 1110, 1115; 1510 (choose one); or 1120, 1520, 1520 (choose one); or Geography 1410 or 1420 or 2110 or 2120, or Astronomy 2110 or 2120, or Physics 1210 or 1220 or 1410 or 1420.

**College of Home Economics**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Sociology elective</td>
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<tr>
<td>Electives</td>
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</tr>
<tr>
<td>**TOTAL: <strong>192 hours</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


1. Requirement may be satisfied by Mathematics 3000 or Psychology 3150.
2. Requirement may be satisfied by Educational Psychology 4110 to be taken as part of the major.
3. Requirement may be satisfied by Nutrition and Food Sciences 3120 to be taken junior year.
4. Selected from at least two of the following areas: Psychology 2500, 2530, 2540, Sociology 1510-20, Anthropology 2510, 2520, 2530.
Professional Curricula in Home Economics Education

Option 1. Vocational Home Economics Education

The teacher education program in home economics, planned in cooperation with the College of Education, prepares prospective teachers for vocational certification at the secondary level. Preparation is for both the consumer and homemaking program and the occupational program. The four-year course of study involves general education and professional courses including home economics subject matter. State certification requirements are met plus provision for capitalizing on one's area of interest. Requirements for admission to teacher education, to student teaching, and recommendation for certification are listed on page 95-96.

All freshmen, sophomore, and junior required courses must be completed before a student engages in student teaching. Home Economics Education 4240 should be scheduled within one of the two quarters immediately preceding the quarter in which student teaching is scheduled.

Endorsement in one or more of the occupational areas is optional. Course requirements for an endorsement are in addition to those of the basic consumer and homemaking education requirements.

Freshman

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Hours</th>
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<tr>
<td>Mathematics elective</td>
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<tr>
<td>Physical Education or health elective</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Speech elective</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Textiles &amp; Clothing 1160</td>
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<td>3</td>
</tr>
<tr>
<td>Textiles &amp; Clothing 1170</td>
<td>4</td>
<td>4</td>
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<tr>
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<td>Home Economics 1520</td>
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<td>Human behavior electives</td>
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<td>Psychology 2500</td>
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<td>Social science electives</td>
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<tr>
<td>Zoology 2920-30</td>
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Junior

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<tr>
<th>Course Code</th>
<th>Hours</th>
<th>Credit</th>
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<tr>
<td>Child &amp; Family Studies 3210, 3510</td>
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<tr>
<td>Educ. Curriculum &amp; instruction 3300-30</td>
<td>3</td>
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<td>Special Education 3333</td>
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<td>Educational Psychology 3810</td>
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<tr>
<td>Nutrition and Food Science 3020</td>
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<td>Home Economics Education 3240</td>
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<tr>
<td>Child &amp; Family Studies 4210</td>
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<tr>
<td>Nutrition and Food Sciences 3120</td>
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<td>Interior Design &amp; Housing 3110</td>
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<tr>
<td>Textiles &amp; Clothing 3429</td>
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<td>1</td>
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<td>Senior</td>
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<td>Home Economics Education 3510</td>
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<td>Home Economics Education 4610, 4611</td>
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<td>Interior Design &amp; Housing 4320</td>
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</table>

TOTAL: 190 hours

OPTION 2. Extension and Community Service

This option is designed to prepare graduates to work in community based home economics education programs. Due to social forces and effects of globalization, home economists increasingly are entering the field of community service as teachers and specialists in home economics subject matter in non-traditional educational settings. This option provides a range of general education components as in Option 1, a comprehensive home economics background encompassing all of the subject matter areas within the field, as well as educational principles and skills needed to participate effectively in community based programs. There is provision in the curriculum for students to select coursework in supporting areas such as communications, psychology, political science, sociology, human services, and education. Early exposure to community based programs and an extensive field experience are integral portions of the curriculum.

Freshman

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Hours</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Chemistry 1510-20-30</td>
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</tr>
<tr>
<td>English 1010 or 1011; 1020</td>
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<tr>
<td>English 1031 or 1032</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Nutrition and Food Sciences 1010</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Home Economics 1510</td>
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<tr>
<td>Mathematics elective</td>
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<td>Physical Education or health elective</td>
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<td>Speech elective</td>
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<td>3</td>
</tr>
<tr>
<td>Textiles &amp; Clothing 1160</td>
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</tr>
<tr>
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<td>4</td>
<td>4</td>
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<tr>
<td>Sophomore</td>
<td></td>
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</tr>
<tr>
<td>Home Economics 1520</td>
<td>4</td>
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<tr>
<td>Economics electives</td>
<td>6</td>
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<tr>
<td>Psychology 2500</td>
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<tr>
<td>Social science electives</td>
<td>4</td>
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</tr>
<tr>
<td>Zoology 2920-30</td>
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Junior

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Hours</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
<td>Child &amp; Family Studies 3210, 3510</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Home Economics Education 3240</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Child &amp; Family Studies 4210</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Nutrition and Food Sciences 3120</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Interior Design &amp; Housing 3110</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Textiles &amp; Clothing 3429</td>
<td>1</td>
<td>1</td>
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</table>

Senior

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Hours</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child &amp; Family Studies 4210</td>
<td>3</td>
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</tr>
</tbody>
</table>

 TOTAL: 190 hours

* * *

Professional Curricula in the Department of Nutrition and Food Sciences

Nutrition and Food Sciences Major

Entering freshmen in Options 1 and 2 will be enrolled as departmental majors and a departmental advisor will be assigned to assist with program planning. Students will not register in a particular option until their third quarter in residence. They will apply for progression into a specific option by March 15 of the sophomore year. Assignment of an option for each applicant will be made by a faculty committee by May 15, and each student will be assigned to an advisor associated with the chosen major. Transfer students must apply to the Director of Admissions and be admitted to The University of Tennessee, Knoxville, and associate with the College of Home Economics before initiating progression procedures into the Nutrition and Food Sciences, the College of Home Economics before initiating progression procedures into the Tourism, Food and Lodging Administration majors, respectively.

OPTION 1. NUTRITION AND FOOD SCIENCES

This professional curriculum provides a broad, flexible approach to the study of nutrition and food sciences. It includes indepth study in nutrition and food sciences and application of this knowledge to individuals, families, and groups. Career opportunities of graduates include positions in food product development and evaluation and/or consumer services in industry, dietetic internship, and graduate school.

Students may elect to meet academic requirements (Plan IV - Clinical Nutrition) for membership in The American Dietetic Association by selection of appropriate electives noted below. An internship or a graduate degree with experience complete the clinical requirements. Upon completion of academic and clinical requirements, students are eligible to apply for membership in The American Dietetic Association and to apply for the registration examination to qualify as a Registered Dietitian (R.D.).

Freshman

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Hours</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Chemistry 1510-20-30</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>English 1010 or 1011; 1020</td>
<td>6</td>
<td>6</td>
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<tr>
<td>English 1031 or 1032</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Nutrition and Food Sciences 1010</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Home Economics 1510</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Child &amp; Family Studies 1120</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Mathematics elective</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Physical Education or health electives</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Speech elective</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Textiles &amp; Clothing 1160</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Textiles &amp; Clothing 1170</td>
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<td>4</td>
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<td>Electives and/or supporting courses</td>
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<td>8</td>
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<tr>
<td>Sophomore</td>
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<td></td>
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<tr>
<td>Home Economics 1520</td>
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<tr>
<td>Economics electives</td>
<td>6</td>
<td>6</td>
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<tr>
<td>Anatomy and Physiology 1040</td>
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<tr>
<td>Psychology 2500</td>
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<td>Social science elective</td>
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</tr>
<tr>
<td>Zoology 2920-30</td>
<td>3</td>
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<td>Electives and/or supporting courses</td>
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<td>8</td>
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<tr>
<td>Junior</td>
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<td></td>
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<tr>
<td>Child &amp; Family Studies 3510</td>
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<tr>
<td>Child &amp; Family Studies 3120, 3510</td>
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<tr>
<td>Educational Psychology 3810 or Child &amp; Family Studies 3520</td>
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<tr>
<td>Nutrition and Food Sciences 3020</td>
<td>3</td>
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<tr>
<td>Child &amp; Family Studies 3420 or 4830</td>
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<td>Nutrition and Food Sciences 3020</td>
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<tr>
<td>Interior Design &amp; Housing 3110</td>
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<tr>
<td>Rural Soc. 3420</td>
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<td>4</td>
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<tr>
<td>Sociology 3420</td>
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<tr>
<td>Textiles &amp; Clothing 3420</td>
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<tr>
<td>Textiles &amp; Clothing 4249</td>
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<td>12</td>
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<tr>
<td>Senior</td>
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</tr>
<tr>
<td>Child &amp; Family Studies 4210</td>
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</tr>
</tbody>
</table>

TOTAL: 190 hours

* * *

OPTION 2. NUTRITION AND FOOD SCIENCES

See College of Education Curriculum for Secondary Education.

*Requires admission to Teacher Education Program.

*Course should be any course in areas of anthropology, economics, sociology, human services, political science, psychology, sociology.

*All students who desire teacher certification are required to apply for admission to the Teacher Education Program in the College of Education.

*Application for student teaching in Child and Family Studies and in Curriculum and Instruction must be filed in each department no later than January 1 of the academic year preceding the actual experience.
TOURISM, FOOD, AND LODGING ADMINISTRATION MAJOR

The professional curriculum is concerned with meeting the middle and upper level management needs of the tourism, food, and lodging industry of today. It provides a program that will assist students in gaining breadth of knowledge, perspective, flexibility, and creativity to meet the changing environment of complex management problems in the industry.

This major offers two curricular plans: a regular four-year program (A) and a cooperative plan (B) with pre-planned summer work experience. The sophomore, junior, and senior years during which the student is employed by an approved facility in the tourism, food or lodging industry. The cooperative plan will take four years plus two terms. Selection of Plan A or B must be made at the end of the freshman year.

A business minor is available to students who successfully complete 21 hours of the following required courses: Accounting 2110-20-30, Economics 2510-20, and Statistics 2100. In addition, 15 hours of upper-division business electives must be taken at UTK. Not more than six upper-division hours of accounting, economics, or statistics may be used for this minor. Students are responsible for meeting prerequisites listed for any upper-division courses taken. The 12 hours of upper-division business courses required in Plan A or B may be applied toward satisfying the 15 hour elective requirement.

PLAN A

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Hours</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Nutrition and Food Sciences 1010</td>
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</tr>
<tr>
<td>Nutrition and Food Sciences 1130</td>
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<td></td>
</tr>
<tr>
<td>Nutrition and Food Sciences 2210</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Natural science electives</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Math 1500</td>
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</tr>
<tr>
<td>Statistics 2100</td>
<td>3</td>
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</table>

Electives: 12 hours

Phone Credit: 39

TOTAL 190 hours

PLAN B

Cooperative Curriculum in Tourism, Food, and Lodging Administration

First Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
<td>Business Law 4110</td>
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</table>

TOTAL 190 hours

| Natural science electives (12 hr. sequence) from one of the following areas: Biology 1210-20-30, Chemistry 1510-20-30, or Physics 1510-20-30. Statistics 2100 requires Math 1500 as a prerequisite.

PLAN B

Cooperative Curriculum in Tourism, Food, and Lodging Administration

First Year

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Law 4110</td>
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</table>
Acquisition and Exhibition
Professional Curricula in the course work. Wrogram must include at least Statistics or Physics.

<table>
<thead>
<tr>
<th>Course Title</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>Nutrition and Food Sciences 4240</td>
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<td>Accounting 3120</td>
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<td>Psychology 2500 or 2530</td>
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<td>Sociology 1510</td>
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<td>Nutrition and Food Sciences 3220</td>
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<td>Accounting 2120</td>
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<tr>
<td>Speech 2311 or 2361</td>
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Summer Work

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<tr>
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<th>Credits</th>
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<tr>
<td>Economics 3420</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Marketing 3110</td>
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<td>3</td>
</tr>
<tr>
<td>Accounting 2130</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Electives</td>
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<td>8</td>
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<tr>
<td>Spring</td>
<td>6</td>
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Second Year

<table>
<thead>
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<th>Hours</th>
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<tbody>
<tr>
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<tr>
<td>Economics 3510</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Nutrition and Food Sciences 4260</td>
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<tr>
<td>Electives</td>
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<td>6</td>
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<tr>
<td>Spring</td>
<td>8</td>
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Fall Work

<table>
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<th>Hours</th>
<th>Credits</th>
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<tbody>
<tr>
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<tr>
<td>Agriculture 1200</td>
<td>3</td>
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<tr>
<td>IDH 1430-1440-1450, 2000</td>
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<tr>
<td>Home Economics 1510-20</td>
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<tr>
<td>*Natural science electives</td>
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Sophomore

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<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Art 1815, 1825, 2117, 2270</td>
<td>16</td>
<td>16</td>
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<tr>
<td>Interior Design &amp; Housing 2450-51-52</td>
<td>2</td>
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</tr>
<tr>
<td>Interior Design &amp; Housing 2435</td>
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<tr>
<td>Interior Design &amp; Housing 2420</td>
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<td>4</td>
</tr>
<tr>
<td>Interior Design &amp; Housing 2791</td>
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<tr>
<td>Economics 2510</td>
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Junior

<table>
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<tr>
<th>Course Title</th>
<th>Hours</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior Design &amp; Housing 3450-51-52</td>
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<td>4</td>
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<tr>
<td>Interior Design &amp; Housing 3791</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Interior Design &amp; Housing 4110</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Interior Design &amp; Housing 3260</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Interior Design &amp; Housing 4320</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Economics 3510</td>
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<tr>
<td>*Art Electives</td>
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<tr>
<td>*Social science electives</td>
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<tr>
<td>Humanities elective</td>
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Senior

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>Interior Design &amp; Housing 4450-51-61</td>
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<td>12</td>
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</table>

TOTAL: 190

TEXTILES AND CLOTHING MAJOR

Option 1. Merchandising

This major is designed to prepare students for a variety of careers associated with the design, manufacture, promotion, and distribution of textiles and apparel products. Students who have a strong interest in retailing should pursue this major. A business minor is available to students who successfully complete 21 hours of the following required courses: Accounting 2110-20, Economics 2510-20, and Statistics 2100. In addition, 15 hours of upper-division hours of accounting, economics, or statistics may be used for this minor. Students are responsible for meeting prerequisites listed for any upper-division courses taken.

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
<th>Credits</th>
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<tbody>
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<tr>
<td>English 1010 or 1011, 1020, 1039</td>
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<tr>
<td>Math 1450-50</td>
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<td>Home Economics 1510, 1520</td>
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<td>Textiles and Clothing 1160</td>
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<td>Textiles and Clothing 1170</td>
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Junior

<table>
<thead>
<tr>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
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<td>Sociology 1510</td>
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<tr>
<td>English 2311 or 2361</td>
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<tr>
<td>Sociology 310-10-33</td>
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<td>Marketing 3110-20</td>
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<tr>
<td>Textiles and Clothing 3510</td>
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</tr>
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<td>Textiles and Clothing 4100</td>
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<td>Textiles and Clothing 4110</td>
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<tr>
<td>Textiles and Clothing 4620</td>
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<tr>
<td>Anthropology 2630</td>
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<tr>
<td>*Advising 3000 or Marketing 4150 or 4210</td>
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Senior

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Hours</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textiles and Clothing 3420</td>
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<tr>
<td>Child &amp; Family Studies 4320</td>
<td>4</td>
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<tr>
<td>Child &amp; Family Studies 4382</td>
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<tr>
<td>Textiles and Clothing 4120</td>
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<td>Textiles and Clothing 4220</td>
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<td>Textiles and Clothing 4680</td>
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</tr>
<tr>
<td>Textiles and Clothing 3410</td>
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</table>

*All minimum of 72 hours of upper-division courses are required for graduation.
Option 2. Textile Science

This curriculum is appropriate for persons wishing to prepare for positions as research technicians and for graduate study leading to college teaching and research in textiles.

Freshman Hours Credit
Chemistry 1110-20 or 1510-20-30 
English 1010 or 1011; 1020, 1033 
Home Economics 1510 
Psychology 2500 
Home Economics 1520 
Textiles & Clothing 1165 
Textiles & Clothing 1160 
Textiles & Clothing 1150 
Math 1540-50-60 or 1840-50-60 
Sociology 1510 
Textiles & Clothing 3420, 3429 
Zoology 2520-30 
Electives 
Sophomore 
Chemistry 3211-19 or Nutrition and Food Sciences 3109 
English 2510 or 2520 or 2530 or 2540 
Physical Education 1210-20 or 1210-20-12 
Mathematics 1540-50-60 or 1840-50-60 
Sociology 1510 
Textiles & Clothing 3420, 3429 
Electives 

Junior

Economics 2510-20 
Humanities electives 
Journalism 2210 
Physics 2210-20 or 1210-20 
Statistics 2100 or 3450 
Home Economics 4510 
Electives 

Senior

Child & Family Studies 4830 
Interior Design & Housing 2430, 3130 
Textiles & Clothing 2170, 3170, 4510, 4520 (choose three) 
Textiles & Clothing 4280 or 4410 
Electives 

TOTAL: 192 hours

*Eight hour sequence from foreign language or philosophy or history or art history or music.
**Twenty-five hours of electives must be upper-division level.

Graduate Study Programs in the College of Home Economics

The College of Home Economics offers a full range of graduate studies leading to the M.S. and Ph.D. degrees. Any person interested in graduate studies should request information, application and a Graduate Catalog from: Dr. Jay Stauss, Associate Dean, Graduate Studies and Research, College of Home Economics, The University of Tennessee, Knoxville, TN 37996-1900.

Departments of Instruction

Child and Family Studies (245)

Professors:
C. Beasley (Emerita), Ed.D. Columbia, N. H. Belck (Dean), Ph.D. Michigan State; M. L. Bishop (Emerita), Ph.D. Cornell; C. Beasley (Emerita), Ed.D. Columbia; N. H. Belck (Dean), Ph.D. Michigan State; C. E. Gilbert (Emerita), Ed.D. Cornell; R. L. Highegeber (Emerita), Ph.D. Iowa; N. P. Logan (Emerita), Ed.D. Tennessee; V. M. Nordquist, Ph.D. Tennessee; E. L. Speer (Emerita), M.A. Columbia; P. N. White, Ed.D. Tennessee.

Associate Professors:

Assistant Professors:
J. E. Allen, Ph.D. Purdue; C. A. Sutler, Ph.D. University of Minnesota; G. E. Eastman, M.S. Utah State; J. K. Kidwell, Ph.D. Purdue; G. W. Peterson, Ph.D. Brigham Young; K. G. Westde, Ph.D. Tennessee.

Lecturer:
A. E. Cox, M.S. Tennessee.

1120 Management and Its Contribution to Family Living (3) Decision making process, relationships among decisions; principles of organization for implementing decisions; evaluation procedures; factors affecting management process; application of management principles to problems.

1500 Introduction to Early Education (3) Introducition and overview of early childhood education: conceptions of children, teachers, and teaching. Includes field experience.

2110 Human Socialization (3) Human development with emphasis on socialization process from infancy through adolescence in family, school, and peer group settings. For non-home economics majors only.

2120 Sex Roles and Marriage (3) Examination of impact of gender roles on marital relationships, issues such as power and decision-making, communication, combining careers and families are included. (Same as Women's Studies 2120.)

2410 Human Sexuality (3) Dimensions of human sexuality examined through cultural, social, and psychological influences.

3125 Day Care and Children (3) Examination of different types of day care and influence of day care on infants and children. Prereq: 3210.

3200 Development in Infancy (3) Development during prenatal period and first 15 months of life. Interaction between infant and his/her environment. Review of research relating to childbearing practices and prediction of later behavior. Prereq: 2110 and Zoology 2930 or equivalent.

3210 Development in Early Childhood (3) Comprehensive view of the child during the early childhood years. Analysis of interrelationship among various aspects of development: physical, cognitive, emotional, and social. Required taken prior to this course. 3 hrs. 1 hr. observation per week.

3220 Development in Middle Childhood (3) Growth and development during the middle childhood years with emphasis on intellectual and social development. Special attention to different social and cultural settings. Recommend 3500 and 3520 be taken prior to this course. 3 hrs. 1 hr. observation per week.

3300 Observational Methods in Child Development (3) Overview of methods of observing teacher and child behavior and development of individual skills in observational assessment. Prereq: 3200 or 3210 or 3320 or consent of instructor.

3500 Program Planning (3) Philosophies of preschool education. Analysis of program and teacher-child interaction. Prereq: 3210, 3350 recommended.

3350 Aesthetic Experiences (3) Examination of subject matter areas—quantity and logic, art, music, literature, science. Prereq: 3350 recommended.

3420 Family Economics (3) Management of family income and resources. Private and public measures to improve income position and reduce income insecurity. Prereq or coreq: Economics 2520.

3510 Intimacy: Marriage and Alternatives (3) Examination of primary relationship perspectives from points of view of both individual development and relationship development. Emphasis are on dating, marriage, and various family forms.

3515 Family Relationships (3) Focus on emerging and declining family roles and changing relationships among family members across the family life cycle. Prereq: 3510 or 3520.

3520 The Family and the Adolescent (3) Problems of growth and development during teen years; role of parents and other adults in fostering adolescent development. Upper division students only. Prereq: 2110 or 3210 or 4 hrs. psychology.

4110 Student Teaching in Preschool Settings (9) Increasing responsibility for planning and guiding groups of young children under supervision of head teacher. Includes 2-hr. weekly seminar. Prereq: 1500, 3210, 3350, 3360 recommended; coreq: 4111. S/N.

4111 Student Teaching of Preschool Children (3) Increasing responsibility for planning and guiding groups of young children under supervision of head teacher, includes 2-hr. weekly seminar. Prereq: 1500, 2110, 3330, 3350, 3360 recommended; coreq: 4110. S/N.

4210 Family Finance (3) Analysis of alternative ways of meeting financial problems encountered during life cycle of family.
2420 Conserving Time and Energy in the Home (3) Application of management principles to homemaking activities; evaluation of equipment, work centers, and work procedures in terms of time and energy demands. Adaptations for the handicapped.

2460 Adult Development and Aging (3) Adult life in our society. Adjustment to internal and environmental changes through middle and aged years. Prereq: 2110 or equivalent. Coreq: 1510 or equivalent background in adult development or consent of instructor.

4530 Advanced Child Development (3) Survey of selected theories relevant to child development with emphasis on research literature and research methodology. Prereq: 4 hrs. of psychology and 6 hrs. of child development or equivalent.

4420 Learning Experience with Parents (3) Dynamics of parent-teacher interaction. Emphasis on a variety of techniques for developing communication and working relationships between parents and teachers through experiences in a variety of settings. Prereq: Home Economics 1510 or 3210.

4430 Family Interaction (3) Dynamics of family interaction at different points in the life cycle. Includes dynamics of parent-child relationships and the marital dyad, both with the family and as the family interacts within the community; formal and informal support systems within the community. Prereq: 3515.


4610 Child in the Community (3) Needs of children; community agencies meeting these needs; visits to agencies contributing to welfare of children. Prereq: 2110 or Home Economics 1510 or equivalent.

4620 Administration of Programs for Young Children (3) Planning for staffing, housing, feeding, scheduling, and financing for day care of infants and young children, nursery school programs, and specialized programs for deprived preschool children. Prereq: 2110 or 3130 or 4110.

4630 Field Work in Child, Family, and Consumer Studies (3-15) Opportunity for student to work in nursery schools or community agencies; focus on children, families, and/or consumer concerns. Hrs. arranged. May be repeated. Maximum credit 15 hrs. S/NC.

4710 Contemporary Developments (1-3) Student or staff initiated course for study of special topic(s) pertinent to the field; topics to be determined by students and instructor with departmental approval. Elective credit only. Prereq: Consent of instructor. May be repeated with departmental approval for credit up to 9 hrs.

4810 Afro-American Families (3) Historical background of contemporary family structure and relationships; emerging needs and programs. Prereq: 4 hrs. in social sciences and upper-division standing. (Same as Black Studies 4810.)

4820 Families, Economics, and Demographic Change (3) Introduction to economic analysis of family demographic change. Topics covered include the decline in family size, dual working-dual career families, economics of marriage, and increased divorce rates. Prereq: 3420 or 3515 or consent of instructor.

4830 Consumers and the Market (3) Analysis of elements in marketplace which create problems for consumers. Special attention is given to consumer decision making, need for information and constraints, and opportunities associated with government protection of consumers.

4978 Honors: Child, Family, and Consumer Studies (3) Special tutorial problems for juniors and seniors showing special ability and interests. May be repeated. Maximum credit 9 hrs.

GRADUATE

Consult the Graduate Catalog for listing of graduate level courses.

Nutrition and Food Sciences (725)

Professors: R. E. Beaufichte, Ph.D. Kansas State; M. R. Buckley (Emerita), M.A. Columbia; A. M. Campbell (Emerita), Ph.D. Columbia; B. R. Carruth (Head), Ph.D. Missouri; G. E. Goertz (Emerita), Ph.D. Kansas State; M. J. Hitchcock (Emerita), Ph.D. Wisconsin; F. L. Macleod (Emerita), Ph.D. Columbia; M. P. Penfield, Ph.D. Tennessee; J. R. Savage, Ph.D. Wisconsin; J. T. Smith, Ph.D. Missouri; M. A. Smith*, Ph.D. Tennessee.

Associate Professors: F. E. Andrews, Ph.D. Ohio State; G. W. Disney, Ph.D. Tennessee; D. E. Lyon (Emerita), M.S. Cornell; N. L. Marable, Ph.D. Massachusetts; D. S. Sachen, Ph.D. Illinois; D. G. Tapp (Emerita), M.S. Georgia; M. P. H. Berkeley.

Assistant Professors: M. D. Brooks*, M.S. Alabama; M. R. Evans, M.A. Kentucky; H. L. Feshbush, Ph.D. Wisconsin; E. A. Haughton, Ed.D. Columbia; J. D. Skinner, Ph.D. Oregon State; J. V. White, Ph.D. Tennessee.

Instructors: K. F. Anderson, M.S. Tennessee; R. N. Gross, M.S. George Peabody (Vanderbilt); B. F. Hammond, M.A. Texas; L. H. Hefley, Ph.D. Tennessee; K. A. Mount, M.S. Tennessee; J. Fershe, M.S. Tennessee; B. B. Speer, M.S. Tennessee.

*Memphis

Nutrition and Food Sciences (725)

1010 Food Principles (3) Principles of food selection, preparation, and service; 2 hrs. and 1 lab. F, W, S.

1130 Elementary Nutrition (3) Principles and applications to everyday living. A student who has received credit for NFS 1130 may not receive credit for this course. F, W, S.

2010 Nature of Food I (4) Classification of foods; measurement of vitamins and minerals; principles of food preservation; fats, high protein foods, and batter and dough systems. Prereq: 3010. 2 hrs. and 1 lab. F, S.

2210 Introduction to Tourism, Food and Lodging Administration (2) Overview of tourism industry; nutrition in selected health care and community facilities. Prereq: 2110 or 3130 or 4110.

3100 Food Principles II (4) Principles of food selection, preparation, and service; 1 hr. and 1 lab. F, W, S.

3150 Food and Clinical Analyses (4) Elementary quantitative analyses; methods of food and clinical analysis. Prereq: 3130 or equivalent. 2 hrs. and 2 lab. Not for graduate credit for departmental majors. S, SU.

3160 Science of Nutrition (5) Basic principles of nutrition; significance and application of Recommended Dietary Allowances. Prereq: 2110, 3140, or 3150; Zoology 2205-30; F.

3161 Clinical Experience in Dietetics (2) Planned clinical experiences for application of principles of normal nutrition in selected health care and community facilities. Coreq: 3160. Open only to students in the Coordinated Undergraduate Program in Dietetics.

3210 Foodservice Systems Management (3) Effective and efficient use of management resources in foodservice systems; fundamental management principles and concepts and principles to improve competence in decision-making and problem solving. W.

3220 Quantity Food Procurement and Production (5) Application of principles necessary for determining needs, procuring, storing and producing foods in volume. Prereq: 1010 or 2110 and 3210. 3 hrs. and 2 labs. F, W.

3230 Tourism, Food and Lodging Administration Externship (5) Planned educational experiences in selected food and lodging operations or other tourist related facilities. Prereq: 3220. F.

3230 Survey of Dietetics I (1) Overview of dietetics and career opportunities. Prereq: Junior standing. F.

3330 Survey of Dietetics II (1) The role of the dietitian in health delivery systems. Prereq: Junior standing. W.

4000 Origin of Food and Foodways (3) Food origin and development of individual and group foodways. Prereq: 8 hrs. of social science or humanities. S.

4001 Clinical Experience in Dietetics (2) Planned experiences for application of economic and sociocultural food principles and consumer acceptability in community facilities. Coreq: 4000, 3209. Open only to students in the Coordinated Undergraduate Program in Dietetics.

4010 Introductory Experimental Food Science (3) Principles and sensory evaluation in experimentation with fats, high protein foods, and batter and dough systems. Prereq: 3010. 2 hrs. and 1 lab. F, S.

4011 Clinical Experience in Dietetics (1) Planned experiences applying food science principles to modification of diets for patients. Coreq: 4010. Open only to students in the Coordinated Undergraduate Program in Dietetics.

4110 Introduction to Sensory Evaluation of Foods (3) Sensory evaluation methods. Prereq: 4010 or 9 hrs. FTS; PSBC 3610 or equivalent. 2 hrs. and 1 lab. W.

4120 Food in Contemporary Society (3) Consumers' options, responsibilities, and potential influence with respect to the food supply.

4200 Food Preservation (3) Application of basic principles and techniques for keeping food in edible condition; emphasis on food preservation at home. Prereq: 2110 or 3010; 4 hrs. microbiology and 3150 or equivalent recommended. 2 hrs. and 1 lab. F.

4100 Consumer Behavior (3) Application of the principles of consumer behavior and marketing to the food environment. Prereq: 2110 or 3010, 4 hrs. microbiology and 3150 or equivalent recommended. 2 hrs. and 1 lab. F.

4110 Introduction to Nutrition Research (3) Nutrition principles and laboratory experiences involving small animals. Prereq: 3160. 2 hrs. and 1 lab. W.

4120 Nutrition in Disease I (4) Nutrition problems in diseases influenced by diet. Prereq: 3160. W.

4131 Clinical Experience in Dietetics (2) Planned clinical experiences applying principles of nutrition in disease. Coreq: 4150. Open only to students in the Coordinated Undergraduate Program in Dietetics.

4140 Nutrition in Disease II (3) Interdisciplinary lectures and discussions on the metabolic processes of normal and diseased organs and/or tissues and the dietary or behavioral modifications required. Prereq: 4130. Designed for senior students in the Coordinated Undergraduate Program in Dietetics.

4141 Clinical Experience in Dietetics (3) Advanced educational experiences applying principles of nutrition in disease in selected health care facilities. Coreq: 4140. Open only to students in the Coordinated Undergraduate Program in Dietetics.

4145 Community Nutrition (3) Nutrition problems and services in the community. Supervised field experiences. Prereq: 3120 or 3160 F.
4151 Clinical Experiences in Dietetics (3) Supem\-vised field experience in the community. Prereq: 4131; 4001; or consent of instructor; coreq: 4155. F, W.

4180 Nutrition Throughout the Life Cycle (4) Ap\-plication of nutrition principles throughout the life cycle with emphasis on communication of nutrition informa-\tion. Prereq: 3120 or 3160 or consent of instructor. W.

4170 Clinical Experience in Dietetics (4) Experi-\ence in providing coordinated, continuing nutrition care in healthy delivery systems. Prereq: 4151. Open only to students in the Coordinated Undergraduate Pro-gram in Dietetics. S.

4180 Environmental Effects on Nutrition (3) Effect of environmental factors on nutrition, drugs both the-apeutic and adverse, and extreme environmental condi-\tions upon the nutrient availability, utilization, and re\quirements of humans. Prereq: 6 hrs. natural sci-\ence.

4190 Diet and Drug Therapy (3) Effect of drug therapy on absorption, utilization, and toxicity of drugs. Prereq: 3160 or consent of instructor. W.

4210 Design and Layout of Food Systems (3) Design of physical facilities, selection and purchasing of equipment for food service systems. Prereq: 3220. S, SU.

4220 Food and Lodging Information Systems (3) Design of information systems for decision making in the food service and lodging industry. Prereq: 2130; coreq: 4225. S, SU.

4230 Tourism, Food, and Lodging Managerial Field Experience (5-15) Planned educational managerial experience in selected food service or food and lodging systems or tourist related facilities. To be taken at the beginning of the senior year with consent of instructor. Prereq: 3220. F.

4240 Food Systems Personnel Development (3) Development of training programs and personnel man-\gement policies for food systems personnel. Prereq: Econ. 3424 or Psych. 4460 or consent of instructor. W.

4241 Clinical Experience in Dietetics (3) Develop-\ment of technical, human and conceptual skills through planned educational experiences at increasing levels of administrative responsibility in selected food systems. Prereq: 3220. Coreq: 4240. Open only to students in the Coordinated Undergraduate Pro-gram in Dietetics. W.

4250 Food Systems Managerial Cost Control (3) Cost analysis for food and beverages; use of financial statements for decision making in foodservice sys-\tems. Prereq: 3220. W.

4251 Clinical Experience in Dietetics (3) Develop-\ment of technical, human and conceptual skills through planned educational experiences at increasing levels of administrative responsibility in selected food systems. Prereq: 3220. Coreq: 4250. Open only to students in the Coordinated Undergraduate Pro-gram in Dietetics. W.

4260 Food and Lodging Physical Plant Planning and Maintenance (4) Fundamentals of mechanical systems and building components of the food and lodging physical plant; organization and principles of properties management. Prereq: 4210. 3 hrs. and 1 lab. W.

4270 Tourism and Lodging Administration (3) Mar-\keting management principles for the tourism and lodging industries; current problems in the marketing of hospitality services. Prereq: Marketing 3120. W.

4280 Clinical Experience in Dietetics (4) Planned educational experiences at increasing levels of ad-ministrative responsibility in selected food systems. Prereq: 3220. Coreq: only to students in the Coordinat-ed Undergraduate Program in Dietetics. S.

4330 Readings in Nutrition and Food Sciences (3) Reports and discussions of current literature. Prereq: 3160. S.

4340 Field Experience (3-15) Planned educational experience in selected food service, nutrition related industries or laboratories or community facili-\ties. Prereq: Consent of instructor. Hrs. and credit arranged. E.

4710 Contemporary Developments (1-3) Student or staff initiated course for study of special topic(s) pertinent to the field. Topics require departmental approval. Elective credit only. Prereq: Consent of instructor. May be repeated with departmental approval for credit up to 9 hrs.

4978 Honors: Nutrition and Food Sciences (1-3) Problems for juniors and seniors with special ability and interest in nutrition and food sciences. Elective credit only. Prereq: Consent of department head. May be repeated with departmental approval for credit up to 6 hours.

GRADUATE Consult the Graduate Catalog for listing of graduate level courses.

### Home Economics (481)

1010 Home Economics as a Profession (3) Scope of the profession of home economics; educational and professional preparation; personal qualities required and satisfaction to be gained from various careers within the profession. S/NC.

1510 Family Systems: Human Development (4) Def-nition, description, and utilization of basic systems concepts as applied to development of individual and family; emphasis on professional development and contribution. F, W, S.

1520 Family Systems: Aesthetic Environment (4) Examination of near and far environment from an aesthetic perspective with implications for quality of life of individuals and families. F, W, S.


3110 Methods of Community Services Develop-\ment (3) Organizations, educational responsibility, ob-jectives, methods, and evaluation of community serv-\ices programs. Prereq: Psychology 2500 or equivalent. W.

3510 Family Systems: Consumer Resources (4) Appraisal and application of effective management of resources with implications for roles of professional in the interactions of individuals and families with society. Prereq: 3 hrs. of economics, junior standing. F, W, S.

4000 Senior Seminar (2-15) Personal application of interrelated knowledge and professional competen-cies through experience in community service training to serve society in a professional capacity; gaining experience beneficial to chosen professional career; scope of current research and career opportunities in home economics; comprehension of professional ethics required of a home economist. May be re-peated with departmental approval for credit up to 15 hrs. Prereq: Junior or senior standing. Consent of department head required for credit beyond 2 hrs. S/NC.

4110 Community Services Programs with Adults (3) Procedures and techniques in working with adults; individual, group, and mass methods. Taken as an off-campus course of field training together with 4120. Prereq: 3110 and consent of instructor.

4120 Community Services Programs with Youth (3) Procedures and techniques in working with youth. Taken as an off-campus course of field training together with 4110. Prereq: 3110 and consent of instructor.

4130 Methods and Procedures for Community Services Work (3) Individual; group, mass and indirect methods in community services work. Prereq: 3110. 2 hrs. and 1 lab.

4710 Contemporary Developments (1-3) Recent advances in specified areas of home economics, their implications for home economics and related profes-sions. Prereq: Consent of instructor. Hrs. arranged. May be repeated with departmental approval for credit up to 9 hrs.

4910 International Study Tour (6) See page 135. Prereq: Consent of instructor.

4978 Honors: Community Services Programs (3) Problems for junior and seniors with special interest in community services programs. May be repeated. Maximum credit 3 hrs. Prereq: Consent of department.

### Textiles Merchandising and Design


Assistant Professors: C. E. Cox, Ph.D. Tennessee; J. Rabun, M.S. Tennessee.

Lecturer: B. B. Thompson, B. Arch. Iowa State.

### Interior Design and Housing (582)

1430 Introduction to Interior Design (3) Introduction to interior design, basic creative design skills, drawing, spatial organization, color, and design awareness. Prereq: Architecture 1002. 1 hour and 3 labs. F.

1440 Visual Studies (4) Introduction to classification and properties of two-dimensional visual organizations as applied to interior design. Relationship of properties of visual elements and their ability to communicate information and create legible visual systems. Basic elements of design. Introduction to color principles of design. F.

1450 Visual Studies II (4) Advanced classification and properties of two-and three-dimensional visual organi-zation and design principles as applied to interior design. Relationship of properties of visual elements and their ability to communicate information and create legible visual systems. Prereq: 1440. S.

2000 Man-Environment Systems (4) Introduction to theory and application and environmental impact upon human behavior patterns; cause - effect relationship of dynamics of developmental changes on human behav-ior. Prereq: 1430, 1450 or consent of instructor. W, S.

2420 Mechanical Systems for Interior Designers (4) Principles and methods of analysis required in...
heating, ventilation and air conditioning buildings; includes plumbing and acoustics. Prereq: Sophomore standing.

2450 Materials and Methods of Design (4) The development and application of materials and design methods used in interior architectural space. Prereq: 1430. 4 hours. F.

2450 Fundamentals of Interior Design (4) Development of basic design skills for problem solving in spatial organization. Introduction to design methods, project budgeting, drawing, materials, environmental systems on a micro-use scale. Prereq: 1430. F.

2451 Fundamentals of Interior Design II (4) Problem solving in design using design and development process. Communication of design solutions through perspective drawing, model building, and experimentation with various media types. Prereq: 2450 and full admission to interior design program or consent of instructor. W.

2452 Fundamentals of Interior Design III (4) Problem solving, spatial organization in micro-environments on an increasingly larger scale. Communication of total design solutions using a variety of graphic, auditory and photographic techniques. Prerequisite: 2451 or consent of instructor. S.

2791 History of Interior Architecture I (4) History of interior architecture, furniture, and other design forms within the cultural context: Greece, Rome, the Italian Renaissance, and France during the seventeenth, eighteenth, and early nineteenth centuries. (Same as Art 2791.) F, S.

3110 Beginning Interior Design (3) Individual and design problems, analysis, arrangement and combination of furnishings to derive the greatest satisfaction from homes and places of work. Prereq: 1410 or equivalent. 1 hr. and 2 labs. F, W, S.

3130 Color (4) Experimentation based on an understanding of the systematic theories of color. Color communication as related to light, perception, and cultural measure. Prereq: Consent of instructor. S.

3260 Professional Procedures (4) Preparation of interior design majors for practicum experience. Emphasis on interpersonal relationships and business practices related to interior design. F.

3400-51-52 Interior Design I, II, III (4,4,4) Studio problems of intermediate complexity that integrate and extend previous knowledge of working drawings, materials and sources; techniques, principles, and conceptualization and planning of micro- and macro-environments. Prereq: 2452 and junior standing for 3450. Courses should be taken in sequence or have consent of instructor. 3450-F; 3451-W; 3452-S.

3791 History of Interior Architecture II (4) History of interior architecture, furniture, and other design forms within the cultural context of England from the sixteenth through the nineteenth centuries. (Same as Art 3791.) S.

4110 Lighting for Interior Designers (4) The application of elements and principles of lighting and wiring to the design of the visual environment. Prereq: Junior standing. W.

4260 Interior Design Practicum (8-16) Supervised practicum in establishments engaged in practice of interior design. Prereq: Senior standing in interior design major, 3260, and consent of instructor. E.

4300 Field Experience (3-15) Supervised field experience; subject to departmental approval. Prereq: Senior standing and consent of faculty. SU.

4320 Family Housing Problems (3) Housing requirements of family living; planning and planting effective use of space; maintenance problems; housing regulation and restrictions; site selection and neighborhood considerations. Prereq: 6 hrs. from Economics 2110-20. F, W, S.

4440 Furniture Design (4) Analysis of human factors data in the design of body support, task support and storage systems; planning and production of construction drawings and scale models. Prereq: Senior standing. F.

4450-51 Advanced Interior Design I, II (6,6) Intensive interior design experiences to include complex design problems utilizing systematic design methodology. Project types to include multi-family housing, commercial and institutional environments, or complex working environments, assistance and critiques from area professionals. Prereq: 3452 for 4450. Courses should be taken in sequence or have consent of instructor. 4450-F; 4451-W.

4610 Studio Problems in Interior Design (3) Problems for seniors with special ability and interest in interior design. May be repeated to a maximum of 9 hrs. Prereq: Senior standing and consent of department. S.

4710 Contemporary Developments (1-4) Student or staff initiated course for study of special topic(s) pertinent to the field; topics selected to be determined by students and instructor with departmental approval. Elective credit only. May be repeated with consent of department. Maximum credit 12 hrs. Prereq: Consent of instructor. S.

4791 History of Contemporary Interior Architecture (4) History of interior architecture, including a study of furniture. Design and design philosophies of Europe and America are discussed in relation to the forces that shaped them: movements in the visual arts, technological advances, and the culture milieu. (Same as Art 4791.) F.

4792 History of American Interior Architecture (4) A study of particular historical periods and their expression in a number of distinct periods within the cultural context. (Same as Art 4792.) W.

4978 Honors: Interior Design (1-3) Problems for juniors and seniors with special ability and interest in interior design. Hours arranged. May be repeated. Maximum credit 9 hrs. Prereq: Consent of department head. E.

4988 Honors: Housing (1-3) Problems for juniors and seniors with special ability and interest in housing. Hrs. arranged. May be repeated. Maximum credit 9 hrs. Prereq: Consent of department head. E.

GRADUATE
Consult the Graduate Catalog for listing of graduate level courses.

Textiles and Clothing (971)

1160 Introduction to Design Analysis (3) Identification of the elements and principles of design, and application to contemporary apparel design and production. Analysis of the relationships of design to figure type, personality, color and fabrication. F, W, S.

1165 Apparel Construction (3) Fundamentals of pattern alteration, construction with emphasis on design, quality and construction compatibility. Prereq: 1160. 1 hr. and 2 labs. F, W, S.

1170 Design Analysis: Pattern Making (4) Apparel design analysis based on flat pattern, draping and construction techniques. Comparison of these methods for style variations and costing of garments. Prereq: 1160, proficiency or 1165 or equivalent. 2 hrs. and 2 labs. F, W, S.

2110 Fashion (3) How fashion world works, from designer to consumer, fashion trends and cycles. F, W, S.


3170 Advanced Apparel Production (3) Advanced apparel techniques and an experimental approach for contemporary fabrics and variations in garment style. Prereq: 1170. 1 hr. and 2 labs. W.

3330 Textiles (3) Textile products-study of consumer selection, preference, and satisfaction with emphasis on performance. For non-majors only. F.

3410 Cultural and Functional Aspects of Textiles and Clothing (3) Analysis of functional and historical developments and family relationships, economics; 4 hrs. of sociology or anthropology or psychology. F, S.

3420 Textiles I (3) Consumer-oriented study of textiles, emphasizing fibers, fabric construction, and finishing in relation to use, serviceability, and care of apparel and household fabrics. Prereq: 12 hrs. of chemistry or physics or biology or botany. E.

3429 Textiles Laboratory (1) Laboratory examination of fibers, yarns, fabrics, and finishes. Coreq: 3420. Restricted to majors, optional for non-majors. E.

4350 Contract Issues: Shopping for Contemporary Furnishings (3) Problems of clothing consumption encountered during various stages of family life cycle. Prereq: Junior standing. F.

4380 Historic Costume (3) Development of costume from ancient to modern times with consideration of historic, social, and economic settings. W.

3510 Fashion Merchandising: Planning and Control (1) Analysis of fashion merchandising practices and problems focusing on application of decision mechanisms. Prereq or coreq: 2110 and Accounting 2110. F.

4010 Textiles II (3) Recent textile developments with emphasis on manmade fibers, new construction techniques and finishes. Opportunity for individual investigation. Prereq: 3420. F, W, SU.

4110 Fashion Buying (3) Analysis of buying practices, purchasing activity, and calculation of cost. Market concepts fundamental to fashion merchandising. Prereq: 3510. S.

4120 Textiles Economics (3) Economic background of textile and apparel industry with emphasis on production, distribution, and technological advances, and the culture milieu. (Same as Art 4790.) F.

4130 Research Experiences (3-15) Individual juniors and seniors showing special abilities may be assigned to ongoing research within designated areas of research and development laboratory or quality control department of fiber, chemical, or textile company. Prereq: Recommendation of research advisor, 4010, 4140, and 3 hrs. of statistics. May be repeated. Maximum credit 15 hrs. E.

4140 Introduction to Textile Testing Methods (3) Methods and equipment used in physical testing as approved by recognized textile groups. Prereq: 3420, 3429. 1 hr. and 2 labs. S.

4210 Elementary Textile Microscopy (3) Microscopic techniques as applied to study of textile fibers and fabrics. Prereq: 4010. 1 hr. and 2 labs. W.

4220 Textile Fiber Chemistry (3) Chemistry of textile fibers with emphasis on structure, properties, preparation, and reactions. Implications relating to dyeing and finishing of fabrics. Prereq: One quarter of organic chemistry; 3 hrs and 1 lab. F.

4280 Design Analysis: Functional Apparel (3) A systematic approach to apparel design integrating aesthetic, psychological, social and physiological aspects of apparel problems for special reference groups. Garment specifications are translated for production. Prereq: 1170, 2170 and 3170. 2 hrs and 1 lab. W.

4410 Apparel Production Management (3) A management perspective of the apparel production industry. Emphasis on production planning, process, management of operating and control. Course work supplemented by plant tours and case studies on production problems. Field trips required. F.

4510 Teaching Materials (3) Investigation, preparation, and evaluation of teaching materials for students planning to teach or do home demonstration work. Prereq: 3440, senior standing. 1 hr. and 2 labs. F, W.

4620 Introduction to Field Experience in Merchandising (2) Interviews with store personnel; placement and training for human resource personnel. Prereq: Economics 2510-20. Junior standing, concentration in merchandising option, approval of program coordinator, and a minimum grade point average of 2.2. Open only to students who intend to enroll in 4630-40. May not be repeated. S.

4630 Field Experience in Merchandising (9) Off-campus, supervised experience in a cooperative pro-
gram with business establishments which merchandise textiles and/or apparel. Prereq: 3510, 4110, 4620, 9 hrs. of marketing, senior standing, major in merchandising, and a minimum grade point average of 2.2; coreq: 4640. Offered fall quarter only. F.

4640 Methods in Field Experience (6) Investigation of training systems and store organization, analyses of jobs, and evaluation of field experience. Prereq: 4620, senior standing, major in merchandising, and a minimum grade point average of 2.2; coreq: 4630. Offered fall quarter only. F.

4650 Problems in Fashion Merchandising (3) Investigation of methods affecting consumer response. Prereq: 4110, 4230, Marketing 3110-20. F.

4710 Contemporary Developments (1-3) Student or staff initiated course for study of special topic(s) pertinent to the field; topics to be determined by students and instructor with departmental approval. Elective credit only. Prereq: Consent of instructor. May be repeated with departmental approval for credit up to 9 hrs. W.

4978-88-98 Honors: Textiles and Clothing (3,3,3) Individual problems for juniors and seniors showing special ability and interest in textiles and clothing. Admission only upon recommendation of head of department. Hrs. arranged. E.

GRADUATE
Consult the Graduate Catalog for listing of graduate level courses.
The arts and sciences encompass the entire range of human knowledge, from the earliest records to the latest laboratory results. All that human beings have observed about themselves, about their societies, and about the natural world around them is of concern to one or another of the arts and sciences.

The curriculum of the College of Liberal Arts reflects this wide-ranging concern with the life of the mind. It emphasizes the breadth of human knowledge, perceived not only in terms of the traditional categories of the humanities and the natural and social sciences, but also in broader perspectives which extend across academic fields and reach beyond the boundaries of a college of liberal arts. It also stresses depth of learning, thereby seeking to acquaint the student with the rigors of the intellectual process. Through a study of the liberal arts one thus learns to participate in an intellectual tradition which is independent of particular teachers and which guides one in the choice of subjects for investigation and in the interpretation of those subjects. With time the individual begins to apprehend the great outlines of knowledge, the principles upon which they rest, the scale of their parts, and their lights and shadows.

The central purposes of a liberal education include the encouragement of intellectual tolerance, a dedication to the quest for knowledge as a worthwhile goal in and of itself, and the cultivation of a responsible, creative individual mind. These qualities should enable one to develop through life an ability to reason and to express oneself clearly, an incentive to absorb emerging knowledge, and a competence to confront the uncertainties of human experience. For the student whose interests and talent lead into research, scholarship, and teaching, a liberal education provides an invaluable foundation.

For the individual who enters business, industry, the professions, or government service, it furnishes a broadly useful and well-rounded educational background. For all, it offers the opportunity to share in a rich intellectual heritage, in the adventures of the mind, and in the life of the educated imagination. A liberally educated person is identified not so much by specific knowledge as by quality of mind and by creative response to the challenges of the times.

The college is committed to educating men and women to lead socially useful and personally meaningful lives. It endeavors to accomplish this mission by:
1. offering a comprehensive liberal studies program for liberal arts majors and for students in the other colleges of the university;
2. providing appropriate professional and graduate study in the arts and sciences;
3. conducting research and engaging in creative activity; and
4. serving the public interest in ways commensurate with the land-grant status of the University.

Through the programs which embody these activities, the college strives to encourage the intellectual, social, and personal development of each student in an academic community of students, faculty, and staff.

Association with the College
(See page 28.)

Programs of Study
Granting the broad, general goals of a liberal education, students come into the college with a wide variety of specific educational and vocational objectives. Recognizing this diversity, the college offers a number of different programs of study leading to the baccalaureate degree and also several pre-professional curricula which prepare the student for advanced study but do not lead to a degree from this college.

Degrees Offered
(1) BACHELOR OF ARTS
The Bachelor of Arts represents the attainment of a broad knowledge of the arts and sciences as well as a comprehensive understanding of one or more areas of special interest. Four programs leading to this degree are open to the student:
(a) Basic Program—The program appropriate for most B.A. students is developed around the basic skills and distribution requirements plus intensive study in one or more of the specified departmental or inter-departmental major fields described below.
(b) Individualized Program—Designed for students whose educational goals are best met by a program tailored to their particular needs, it is the same as the Basic Program in broad area requirements but permits the student to develop an individual concentration incorporating work in two or more departments.
(c) College Scholars Program—Intended for a limited number of students who are especially highly qualified and motivated who have been selected to undertake this honors program, the College Scholars Program permits the student maximum freedom to design a curriculum to meet particular interests and goals.
(d) Pre-Professional Program—The Pre-Professional Program is offered for those who wish to participate in one of the cooperative 3-1 curricula in the health sciences (medicine, dentistry, pharmacy, veterinary medicine, or medical technology). The student proceeds directly to specialized training in the chosen area after the third year of liberal arts study and offers the first year of professional study in lieu of a major concentration in the college in satisfying the requirements for the B.A. degree.

(2) BACHELOR OF SCIENCE
The Bachelor of Science degree, offered in selected departments and programs, is designed for those students who wish to pursue a more scientifically or professionally oriented program of study. Three programs leading to this degree are open to the student:
(a) Basic Program—The Basic Program for the B.S. degree contains basic skills and distribution requirements similar to the Basic Program for the B.A. as well as a unique set of requirements for the major including...
additional study in mathematics, statistics, or laboratory sciences.

(b) Bachelor of Science in Chemistry—The Bachelor of Science in Chemistry is a professional degree designed in accordance with standards set by the American Chemical Society to train students to go directly into positions in the chemical industry or to enter graduate study. Students may elect either the four-year resident program or a five-year cooperative program in which they alternate a quarter of study with a quarter of work in a chemical industry, and thus gain seven quarters of on the job experience while earning the degree.

(c) Bachelor of Science in Social Work—The program leading to the Bachelor of Science in Social Work is designed to prepare students for practice as beginning professional social workers. The program conforms to Council on Social Work Education Accreditation Standards.

(3) BACHELOR OF FINE ARTS

The Bachelor of Fine Arts degree represents an intensive study preparing students for graduate study and professional positions in art. The degree is offered with a major in studio art. Recommended course combinations for those who desire to concentrate on graphics, design/illustration, drawing, fiber-fabrics, interior area, painting, printmaking, sculpture, or watercolor are available in the art department office.

(4) BACHELOR OF MUSIC

The program leading to the Bachelor of Music degree prepares students for graduate study and for positions in which a professional degree is required. The degree is offered with concentrations in music theory, composition, electronic music, music history and literature, and applied music (voice, piano, organ; church music—organ or piano; church music—voice, piano; literature—multiple keyboard instruments, strings, woodwind, brass, and percussion instruments; multiple woodwind instruments; studio music and jazz; Suzuki string pedagogy).

Program Planning

Each student’s academic program is highly individualistic, reflecting that person’s special interests, goals, and aspirations. Usually it will reveal a growing intellectual sophistication and the development of particular motivations. On occasion, unfortunately, it gives indication of frustration and lack of clear direction. Viewed as a whole it may appear to be a miscellany of unrelated courses which were chosen almost capriciously; or it may be a carefully selected curriculum which the student brought together in a way which represented for that individual the most appropriate and effective way of attaining educational goals.

The importance of program planning can hardly be overstressed. A few students enter the college with firm educational objectives in mind and their programs develop quite readily around these predetermined goals. Many, however, do not reach that stage of certainty until their academic careers are relatively far advanced. For these the exploration of possible directions and programs, in consultation with faculty advisors, is an important part of the educational process. It is essential for these students to develop their programs carefully and creatively in order that maximum flexibility in their ultimate decision making may be assured.

A basic decision, of course, is the degree to be sought. If it is one of the four professional degrees (Bachelor of Fine Arts, Bachelor of Music, or Bachelor of Science in Chemistry, Bachelor of Science in Social Work), the student’s program will be somewhat circumscribed, for these degrees are necessarily more specific than the general liberal arts degree. If the student chooses to work for the Bachelor of Arts degree or the Bachelor of Science degree, all the elements which make up the curricula leading to that degree will need to be kept in balance: the broad requirements in the Basic Skills and Distribution requirements, the major area, and the elective courses which support and supplement the work in the first two categories. Most students find it desirable to lay a broad foundation by taking courses which will satisfy the Basic Skills and Distribution requirements in the first two years, thus reserve most of the final year for in-depth study in the area of concentration. Elective courses may be taken at any time.

Advisors in the Liberal Arts Advising Center (220 Ayres Hall), in the various major departments, in the University Counseling Center, and elsewhere on campus are available to assist students with their program planning. In the final analysis, however, only the student can determine the program which will best satisfy particular needs.

Requirements for Degrees

GENERAL REQUIREMENTS: Bachelor of Arts and Bachelor of Science Basic Programs Each student seeking a Bachelor of Arts or Bachelor of Science (excluding the Bachelor of Science in Chemistry and the Bachelor of Science in Social Work) must develop a program which includes the following:

1. All University degree requirements as stated in the front section of this catalog;
2. A minimum of 190 credit hours; (3) At least 60 credit hours in courses numbered 3000 or above; (4) Appropriate work to satisfy the basic skills requirements and the distribution requirements, counting no course in more than one area (not required in the College Scholars Program); (5) Completion of at least one major concentration (see below). Up to 8 hours in the major may also be used, where listed, to satisfy basic skills or distribution area requirements; (6) Students may take up to 30 hours of courses Satisfactory/No Credit in any area outside the major and minor, basic skills and distribution requirements; (7) Beginning in Fall 1987, no credits earned forremoval of association deficiencies may be used to satisfy requirements for graduation.

I. PROGRAMS LEADING TO BACHELOR OF ARTS AND BACHELOR OF SCIENCE DEGREES (excluding the Bachelor of Science in Chemistry and the Bachelor of Science in Social Work).

The B.A. and B.S. degrees share the same program Basic Skills and Distribution requirements, except where noted on pages 148 and 149.

Basic Skills

(1) English Composition

Purpose:
1. To gain and improve the skills necessary to write English expository prose coherently and convincingly;
2. To improve reading skills;
3. To enhance critical and analytical abilities as applied to key issues and texts.

Requirement: Students may meet this requirement in one of the following five ways:

1. By completing nine credit hours in English writing courses in one of the following series:
   (a) English 1010 or 1011, 1020, and three additional credits drawn from 1031, 1032, or 1033 (English Composition). Students who complete 1020 with a grade of A have the additional option to satisfy the remaining three credits in any 3000-level or 4000-level writing course offered by the department.
   (b) English 1016-26-36 (Honors: English Composition). Students who obtain a grade of A or B in 1028 have the additional option, with permission, to satisfy the remaining three credits in any 3000-level or 4000-level course offered by the department.
   (c) English 1431-41-51 (English Composition for Foreign Students).
2. By earning a score of 4 or 5 on the College Board Advanced Placement Test in English; or, with special permission, by earning a score of 3 on that examination and completing one 2000-level course in English at The University of Tennessee, Knoxville with a grade of B or better.
3. By completing three hours of freshman English followed by a minimum of six hours in courses which require substantial writing emphasis and are identified by the Committee on Writing Standards; a list of approved courses may be obtained in the office of the Department of English or the Liberal Arts Advising Center.
4. By earning a score of 25 or above on the English ACT exam and a composite ACT score of 25 or above and by passing a proficiency examination in writing administered by the Department of English in cooperation with the Committee on Writing Standards.
5. By obtaining CLEP credit for English composition (as described on page 34 of this catalog).

(2) Foreign Language

Purpose:
1. To learn the basic grammar, syntax, and vocabulary of a foreign language;
2. To be able to use a foreign language independently as a tool for oral communication and reading;
3. To acquire techniques of language learning;
4. To develop insight into the phenomenon of language;
5. To complement the study of certain aspects of a foreign culture or civilization.

Requirement: Completion of the intermediate level (for most languages, the
Requirement: One course chosen from those listed below (total: 3 to 4 hours).

1. Students with a Math ACT score of 24 or above, or those who pass a waiver or proficiency examination on material equivalent to any of these courses, will be exempted from this requirement. Standards for waiver or proficiency examination will be set by the appropriate department. Exemption from this requirement is limited to students who complete a three-course mathematics or statistics package under Divisional Distribution.

2. All Bachelor of Science majors must complete a three-course mathematics or statistics package that includes at least two calculus courses and either an additional three-quarter mathematics or statistics package or an additional three-quarter laboratory science sequence. This requirement has been incorporated into the major statement by each department offering a Bachelor of Science degree.

Under the conditions stated above, the following courses fulfill this requirement:

- Mathematics 1101-20 (1108-28-38) Introductory Symbolic Logic
- Mathematics 1140 Basic Mathematical Skills, 1700 Pre-calculus Mathematics

Distribution

(1) Divisional Distribution

Non-U.S. History

Purposes:

1. To acquire an appreciation for the richness of the past as a statement on human nobility, aspiration, and achievement.
2. To develop an historical perspective on a civilization that differs from or serves as a foundation for studying one's own;
3. To develop the ability to explore continuity and change among historical events and movements, and to be able to assess them critically;
4. To learn to keep one's own place and time in proper perspective, and to appreciate it more fully because of an awareness of human creativity as revealed through a study of the past of a civilization;
5. To further develop writing skills.

Requirement: Completion of a two-course, writing emphasis, lower-division sequence in Non-U.S. History (total: 8 hours). International students may fulfill this requirement with a U.S. History sequence. The following sequences satisfy this requirement:

- History 1510-20 Western Civilization, History 1518-28 Honors Western Civilization, History 1610-20 World Civilization
- Latin American Studies 2510-20 Introduction to Latin American Studies

Natural Science

Purposes:

1. To know and understand the basic vocabulary of at least one scientific discipline;
2. To learn the basic discoveries and their importance in one scientific discipline;
3. To be able to use the tools (i.e., mathematics, laboratory equipment, computers, etc.) of one scientific discipline;
4. To understand how to devise hypotheses and how to devise and perform experiments to test them;
5. To learn to apply the methods of at least one scientific discipline in a "hands on" laboratory experience;
6. To be able to analyze a situation on a college level from one particular scientific perspective.

Requirement:

- All Bachelor of Science majors must complete a three-course mathematics or statistics package that includes at least two calculus courses and either an additional three-quarter mathematics or statistics package, or an additional three-quarter laboratory science sequence. This requirement has been incorporated into the major statement by each department offering a Bachelor of Science degree.

Part I: A three-course physical or biological science sequence that includes at least two quarters of laboratory experience (total: 12 hours). The following sequences satisfy Part I of this requirement:

- Astronomy 1610-20-30 (2118-28-38) Introductory Astronomy with Lab (Honors)
- Biology 1210-20-30 General Biology
- Botany 1110-20-30 (1118-28-38) Fundamentals of Botany (Honors)
- Chemistry 1110-20-30-38 (1118-28-38) General Chemistry (Honors)
- Chemistry 1010-20-30 General Chemistry
- Chemistry 1010-20-30 Introductory General, Organic and Biochemistry
- Geography 1110-20-30 Geography of the Natural Environment
- Geology 1410-20-30 General Geology I, II, III
- Physics 2210-20-30 Elements of Physics
- Zoology 1118-28-38 Honors Fundamentals of Zoology

Part II: A three-course package in science, mathematics, and/or computer science (total 9 to 12 hours). The following course packages or any sequence listed in Part I will satisfy this requirement:

- Anthropology 2510-2930-3070 Human Origins - Bio. of Human Races - Genetics and Society (Same as Botany 3070); Anthropology 2510-2910-2920 Human Origins - Human Paleontology - Human Identification
- Astronomy 1510-20-30 Introductory Astronomy
- Zoology 2920-30-Biochemistry 3110 Human Physiology - Introduction to Biochemistry
- Zoology 2920-30-Microbiology 10 Human Physiology - General Microbiology; Botany 3011-Zoology 3090 (Same as Botany 3090); Zoology 3410 Plants and People - Biology and Human Affairs - Bioethics
- Botany 3010-20-30 Plants in Evolution - Field Botany
- Geography 3510-20-30 Meteorology - Climatology - Land Surface Systems
- Mathematics 1840-50-60 (1848-58-68) Single Variable Calculus (Honors)
- Mathematics 1841-51-3861 Calculus for Biological Sciences - Math Models in the Life Sciences
- Mathematics 1550-60-3000 Calculus - General Mathematics - Quantitative Methods
- Physics 1210-20-30 Introductory Physics
- Physics 1410-20-30 Nature of the Physical World
- Zoology 2510-20-30 Human Biology

Social Science

Purposes:

1. To promote understanding of society and individual relationships;
2. To develop a critical understanding of
one or more approaches, perspectives, or methodologies used in the social sciences;
3. To develop analytical skills relevant to
current social, economic, or political problems, their origins in society and
individuals, and possible perspectives for their resolution.

Requirement: Four or five courses (total: 15-
16 hours) selected from at least two
departments or programmatic areas. The
following courses satisfy this requirement:
- Afro-American Studies 2010 Introduction to
Afro-American Studies; Afro-American Studies 2020 Introduction to Afro-American Studies
- Anthropology 2520 Prehistoric Archaeology;
Anthropology 2530 Human Cultures;
Anthropology 3420 Linguistic Anthropology
(Same as Linguistics 3420); Anthropology 3670 Principles of Archaeology
- Botany 3050 Socio-economic Impact of Plants.

Economics 2510 Principles of Economics;
Economics 2520 Principles of Economics;
- Geography 1620 Introduction to Geography;
Geography 3000 Man, Location, and Behavior;
Geography 3660 Cultural Geography.

Human Services 2690 Introduction to Human Services.


Music 3361 Introduction to Ethnomusicology; Music 3371 Introduction to Ethnomusicology.

Political Science 2020 Introduction to Political Science; Political Science 2510 U.S. Government and Politics; Political Science 2520 Historical Political Science; Political Science 3110 Political Community.

Psychology 2500 (2518-28) General Psychology (Honors); Psychology 2520 Biological Foundations of Behavior;
Psychology 2530 Psychology as a Social Science; Psychology 2540 Psychology of the Individual.

Religious Studies 3021 Religious Myth, Symbol and Ritual.

Sociology 1510 (1518) General Sociology (Honors); Sociology 1520 (1528) Sociology of Social Problems (Honors); Sociology 1530 Contemporary Social Change; Sociology 3130 Social Psychology.

Speech 1211 Communication and Society; Speech 1221 Introduction to Speech Communication; Speech 3031 Non-verbal Communication.

Women's Studies 2020 Women in Society;
Women's Studies 3150 Gender in Society (Same as Sociology 3150).

Humanities

Purpose:
1. To learn to appreciate and interpret significant literary, philosophical, or religious texts by study and application of selected methods or traditions of thought;
2. To further develop abilities to reason critically, to construct arguments, to think creatively, to analyze objectively, to assess evidence, to perceive assumptions, and to respond to and appreciate values;
3. To further develop writing skills;
4. To learn to manipulate symbols (i.e., words, sounds, images, body movements) in a variety of ways and to employ these symbols critically, affectively, and evaluatively;
5. To develop abilities to participate as an enlightened observer or as an artist in a discipline within the visual, spatial, musical, theatrical, rhetorical, or written arts.

Requirement:
Part I: Literature or Philosophical Perspectives. A two- or three-course package in either literature or a philosophical perspective (total: 8-9 hours).

The following course packages are designated as literature packages:
- Classics 3510-20 Greek Literature in English Translation—Roman Literature in English Translation.
- English 2510-20 English Masterpieces;
English 2531 and either 2532 or 2533
American Masterpieces;
English 2560-70-80 (2 out of 3 in chronological order) Literature of the Western World; English 2660-70-80 (2 out of 3) Introduction to Literary Genres.
French 2010-20-30 French Literature in English Translation
German 2210-20-30 German Literature in English Translation.

Medieval Studies 2601-02 Literature of the Dark Ages (5th-10th centuries) - Literature of the Later Middle Ages (11th-15th centuries).
Religious Studies 3222-33 Themes in Classic Works; Religion and Literature: 20th Century.

Russian 2210-20-30 Russian Literature in English Translation.

Spanish 2910-20-30 Spanish and Spanish American Literature in English Translation.

Women's Studies 2010-15 Biography and Autobiography Fiction, Poetry and Drama.

The following course packages are designated philosophical perspectives packages:
- Classics 2210-20-30 Greek and Roman Mythology.
- Philosophy 1511-21 Value and Reality—Consciousness and Reality; 1611-21 Psychology to 1900-500 to Early 20th Century.
- Political Science 3801-02 Studies in Ancient Political Thought-Studies in Medieval Political Thought; Political Science 3803-04 Studies in Early Modern Political Thought-Studies in 19th and 20th Century Political Thought.
- Religious Studies 2210-20 Founders of Religion; Religious Studies 2310-20 Criticism of Religion; Religious Studies 3370-80 The Christian Tradition; Religious Studies 3805-06 Professional Responsibility-Responsible Professionalism (Same as Phil. 3605-06).

Women's Studies 3430-35 The Concept of Woman-Philosophy of Feminism (Same as Phil. 3430-35).

Part II: Arts, Literature or Philosophical Perspectives. Either two courses in the study or practice of the arts; or a two-course package in literature if a philosophical perspectives package is chosen to meet Part I; or a two-course package in philosophical perspectives if a literature package is chosen for Part I (total: 6-8 hours).

The following are designated Practice of the Arts courses:

* Three-course package required for completion of Part I; a two-course package will meet the minimum requirement for Part II.

Art 1105 Introduction to Studio Art; English 2410 Creative Writing: Fiction and Poetry.

Music 1416 Music Performance; Speech & Theater 2031 Introduction to Oral Interpretation; Speech & Theater 3651 Oral Interpretation of Prose; Speech & Theater 3661 Literature and Oral Interpretation of Poetry.

The following courses are designated Study of the Arts courses:
Art 1815 World Art I; Art 1825 World Art II.

Classics 2320 Art and Archaeology of Ancient Greece; Classics 2330 Art and Archaeology of Etruria and Rome.

Music 1000 Fundamentals of Music Theory; Music 1210 Orientation in Music Appreciation; Music 1220 Orientation in Music Appreciation; Music 1300 History of Rock.

Theater 1200 Fundamentals of Play Production; Theater 1330 Fundamentals of Play Production; Theater 1340 Fundamentals of Play Production.

(2) Upper Level Distribution
Bachelor of Arts students must satisfy two of the following three options. Bachelor of Science students must satisfy one of the following three options. It is recommended that these requirements be fulfilled after the student has achieved upper-division standing (completion of 96 hours).

U.S. Studies Option

Purpose:
1. To develop an appreciation and knowledge of U.S. culture and civilization;
2. To provide a basis from which to compare foreign cultures and civilization;
3. To develop an understanding of the sources of values and traditions that constitute contemporary U.S. civilization;
4. To develop an understanding of the relationship between individual and societal behavior;
5. To further develop writing skills.

Requirement: This option will be satisfied by taking any two of the following courses (total: 6-8 hours).

- Afro-American Studies 3630 History and Philosophy of Afro-American Education; Afro-American Studies 3640 Contemporary Issues in Afro-American Education; Afro-American Studies 4810 The Family (Same as Child & Family Studies 4810); Afro-American Studies 4830 Black Women in American Society.
- Anthropology 3575 Afro-American Anthropology; Anthropology 3611 Archaeology of U.S. and Canada II; Anthropology 4740 Southern Appalachian Folk Culture.
- English 3311 Women in American Literature; English 3320 Regional Identities in American Literature; English 4445 Film and American Culture; English 4560 Black American Literature and Aesthetics.
- Geography 3910 Geography of the U.S. and Canada; Geography 3920 Geography of the American South; Geography 3040 Geography of Appalachia; Geography 4240 Historical Geography of the U.S.
Music 3950 Evolution of Jazz; Music 4241 Music of the United States.
Philosophy 3311 American Philosophy (Colonial Period-19th Century); Philosophy 3312 American Philosophy (19th-20th Century); Philosophy 3440 Ethics and American Society; Philosophy 3670 Philosophical Foundations of Democratic Societies.
Political Science 3190 Popular Culture & American Politics; Political Science 3390 Contemporary History in American Public Policy; Political Science 3415 Law in American Society; Political Science 3800 American Political Thought.
Religious Studies 3510 Religion in America (Colonial Period-19th Century); Religious Studies 3520 Religion in America (20th Century); Religious Studies 3550 Religion and Racism in America (Same as Afro-American Studies 3550); Religious Studies 3560 Black Religion in America (Same as Afro-American Studies 3560).
Sociology 3420 Urban Problems; Sociology 3780 African Society; Sociology 4030 Society and Law; Sociology 4820 American Minority Groups.
Speech 4930 Studies in American Public Address.

Theater 3262 History of American Theater; Theater 3265 History of American Theater; Woman's Studies 3010 Emergence of the Modern American Woman; Woman's Studies 4280 Women in American History (Same as History 4280): Women's Studies 4580 Rhetoric of the Women's Rights Movement.

Foreign Studies Option

Purpose:
1. To develop an appreciation and knowledge of a foreign culture and civilization;
2. To provide a basis from which a student can analyze his or her own culture;
3. To develop a critical understanding of the sources of values and traditions that constitute a foreign culture and civilization;
4. To develop an understanding of the relationship between individual and societal behavior in a highly interdependent world system;
5. To further develop writing skills.

Requirement: This option will be satisfied by taking two upper-division courses in one of the following areas: Africa, Asia, Europe, Latin America, Ireland, Middle East, or Critical Issues in Foreign Studies (total: 6-8 hours). If Western Civilization is taken to satisfy the history requirement, the European concentration may not be elected here. This option may also be satisfied by Literature courses in Arabic, Chinese, French, German, Greek, Hebrew, Italian, Japanese, Latin, Portuguese, Russian, Sanskrit, or Spanish. (Literature courses in English translation will not meet this requirement.)

Africa
Anthropology 3530 Peoples and Cultures of Africa; Anthropology 4610 African Pre-history; Geography 3820 Geography of Africa; Political Science 3615 Dynamics of Black African Politics; Political Science 3616 Dynamics of Black African Politics;
Asia
Arts 3775 Art of India; Arts 3776 Art of China; Arts 3777 Art of Japan.
History 3810 East Asia: History & Culture to 1600; History 3820 East Asia Since 1600. Political Science 3621 Government & Politics of the People's Republic of China. Religious Studies 3650 Philosophy and Religion in India (Same as Phil. 3650); Religious Studies 3660 Buddhist Philosophy and Religion (Same as Phil. 3660); Religious Studies 3671 Religion and Philosophy in China (Same as Phil. 3671); Religious Studies 3672 Religion in Japan.
Europe
Classics 3310 Art and Archaeology of the Aegean Bronze Age & Early Greece (Europe and the Middle East); Classics 3340 Cities of the Greek and Roman World (Europe-Africa); Classics 3810 Greek Civilization; Classics 3820 Roman Civilization.
English 3050 English Culture (Up to 1660); English 3051 English Culture (1660-Present); English 3820 Comparative European Literature; English 3950 Comparative European Literature.
Geography 3880 Geography and the Soviet Union.
German 3610 Culture of the German-Speaking Peoples; German 3620 Culture of the German-Speaking Peoples; German 3630 Culture of the German-Speaking Peoples. History 3124 Modern Europe 1750-1900; History 3125 Contemporary Europe 1900-Present.
Medieval Studies 4010 Seminar in Medieval Studies.
Philosophy 3111 Ancient Greek Philosophy; Philosophy 3121 Medieval Western Philosophy; Philosophy 3131 17th & 18th Century Philosophy; Philosophy 3141 19th Century Philosophy.
Political Science 3631 Government & Politics in the Soviet Union; Political Science 3632 Government & Politics in the Soviet Union; Political Science 3635 Politics of Western Democracies; Political Science 3636 Politics of Western Democracies.
Russian 3710 Background and Main Currents of Russian Culture; Russian 3720 Background and Main Currents of Russian Culture.
Women's Studies 3240 Women in French Culture; Women's Studies 3830 Women in the Greek and Roman World.

Latin America
Anthropology 3580 Peoples and Cultures of Mosocamerica.
Economics 4231 The Political Economy of Latin America.
Geography 3790 Geography of Middle America; Geography 3800 Geography of South America.
History 3870 History of Latin America (to 1825); History 3880 History of Latin America (1825-Present).
Latin American Studies 4001 Cultural Plurality in Latin America; Latin American Studies 4002 Institutional Changes in Latin America.
Political Science 3625 Latin American Government; Political Science 3626 Latin American Government.

Middle East
Arab Studies 3340 Islamic Culture; Arabic Studies 3670 Islamic Literature in Translation.
History 3790 The Traditional Middle East; History 3790 The Modern Middle East.

Religious Studies 3110 Ancient Israel's Historical & Religious Traditions; Religious Studies 3120 The Rise of Judaism; Religious Studies 3680 Islam.

Critical Issues in Foreign Studies

Afro-American Studies 4210 Pan-Africanism; An Afro-American Perspective.
Economics 3310 Comparative Economic Systems; Economics 3320 Principles of Economic Development.
History 3050 The West and the Third World Since 1870; History 3051 Revolutions in Historical Perspective.
Political Science 3605 Political Change in the Developing Areas; Political Science 3701 Introduction to International Relations; Political Science 3766 Contemporary Problems of Soviet Foreign Policy.
Sociology 3340 Comparative Poverty and Inequality (Same as Afro-American Studies 3340); Sociology 4540 Development and Underdevelopment.

Capstone Experience Option

Purpose:
1. To offer an intensive integrative experience which will substantially broaden the student's comprehension of the major;
2. To significantly increase an understanding of the ways in which the ideas, methods, and achievements in a major area of study have affected modern society;
3. To examine a major field of study from a value-oriented perspective;
4. To enhance student's mastery of prose communication within the professional context of their major.

Requirement: This option will be satisfied by taking six to eight upper-division hours chosen from the courses listed below. Consult with major department for additional approved courses. Course credits should be taken in the major area unless otherwise approved by the department. It is recommended that this option be satisfied during the senior year (within 45 credit hours of graduation).

Chemistry 4000 Topics in the Development of Chemistry; Chemistry 4811 Senior Seminar; Chemistry 4812 Senior Seminar; Chemistry 4813 Senior Seminar; Classics 4220 Seminar in Classical Studies. History 4000 Reflections on History; History 4010 Colloquium in History.

Human Services 4300 Working within the System; Mathematics 4910 Senior Topics; Mathematics 4940 Mathematical Modelling; Facebook 4000 Forefront of Physics; Psychology 4910 Senior Seminar on Great Ideas in Psychology.

Areas of Concentration

(1) Required Major

In many ways the most important part of each student's program is the major, for it is in this intensive study of one more or less limited field of knowledge that the individual begins to find a niche in the vast world of intellectual endeavor. The major may be drawn from the offerings of a single department or it may bring together related concerns of two or more departments. In either case the student should work out a program of study which has a definite design and aims at some overall objective. Guidelines are published by each major department or