Eds. 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 1540 or 1840; Psychology 2500; Physics 1540; 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 activities courses; Physical Educ. 3560 and 4330.

SPECIALIZED PROFESSIONAL EDUCATION .................................... 35 hours
Physics 1320, 1330; Math 1580-60; Anthropology 3900; Zoology 2980 and 3060.

SPECIALIZED PROFESSIONAL PHYSICAL EDUCATION ................................ 9 hours
Physical Educ. 3250, 4110, 4115, and 3570.

GENERAL ELECTIVES ...... 25 to 33 hours
Maximum of 6 hours in 1000 and 2000-level Physical Educ. Major activity courses or 2700-level courses; Physical Educ. 2920, 2930 and 4940; Math 1540 or 1840; Psychology 2500; Physics 1540; 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 ...... 30 hours
Accounting 3000, Communications 1110, Journalism 2215, 2220, 3410, 3417, and 4410; and a minimum of 15 hours selected from the following: Advertising 2750, 3610, 3650, 3670, 4020, 4040, Journalism 2320, 3310, 3910.

PROFESSIONAL PHYSICAL EDUCATION ........................................ 27 hours
Any two Physical Educ. 1000, 2000 or 2700-level activity courses; Physical Educ. 2765, 3000 or 3910, 4260 and six hours from the following: 4260 or 4330 or 4340, and any two from the following: 3110, 3120, 3130, 3190, or 3200.

GENERAL ELECTIVES ...... 25 to 33 hours
Maximum of 6 hours in 1000 and 2000-level Physical Educ. Major activity courses or 2700-level courses; Physical Educ. 2920, 2930 and 4940; Math 1540 or 1840; Psychology 2500; Physics 1540; and any five 1000 and 2000-level Physical Educ. Major activities.

TOTAL MINIMUM REQUIRED ..... 200 hours

4. Sports Management Track

GENERAL EDUCATION ...... 81 to 89 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; Natural Science electives (12 hours including Physics 1450); Math 1540-50-60; and any ten 1000 or 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 ...... 38 hours
Accounting 2110-20-30; Economics 2510-20; Statistics 2100, Management 3460; and 15 hours selected from the following: Advertising 3000, Communications 1110, Finance 3120, Management 3010, Marketing 4140, 4210, and Business Law 4110, 4120.

PROFESSIONAL PHYSICAL EDUCATION ........................................ 13 to 14 hours
Physical Educ. 2765, 3000 or 3910, 4260 and six hours from the following: 4260 or 4330 or 4340.

GENERAL ELECTIVES ...... 37 to 46 hours
Maximum of 6 hours in 1000 and 2000-level Physical Educ. Major activity courses or 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. Sports Communications Track

GENERAL EDUCATION ...... 77 to 85 hours
English 1010 and 1020 and 1032; Speech 2311; Math 1540; Psychology 2500; 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; Natural Science electives (12 hours including Physics 1450); and any ten 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 ...... 41 hours
Advertising 3000, Broadcasting 4010, Communications 1110, Journalism 2215, 2220, 3410, 3417, and 4410; and a minimum of 15 hours selected from the following: Broadcasting 2750, 3610, 3650, 3670, 4020, 4040, Journalism 2320, 3310, 3910.

PROFESSIONAL PHYSICAL EDUCATION ........................................ 27 hours
Any two Physical Educ. 1000, 2000 or 2700-level activity courses; Physical Educ. 2765, 3000 or 3910, 4260 and six hours from the following: 4260 or 4330 or 4340, and any two from the following: 3110, 3120, 3130, 3190, or 3200.

GENERAL ELECTIVES ...... 25 to 33 hours
Maximum of 6 hours in 1000 and 2000-level Physical Educ. Major activity courses or 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

B. Minor in Coaching (29-32 hours)
Zoology 2920 and 2930 or 3080, and 4940; Physical Educ. 3000, 3250, 3320, 3190, 4220, 4160, and any two of the following: 3110, 3120, 3130, 3190, and/or 3200.

C. Major in Dance
GENERAL EDUCATION ............... 91 hours

Communications (15 hours)
English 1010 or 1011; 1020 and 1031 or 1032 or 1033; Speech 2311.

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)
Sociology 1510 or 1520 plus 4 hours of electives.

Health and Safety (3 hours)
Health and Physical Education 1052, 2040-50-60, 2070, 3010-20, 3040-41, 3069-61-62, 3070-75, 3350 or 4300, 3320, 4020, 4050, 4060, 4080-90, 4550, 4560.

CONCENTRATION AREAS ......... 12 hours
Ballet: Physical Education 4000, 4005, or Modern: Physical Education 3030, 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 (29-31 hours)

Option I. Physical Education 2070, 3040, 3060-61-62; 4 hours selected from 3010 and/or 3020; 6 hours selected from 3075 or 4000 or 4005.

Option II. Physical Education 2070, 3010, 3040, 4080, 4090; 2040-50-60 or 3060-61-62; 4 hours selected from 3070 and/or 3075; 6 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 ............... 98 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: chemistry, physics, geology, astronomy, and Geography 1810, 1820, 3530. 4 hours selected from: biology or botany, zoology, the areas of anatomy or physiology. At least 8 additional hours selected from any or a combination of the above.

Mathematics (3-4 hours)

Social Sciences (18 hours minimum)
Sociology 1510 and 4530; at least eight additional hours selected from Sociology 1520, 3130, 3410, 3420, 3869, 4330, 4560, or Rural Sociology 3420 or Human Services 2580, 4900, 3300 or Political Science 2530, 2020, 2510-20, 3565-66, 3710-20, Economics 2510-20, 2001, 3220, 3240.

Behavioral Sciences (16 hours minimum)
Psychology 2500; at least 12 additional hours selected from: Psychology 2540, 3120, 3550, 3650, 3616-26 or Educ. Psych. 2430, 2510-20, 4130, 4800, or CFS 2110, 3210-20, 4260, 4610, 4810.

Communications (16 hours minimum)
English 1010 or 1011; 1020 and 1032; Speech 2311; and Journalism 3710.

Health and Safety (3 hours minimum)
School Health 3210, Public Health 3210 or Safety 3520.

Humanities (16 hours minimum)
At least 4 hours selected from English 2000 level and above; at least 3 hours selected from history; at least 9 additional hours selected from English 2000 level and above, History 1510-20, 1560-60, 2510-20, 2350, Anthropology 2530, Geography 3660, Classics 2810-20, 2910-20, 3210-20-30, 3310-20-30, 4010, Philosophy 1510-20, 3210, 2410, 3315, 3530, 3910, Religious Studies 2510, 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, 4260, 4270, Theatre 2525-53-54, 3262-63, Art 2715, 2725, 3735-36, 3765-66, 1815-25, P. E. 2070, 3090, 3151.

PROFESSIONAL RECREATION
EDUCATION ......................... 24 hours
Recreation 1110, 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 (9-12 hours) in each:


Dance: P. E. 2711-12-13, 2728, 2747-48-

ELECTIVES ......... 66 hours

TOTAL MINIMUM REQUIRED ..... 192 hours

F. Major in Public Health Education

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

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

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

Humanities (16 hours)
English—any 4 courses from literature; Anthropology 2510-20; Philosophy or religious studies elective (4); Art or music elective (4).

Mathematics (4 hours)
English—any 4 hours from literature.

Science (20 hours)
Chemistry or physics sequence (4, 4, 4); 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 3010-20-30-30 (9) or Public Health 9 hours at the 4000 level Non-Teacher Certification.

SPECIALIZED PROFESSIONAL
EDUCATION .......................... 29 hours

Education C & I 4750
Education C & I 4720 and Public Health 4700-10-20 or
Public Health 4100, 4700-10-20 (9) and
Public Health 4740 (6) - Non-Teacher Certification

School Health 3650
Educational and Counseling Psychology 3100.

Special Education 3333

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

Public Health required courses (12): 3310, 3320, 3330, and 4220; Public health electives (6); School health required courses (9): 3410, 3420, 3620; Safety required courses (3): 3520; Biology 1230; Microbiology 2910-19; Psychology 3150; Sociology 1520; Sociology 3130; Nutrition 1233; electives (12).

Special Note: If some of the specific courses
Requires admission to Teacher Education Program.

TOTAL MINIMUM REQUIRED ...... 190 hours

G. Major in School Health Education

GENERAL EDUCATION .................. 87 hours
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 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 1301*--20*-30*.

SPECIALIZED PROFESSIONAL EDUCATION .......................... 29 hours
Education C & I 14750, 4710 and 4720; Education and Counseling Psychology 3100; Health 3650, 4100; Special Educ. 3333.

TEACHING AREAS AND ELECTIVES .......................... 66 hours
School Health required courses (9): 3410, 3420, 3620; School Health electives (3): 4750, 4810-20-30; Public Health required courses (9): 3310, 3320, 3330; Public Health electives: Safety 3520, Biology 1230, Microbiology 2910, Psychology 3150, Sociology 1520, Social Psychology 3110, Nutrition 1230, electives.

TOTAL MINIMUM REQUIRED ...... 190 hours

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

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

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

I. Minor in School Health Education (30 hours)
School Health 3000, 3210, 3410, 3650, 3420; Safety 3520; Public Health 3310, 3320, 4410; Nutrition 1230 or School Health 4420 or School Health 3620.

VI. Special Education*
Concentration in Speech and Hearing
NOTE: Only grades of C and above in the major area of study will be credited for certification and graduation.

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 (18 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*--20*-30*.

SPECIALIZED PROFESSIONAL EDUCATION .......................... 19 hours
Psychology 2500 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, 4040, 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
Total 200 clock hours necessary for State Certification.

*Requires admission to Teacher Education Program.
*Requires admission to Teacher Education Program.

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 humans 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 4450-60-70-80, 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 or 4320; Accounting 2110; Marketing 3110-20, 4110, 4310, 4150; Finance 3120; Management 3010; Business Law 4110; Vo. Tech. Ed. 4440; Textiles and/or Advertising electives (6 hours).

TOTAL MINIMUM REQUIRED ...... 183 hours

*(Requires admission to Teacher Education Program.

*(Requires admission to Teacher Education Program.
Communications (12 hours)

Psychology (7-8 hours) Social Studies (12 hours)

Natural Science (12 hours) Psychology (4 hours) electives.

Mathematics (3-4 hours)

Health and Physical Education (3 hours)

GENERAL EDUCATION 67 hours

EDUCATION 42 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)

Psycho 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

EDUCATION 3610, Cont. & Higher Educ. 3960 and electives taken from an approved list with approval of advisor.

PROFESSIONAL INDUSTRIAL EDUCATION 45 hours

VTE 3830, 3860, 4010, 4820, 4830, 4840, 4850, 4851, 4860, 4895.

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 58 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.
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), instrumental music (voice principal), elementary music education (piano or organ principal), and instrumental music.

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

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.

2101 Basic Experiences in Classroom Music (3) Vocal, instrumental, 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, rhythmic, listening, music reading, and creative activities. Prereq: Offered after first semester of first year of vocal instruction, fall, and spring quarters. 1 hr. and 2 labs. A.

2411-12-13 Materials, Methods, and Techniques of String Class Instruction (2, 2, 2) Structure, use, techniques of playing, care, and repair of principal string instruments in school instrumental organizations. Emphasis on techniques necessary for basic understanding and effective teaching of the instruments. Practical use of current instructional materials. 2 hours per week. 2411-F; 2412-W; 2413-S.

2421-22-23 Materials, Methods, and Techniques of Woodwind Class Instruction (2, 2, 2) Structure, use, techniques of playing, care, and repair of principal woodwinds in school instrumental organizations. Emphasis on techniques necessary for basic understanding and effective teaching of the instruments. Practical use of current instructional materials. 2 hours per week. 2421-F; 2422-W; 2423-S.

2431-32 Methods, Materials, and Techniques of Brass Class Instruction (2, 2) Structure, use, techniques of playing, care and repair of principal instruments in school instrumental organizations. Emphasis on techniques necessary for basic understanding and effective teaching of instruments. Practical use of current instructional materials. 2 hours per week. 2431-F; 2432-S.

2440-41-42-43 Teaching Class Piano (1, 1, 1, 1) For majors in Music Education. Technique, methods and materials of teaching piano. Prereq: Consent of instructor. E.

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

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

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 Educ. 3100 and at least one course in sculpture or crafts. W.

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.

3220 Learning Through Studio Experiences: Sculpture and Craft Design (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 program. Prereq: Art Educ. 3100 and at least one course in sculpture or crafts. W.

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

3500 Art and Music Appreciation in the Elementary School (4) For majors in Elementary Education. Media, techniques, and styles 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 off-campus centers and the student teaching program; describes the objectives and policies of the student teaching program; meets special needs of student teachers; raises awareness of professional liability. The pre-student teaching seminars must be completed the quarter immediately preceding the student teaching. Prereq: Accepted for student teaching. F.

4230-42-43 Teaching Class Piano (1, 1, 1) For majors in music education, or elementary education. Prereq: Approval of instructor. A.

4510 Choral Methods and Materials (3) Organization and administration, teaching techniques, choral literature, and interpretation. Prereq: 1010-20; 4420; one year of vocal instruction, two quarters of each. A.

4600 Marching Band Techniques (3) Functions, organization, and direction of a marching band. Prereq: Senior standing and approval of instructor; coreq: 3511. F.

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

4441-42-43 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 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 vocal instruction, two quarters of each. A.

4620-42-43 Teaching Class Piano (1, 1, 1) For majors in music education, or elementary education. Prereq: Approval of instructor. A.

4700 Graduate Student Teaching (3) Prereq: Consent of instructor. E.

4800 Strategies for Teaching Art (3) Readings on teaching art and planning for teaching; development of lesson plans for elementary classrooms. Prereq: Art Educ. 3100 and 9 hours in art Education. S.

4810 The Administration and Organization of Recreational Arts and Crafts Programs (3) Purpose of art education in the development of activities, organizational procedures, resources, and coordination required in community arts and crafts programs. A.


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

1400 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 Field Experience in Teaching: Elementary (2) Field experiences in which students perform tasks related to teaching elementary primary or intermediate grade levels in elementary school. S/NC.

2020 Field Experience in Teaching: Secondary (2) Field experiences in which students perform tasks related to teaching in the secondary school. S/NC.

2090 Field Study in Education (3) Problems of teachers in action serve as the fields of methods of teaching, curriculum materials, school-community relationships, and school organizations. Undergraduate credit only. E.

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

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

3150 Analysis of Teaching (3) Use of interaction analysis to describe and classify verbal interchanges between teacher and student; related non-verbal behavior techniques. Prereq: Consent of instructor. S.

3180 Microteaching (3) Emphasis upon the development of instructional skills. Students teach a series of lessons to small groups of students in elementary or secondary schools. Lessons are videotaped, and the students and instructor evaluate the teaching behaviors recorded on the tape. Prereq: Consent of instructor. F.

3280 Teaching Language Arts in the Elementary School (3) Methods and materials. Undergraduate credit only. Prereq: Educ. Psych. 3340 or equivalent, admission to Teacher Education. E.

3260 Teaching Language Arts in the Elementary School (3) Methods and materials. Undergraduate credit only. Prereq: Educ. Psych. 3340 or equivalent, admission to Teacher Education. E.

3270 Teaching Social Studies in the Elementary School (3) Study of content of Social Studies and development of concepts relevant to the elementary school. Prereq: 3280 and admission to Teacher Education. E.

3290 History of Education in the United States (3)

3360 The Teaching of Social Studies, Grades 7-12 (3) For description, see 3653. Prereq: Admission to Teacher Education. F, S.

3363 Teaching Language, Composition, and Speaking, Grades 7-12 (3) For description, see 3653. Both this course and Educ. C&I 3562 are required for certification in English. Prereq: Admission to Teacher Education. W.

3715 Developing Science Content Concepts for Elementary School (3) Study of content of science and development of concepts relevant to the elementary science program. Prereq: Admission to teacher education.

3720 Teaching Science in the Elementary School (3) Methods and materials, undergraduate credit only. Prereq: Educ. Psych. 3340 or equivalent, admission to Teacher Education. E.

3751 Teaching of Mathematics: Numerical and Algebraic Concepts, Grades 7-12 (3) For description, see Educ. C&I 3563. Both this course and 3562 are required for certification in mathematics. Prereq: Admission to Teacher Education. F.

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

4100 Pre-Student Teaching Seminar (1) (Seminar) 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 seminars must be completed the quarter immediately preceding student teaching. Fall quarter student teachers complete prep seminar, spring seminars, and summer seminars. Prereq: full admission to the Teacher Education Program. Undergraduate credit only. May not be repeated for credit.

4500 Special Topics (1-6) Topics to be assigned. May be repeated. Will be offered for letter grade or S/NC.

4501 Independent Study (1-6) Topics to be assigned. May be repeated. Will be offered for letter grade or S/NC.

4522 Supervised Readings (1-6) Topics to be assigned. May be repeated. Will be offered for letter grade or S/NC.

4111 Non-Western Education: Anthropological Approaches (3) (Same as Anthropology 4150.)

4610 School Library Administration (3) (Same as Library and Information Science 4610.)

4710 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.

4715 Elementary School Science School (3) Methods and materials used in teaching of science in elementary schools. Developmental and diagnostic correction programs. Not open to students with recent course or background in teaching of elementary school science.

4721 Teaching Elementary School Mathematics (3) Methods and materials used in teaching of mathematics in elementary school. Developmental and
diagnostic/corrective programs. Not open to students with recent course or background in teaching of elementary school mathematics.

4217 Teaching Elementary School Language Arts (3) Materials and methods used in teaching of elementary school language arts. Development of functional relationships with other curriculum areas, diagnostic procedures, and programming for learning-disabled students. Not open to students with recent course or background in teaching of elementary school language arts.

4240 Classroom Instructional Organization (3) Developing understandings and skills relating to grouping, individualization, space utilization, organization, grading, integration, and achieving an effective social environment. For elementary classroom teacher. Prereq: Senior standing.

4280 Orientation to Corrective Practices for Classroom Reading Problems (3) An orientation to the basic practices in diagnosing and correcting reading problems in the regular classroom. The inexperienced or beginning teacher deals with the collection and interpretation of reading behavior information and the prescription of corrective teaching. Prereq: A course in the teaching of reading.

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

4303 Language Development of Children: Birth-Preadolescence (3) In-depth view of language development from birth to preadolescence: application of process of language development to instructional programs for early and middle childhood. F, S, SU.

4304 Developing Reading Skills in Content Fields (3) Study of approaches and techniques for the teaching of reading in the 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 inservice programs designed for improvement of instruction. May be repeated. Maximum credit 9 hours. S/NC.

4410 Educational Sociology (3) (Same as Sociology 4410) F, S.

4430 Practicum in Teaching in the Elementary School (3) Practicum experience in elementary school classroom teaching designed for students seeking elementary certification who have obtained degrees in areas other than elementary education and who have obtained degrees in areas other than this. Application must be filed with the student teaching office at least one quarter prior to registration for practicum. Prereq: 3260-70-80, 3350, 3570; Educ. Psych. 3430; Library Service 3510; minimum grade point average of 2.0. Undergraduate credit only. S/N, F, W, S.

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

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

4530 Home and School Relations (3) Study of need for improved communication and sharing of knowledge and skills in leadership roles. Sections are designed for resident assistants, student government leaders, student activities, and other student organizations. Prereq: Consent of instructor. S/NC only.

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

Higher Education (267)


Assistant Professor: W. D. Barton, Ed.D. Tennessee.

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

5544-55 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 activities, 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.)

Educational Counseling and Psychology (311)

Consult the Graduate Catalog for listing of graduate level courses.

Education (289)

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

Educational Leadership

Educational Administration and Supervision (292)

Consult the Graduate Catalog for listing of graduate level courses.

Educational Administration and Supervision (292)

Consult the Graduate Catalog for listing of graduate level courses.

Educational Counseling and Psychology (311)
contemporary culture. Topics include self-awareness, interpersonal skills, environmental awareness, values clarification and socialization. W.

2230 Career Development (3) Vocational opportunities and aspirations, including self-appraisal, career planning, decision making, skills and educational exploration, and vocational development. F, W.

2299 Developmental Laboratory (1) Repeatable to three credit hours. Specialized laboratory experiences in the development of skills related to academic, personal, or career development. E.

3000 Field Experience (1) Field experiences in working with children and youth and their teachers. Students will perform various teaching tasks and be given opportunities to act in teaching roles. May be repeated for a total of 6 hours. E.

3100 Learning Principles (4) The acquisition, retention, and transfer of information and skills, and major steps in problem solving and reasoning. E.

3110 Classroom Behavior Management (3) Understanding of and action in use of multiple contemporary techniques and approaches in achieving effective classroom discipline and management. Prereq: Psychology 2500, Ed. Psych. 3100 or equivalent. E.

3430 Child Study (3) Child learning and development: study of individual children, ages 5-12. Coreq: either Ed. Psych. 2000 or a 2 hr./week field experience. Prereq: Psychology 2500, Ed. Psych. 3100 or equivalent. E.

3550 Child Psychology (3) (Same as Psychology 3550.)

3810 Adolescent Psychology (3) Physical, emotional, intellectual, social, career, and ethical dimensions of adolescent development, major emphasis given to effective communication with adolescents within the educational setting. Prereq: Psychology 2500, Ed. Psych. 3100 or equivalent. E.

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 seminars must be completed the quarter immediately preceding student teaching. Fall quarter student teachers complete pre-student teaching seminars spring quarter. Prereq: full use of multiple contemporary education programs. Undergraduate credit only. May not be repeated for credit. S/NC only. F, W, S.

4110 Psychology of Sex Role Development (3) Examination, from both a theoretical and research base, of factors which contribute to sex role development, with attention to changes in sex role definition in society and role of education in these changes. Aimed at the undergraduate or graduate student with minimal background in behavioral sciences. (Same as Psychology 4115.) F, S, SU.

4130 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 introductory course in psychology or the consent of the instructor. W, SU.

4350-60-70 Special Topics and Problems (1-6, 1-8, 1) Courses to be offered for letter grade or S/NC and may be repeated. E.

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

4551-52-53 Student Leadership Workshops (1, 1, 1) Series of small group and individualized experiences to develop knowledge and skills required of students in leadership roles. Sections are designed for resident assistants, student government leaders, student activities, and other student organizations. Prereq: Consent of instructor. S/NC. E.

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

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

4760 Advanced Child Study (3) Prereq: 3430 or 3810 or consent of instructor. F, SU.

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

4820 Psychology of the Inner-City School Child (3) Extends the School of Health, educational, and social factors affecting children in inner-city schools. W.

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


Associate Professors: R. J. Piersky, 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. F.

4010-20-30 Problems in Safety (1-3, 1-3, 1-) 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 and environmental aspects of injury prevention; the interrelationships in sports injuries 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 undergraduate students, graduate students, teachers, supervizers, and administrators. May be repeated for credit.

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

Health Education (449)

1110 Principles of Personal Health and Wellness (3) To develop the ability to approach health scientifically, and to develop confidence in judgments affecting personal health and wellness. E.

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

2050 Alcohol/Drugs and the College Student (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/wellness 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, S.

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 in Advanced First Aid and Emergency Care. (Applicant must be at least 18 years of age for certification). E.

3410 Health Curriculum Construction and Instruction (3) Principles of health curriculum construction and study of innovative K-12 health curricula. F. S.

3420 School Health Services (3) Development, maintenance, and protection of health of students including examination, screening, special services, communicable disease control, emergency care, and school health records. S.

3510 The School in Community Health (3) Role of teacher in community health education; school’s responsibility in promoting healthful living and the place of existing media and agencies in program. Not open to health and physical education majors. E.

3610 Methods in Elementary Health Instruction (3) Preparation and presentation of health topics. Teaching method is emphasized and student participation stressed. Required for elementary teachers. Prereq: 1110 or 3510 or Nutrition and Food Sciences 1110. E.

3620 Sex Education as it Relates to Human Sexuality (3) Exploration of the science of human sexuality. Emphasis on the trends, methodology and materials in sex education. F. S.

3650 Methods in Secondary Health Instruction (3) Preparation and presentation of health topics. Teaching method is emphasized and student participation is stressed. Prereq: 3410. W.

4100 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 seminar is designed to act in teaching roles. May be repeated for credit. Fall quarter student teachers complete pre-student teaching seminars spring quarter. Prereq: full admission to the Teacher Education Program.
4120 Alcholism and Alcohol Education (3) Explores problems of alcoholism. Emphasis on factors which make alcoholism a serious health and safety problem. Various types of instructional/educational and intervention programs. F, W, S.

4130 Suicide and Suicide Intervention (3) Explores problems of suicide. Emphasis on factors which make suicide a serious health problem. Various types of instructional/educational and intervention programs. S, W.

4140 Death, Dying and Bereavement (3) Exploration of theories of death and dying. Education and other processes to mitigate the trauma of death and dying. F, W, S.

4140 Consumer Health and Safety Education (3) Survey of major consumer health and safety problems; selecting, purchasing, and financing of safety and medical services. (Same as Public Health 4410.) F, W, S.

4141 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 Emergency Care Instructor. Applicant must be at least 21 years of age for certification. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate.

4142 Cardiopulmonary Resuscitation (2) Theory and Skill development. Basic cardiac life support following cardiac arrest due to such conditions as heart attack, drowning, electrocution, suffocation, poisoning, exposure, intoxication, and vehicular and other accidents. Educational and preventive aspects of controlling cardiovascular disease. (Same as Safety 4412.) F, W, S.

4240 Drug Abuse Education (3) Drug abuse problem and suspected causes; pharmacology of drugs and its 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.

4500-10-20 Field Practice in Health Education (3-5, 3-5) Off-campus health education internship or field practice in educational or other agency with qualified supervised. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate. May be repeated. May be taken for credit or not for credit. F, W, S.

4401 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 Emergency Care Instructor. Applicant must be at least 21 years of age for certification. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate.

4420 Consumer Health and Safety Education (3) Survey of major consumer health and safety problems; selecting, purchasing, and financing of safety and medical services. (Same as Public Health 4410.) F, W, S.

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 Emergency Care Instructor. Applicant must be at least 21 years of age for certification. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate.

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

4420 Drug Abuse Education (3) Drug abuse problem and suspected causes; pharmacology of drugs and its effects on society and methods of drug abuse education.

4500-10-20 Field Practice in Health Education (3-5, 3-5) Off-campus health education internship or field practice in educational or other agency with qualified supervised. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate. May be repeated. May be taken for credit or not for credit. F, W, S.

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.

4500-10-20 Field Practice in Health Education (3-5, 3-5) Off-campus health education internship or field practice in educational or other agency with qualified supervised. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate. May be repeated. May be taken for credit or not for credit. F, W, S.

4401 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 Emergency Care Instructor. Applicant must be at least 21 years of age for certification. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate.

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4420 Drug Abuse Education (3) Drug abuse problem and suspected causes; pharmacology of drugs and its effects on society and methods of drug abuse education.

4500-10-20 Field Practice in Health Education (3-5, 3-5) Off-campus health education internship or field practice in educational or other agency with qualified supervised. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate. May be repeated. May be taken for credit or not for credit. F, W, S.

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.

4500-10-20 Field Practice in Health Education (3-5, 3-5) Off-campus health education internship or field practice in educational or other agency with qualified supervised. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate. May be repeated. May be taken for credit or not for credit. F, W, S.

4401 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 Emergency Care Instructor. Applicant must be at least 21 years of age for certification. Prereq: 3210 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 Emergency Care Instructor. Applicant must be at least 21 years of age for certification. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate.

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

4420 Drug Abuse Education (3) Drug abuse problem and suspected causes; pharmacology of drugs and its effects on society and methods of drug abuse education.

4500-10-20 Field Practice in Health Education (3-5, 3-5) Off-campus health education internship or field practice in educational or other agency with qualified supervised. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate. May be repeated. May be taken for credit or not for credit. F, W, S.

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.

4500-10-20 Field Practice in Health Education (3-5, 3-5) Off-campus health education internship or field practice in educational or other agency with qualified supervised. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate. May be repeated. May be taken for credit or not for credit. F, W, S.

4401 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 Emergency Care Instructor. Applicant must be at least 21 years of age for certification. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate.

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

4420 Drug Abuse Education (3) Drug abuse problem and suspected causes; pharmacology of drugs and its effects on society and methods of drug abuse education.

4500-10-20 Field Practice in Health Education (3-5, 3-5) Off-campus health education internship or field practice in educational or other agency with qualified supervised. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate. May be repeated. May be taken for credit or not for credit. F, W, S.

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.

4500-10-20 Field Practice in Health Education (3-5, 3-5) Off-campus health education internship or field practice in educational or other agency with qualified supervised. Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate. May be repeated. May be taken for credit or not for credit. F, W, S.
scouting, individual and team offensive and defensive strategies. Prereq: 2062 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 beginning arrangements. Prereq: Consent of instructor. W.

3130 Coaching of Track and Field (2) Examination of current coaching methods and training techniques for 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, practice 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 social and cultural movements on the development of sport and physical education from ancient primitive to twentieth century civilization. Prereq: At least junior standing. W.

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 for 3-to-5-year-old children. Prereq: Intermediate level swimming ability. A/F or S/NCS. 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. W.

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. E.

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

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

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

3480 Educational Gymnastics for Children (3) The theoretical principles to six dance forms for children. Prereq: 3350 or consent of instructor. W.

3500 Secondary Field Experience I (2) The design and implementation of learning units appropriate to the teaching of secondary physical education. Prereq: 2300 and all P.E. Major activity courses, and admission to Teacher Education.

3550 Social-Psychological Aspects of Sport and Physical Education (3) An overview of major topics dealing with social psychological influences which affect behavior in a physical education and/or sport environment. Prereq: At least junior standing. W.

3580 Human Growth and Motor Development (3) Structural and functional changes in man from birth to old age and their effects upon physical performance and skill development. F. S.

3570 Developmental Trends in Movement Performance of Children (2) Motion characteristic of basic movement patterns evolving in children with an emphasis upon understanding movement performance as a product of interaction of biophysical percepto-cognitive, and psycho-social variables. Prereq: Admission to Teacher Education or consent of instructor. W.


3720 Philosophy of Sport and Physical Education (3) Philosophical implications of the physical education and sport; specific emphasis on examination of metaphysical, epistemological and axiological status of physical education and sport. Prereq: At least junior standing. W.

3800 Special Topics (1-3) Study in selected disciplinary or professional areas of physical education. May be repeated.

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.

4000 Intermediate Advanced Ballet Technique (2) Emphasis on styles and methods of intermediate/advanced classical ballet techniques, intermediate/advanced pointe work, battery, and petit allegro. Prereq: 3075. 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 and implementation of dance movements, and advanced pointe work. Prereq: 4000. Available to dance majors and minors or with consent of instructor. May be repeated. Maximum credit 6 hrs. 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: 3030. 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 the theory of rhythmic concepts. 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.

4051 Sociology of Sport (4) Prereq: or coreq. 2850 or consent of instructor. F.

4060 Advanced Composition (4) Application of compositional, production, and administrative skills culminating in the presentation of two complete choreographic works. Prereq: 3020, 4205.

4080 History of Dance I (3) A survey of the dance of various societies and cultures from pre-history through the nineteenth century. 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 theatre, recreation, and education during the twentieth 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 objectives and policies of the center and the student teaching program; completes 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/NCS only. (Same Ed. CSE 4100, AE Ed. 4100, Music Ed. 4100, Ed & Counseling Psych. 4110, Bus. Ed. 4100, Physical Health 4100, and Bus. Ed. 4100-J.) F. W. S.

4110 Advanced 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 Advanced Physical Education Laboratory (1-2) Practical work, including student teaching, supplementing the classroom work. Prereq: P.E. 3300 or consent of instructor. W.

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.

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. Undergraduate 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 relating to health related aspects of fitness. 2 hrs. and 1 lab. Prereq: At least junior standing. W.

4200 Motor Behavior Teaching Methods (3) Application of theory and styles of teaching the teacher/learning environment: planning, presenting, and evaluating lessons concerning knowledge, strategies, and skills for physical activity, games, and sport. Prereq: 3650, minimum of 15 hrs. P.E. Major activities 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: 3032, Physics 1450, 1310 or consent of instructor. W.

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 Children (3) Approaches to the design and implementation of preschool, elementary, and middle school movement programs. Prereq: Admission to Teacher Education, or consent of instructor. F. W. S.

4260 Practicum for Physical Education Majors (1-10) Experiences in the community to support and clarify career goals. Prereq: Consent of instructor.

4300 Intermediate Tap Technique (2) Instruction in intermediate and advanced pointe work, batterie, and petit allegro. Prereq: 4205. May be repeated. Maximum credit 4 hours. Prereq: Admission to Teacher Education or consent of instructor. W.

4330 Directed Independent Studies (1-3) Independent study in a specialized area within physical education. Prereq: Consent of advisor. May be repeated. E.

4360 Techniques of Games Forms (2) Study of non-traditional games which includes personal skill development with application to teaching techniques. Prereq: At least junior standing.

4385 Techniques of Folk, Square, and Ballroom Dance (2) Development of intermediate to advanced level of skill 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 in spring, balance beam, vault, and women’s apparatus and tumbling. Emphasis will be placed on spotting and teaching techniques. Prereq: 1042 and 4164. 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 coreq: 4200.
2728 Folk and Square Dance (2)
2730 Physical Fitness: Conditioning (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)
2749 Modern Dance Advanced (2)
2750 Modern Jazz (2)
2752 Paddleball Elementary (2)
2755 Racquetball Elementary (2)
2756 Physical Fitness: 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)
2778 Tap Dance Elementary (2)
2779 Tap Dance Intermediate (2)
2781 Tennis Elementary (2)
2782 Tennis Intermediate (2)
2783 Tennis Advanced (2)
2784 Track and Field (2)
2785 Tumbling Elementary (2)
2786 Tumbling Intermediate (2)
2787 Tumbling Advanced (2)
2789 Volleyball Elementary (2)
2790 Volleyball Intermediate (2)
2792 Physical Fitness: Exercise and Weight Control (2)
2794 Weight Training Elementary (2)
2795 Weight Training Intermediate (2)
2797 Wrestling Elementary (2)
2798 Wrestling Intermediate (2)

Public Health (839)

Professors:
C. B. Hamilton (Chairperson), Dr. P. H. Oklahoma; J. Gorski, Dr. P. H. U.C.L.A.; B. C. Wallace, Ed.D. Colorado State.

Associate Professor:
R. J. Pursley, Ph.D. Iowa.

Assistant Professors:

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

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

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

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 seminars must be completed the quarter immediately preceding student teaching. Fall quarter student teachers complete pre-student teaching seminars in spring quarter. Prereq: full admission to the Teacher Education Program. Undergraduate credit only. May not be repeated for credit. S/NC only.

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

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

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

4700-10-20 Field Practice in Public Health (3, 3, 3) Field practice in public health under supervision of public health profession. S/NC. E.

4730 Workshop in Public Health Education (3-6) For teachers, nurses, case workers, sanitarians, and other voluntary and public health agency personnel. Emphasizes the problem-solving approach through small group interaction, case method, and critical incident technique. May be repeated for credit.

4740 Public Health Fieldwork (6) Field practice in public health under the supervision of public health profession. S/NC. E.

4840-50-60 Problems in Public Health Education (1, 1, 1) Individual identification and study of current problems in public health education. Extensive reading of literature required.

GRADUATE Consult the Graduate Catalog for listing of graduate level courses.
Recreation (853)

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

Associate Professor: K. L. Krick, Re.D. Indiana.

Assistant Professor: M. D. Blanton, Re.D. Indiana.

1000-2000-3000 Field Practice (2, 3-3, 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. E.

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 relationships 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, promotion of selection 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, boating, camping, fishing, orienteering, and nature interpretation without disturbance 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, caving, orienteering, and nature interpretation with disturbance of natural environment without destruction or disturbance of plant and animal habitats. Prereq: Consent of instructor. F, A.

3710 Camp Counseling (3) History and philosophy of camping movement, counselor leadership and professional 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 (18) Full-time practice in an approved recreation agency. Emphasis on supervisory and administrative procedures. Prereq: 1000, 2000, 3000, senior standing. S/N/C. E.

4100 Recreation Administration (3) Introduction to recreation administration, including planning, personnel, areas and facilities, program services, finance, and public relations. Prereq: 3140, 3200, 3880 or consent of instructor. F, S.

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

4310 Camp Administration (3) Program planning and operation, 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 specialized area within the broad field of recreation. For recreation students only. May be taken for variable credit 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 Professors: S. M. Benner, Ed.D Columbia; K. H. Kopp, Ph.D. Peabody; S. W. Mulkey, Ph.D. Florida State.

Instructors:

A. M. Griffin, M.S. Tennessee; D. D. McCampbell, M.S. Tennessee; N. E. Tedder, M.S. Minnesota; G. D. Tyler, M.S. Tennessee; M. K. Warden, M.S. Tennessee.

Lecturer:

O. E. Reece, B.S. Memphis State.

It is possible to plan a program which will lead to certification in Speech and Hearing. For planning a program, the student must consult with an advisor in the chosen area. Certification is available at the graduate level. NOTE: Only grades of C and above in the major area of study will be credited for certification and graduation.

Speech and Hearing: 3310, 3330, 3710, 4030, 4040, 4310, 4320, 4330, 4340, 4341, 4342, 4400, 4720, 4930. Other courses from Audiology and Speech Pathology 4200.) W.

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

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

3333 Education of the Exceptional Child (3) Principles, characteristics, and special needs; local and state programs for diagnosis and care; educational provisions in regular or special classes; home teaching; social and vocational guidance. 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/Language Hearing Programs in the Schools (3) Comprehensive study of the organization, administration of school programs. Also, other settings, hospitals, institutions, private practice, professional certification levels, legislation, careers. W.

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

1100 Pre-Student Teaching Seminar for Teachers in Special Education (1) Seminar to provide students with additional information about student teaching. Prereq: Courses required for Teacher Education in Special Education. F, W, S.

1110 The Nature and Concept of Mental Retardation (3) Identification, description, and study. W, S.

1120 Education of the Mentally Retarded Child (3) Philosophy and rationale underlying the teaching and guidance of the mentally retarded. Methods and materials in special and regular classes. Prereq. or corq: 4110 and admission to Teacher Education. F, W, S.

1130 Education of the Brain-Injured Child (3) Nature of brain-injured children; skills for identifying educational, physical, and emotional characteristics; special educational techniques. Prereq: Admission to Teacher Education.

1150 Education of Children with Crippling and Special Health Conditions (3) Medical and educational characteristics of children with crippling and special health conditions; appropriate educational modifications and associated services. Prereq. Corq: 3333 or consent of instructor and admission to Teacher Education. F, W.

4100 Education of Partially Sighted Children (3) Curricular adjustments and materials; home visits for parents of partially sighted children. May be special needs.

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

4200 Practicum in Speech Development of Hearing Impaired (3) Application of theories and techniques of speech development and improvement for hearing impaired children. Prereq: 4190 and consent of instructor. (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 (3) Techniques for individuals who are deaf. Prereq: knowledge of a 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 development; auditory training, speech reading, manual language, and its relation to other forms of communication. Observation practicum. (Student must acquire a degree of proficiency in use of manual language.) Prereq: Consent of instructor. E.

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

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

4250 Introduction to the Psychology and Education of the Hearing Impaired II (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-
4310 Stuttering (3)(Same as Audiology and Speech Pathology 4250.) F, W, S.

4290 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.

4290 The Teaching of Reading to Hearing Impaired Children (3) Reading activities, developmental approaches, theories, and specialized materials for curricula in teaching reading. Prereq: Admission to Teacher Education. W.

4310 Stuttering (3) (Same as Audiology and Speech Pathology 4310.) F, W, S.

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

4330 Clinical Practice in Speech Pathology (1-4) (Same as Audiology and Speech Pathology 4330.) F, S.

4340 Clinical Practice in Speech Pathology (1-4) (Same as Audiology and Speech Pathology 4340.) S, F.

4341 Clinical Practice in Communication Disorders in Schools (3) Prereq: Audiology and Speech Pathology 4320-30-40. Special Ed. 4500, and consent of instructor. S/N: F, S.

4342 Seminar in Communication Disorders in Schools (3) Prereq: Audiology and Speech Pathology 4320-30-40, Special Ed. 4500, and consent of Instructor. F, S.

4350-60-70 Problems in the Education of Exceptional 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/N: Consent of instructor. F, W, S.

4371-60 Problems in Residential Education (1-6) Special Ed. 4950, and consent of Instructor. F, S.

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

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

4520 Language-Speech Handicapped Child in the Classroom (3) Recognition, understanding, observation of communication disorders; information on referral procedures; laws, mediation; incorporation of speech improvement-language development activities into regular curricular programs; education and training of students majoring in special education programs. Audiology and Speech Pathology. F, W, S.

4610 Nature and Characteristics of Learning and Behavior Disorders (3) Forms of academic and socially disturbing behavior, degrees of severity, possible causes, and relationships to each other. Relationships with respect to personality characteristics and 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, teaching 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 Behavior Problems (3) Practicum in residential settings in area of behavior problems, developmental activities, developmental approaches, theories, and specialized materials for curricula in teaching reading. Prereq: Admission to Teacher Education. W.

4640 Practicum in Public School Systems Serving Children with Learning and Behavior Problems (6) Academic tutoring in a teacher aide capacity to 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.) F, S.

4740 Evaluating Exceptional Students (3) Explores mandates relative to evaluations, introduces basic statistical concepts relative to norm- and criterion-referenced testing. Prereq. Sp. Ed. & Rel. 3330 or consent of instructor and admission to Teacher Education. W, S.

4810 Student Teaching Mental Retardation (3) Prereq: Consent of Instructor. Major in education of mental retardation. S/N: Consent of instructor.

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

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

4870 Student Teaching with Hearing Impaired Children (9) Supervised practicum with preschool, day school, and residential pupil. S/N: Consent of instructor.

4871 Practicum with Hearing Impaired Children (6) S/N: Consent of instructor.

4980 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, 4356, 4740. S/N: Consent of instructor.

4981 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, 4356, 4740. S/N: Consent of instructor.

4982 Student Teaching in Special Education (1-4) 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, 4356, 4740. S/N: Consent of instructor.

4983 Student Teaching in Special Education (1-6) Individual tutoring and classroom observation and teaching. Prereq: or coreq: Educ. C&I 4750 and Information Science 4750.

4984 Student Teaching in Special Education (1-4) Individual tutoring and classroom observation and teaching. Prereq: or coreq: Educ. C&I 4750 and Information Science 4750.

4985 Aural Rehabilitation: Speechreading and Auditory Training (3) (Same as Audiology and Speech Pathology 4985.) F, S.

4990 Introduction to the Verbal-Tonal System (4) (Same as Audiology and Speech Pathology 4990.) G, W.

4990 Introduction to the Verbal-Tonal System (4) (Same as Audiology and Speech Pathology 4990.) G, W.

4990 Introduction to the Verbal-Tonal System (4) (Same as Audiology and Speech Pathology 4990.) G, W.

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

Technical and Adult Education

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.


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: Consent of instructor.

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

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

4130 Special Topics (1-3) Topics to be assigned. May be repeated for a maximum of 9 hours. S/N: Consent of instructor.

4146 Individual Study in Vocational-Technical Education (1-3) Individual study must be approved by supervising instructor and the service area coordinator or department head. Approval form must be filed in the Office of the Department Head. May be repeated.

4750 Utilization of Instructional Media (3) (Same as Educ. C&I 4750 and Information Science 4750.) G, W.

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, and evaluating agricultural mechanics programs. Prereq: Agriculture 1120, Agricultural Mechanization 3110, and/or consent of instructor. 2 hours and 2 labs.

4230-31-32 Problems in Agri-business Education (1-6, 1-6, 1-6) Total not more than 9 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 (4-6) Offered in offcampus 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: Consent of instructor. G, W.

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 the business teacher.

4310 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 is to be completed the quarter immediately preceding student teaching. Fall quarter student teachers complete pre-student teaching seminars spring quarter.

4460 Coordination Techniques in Distributive Education (2) Selection of training agencies; lab analysis; selecting and briefing the training supervisors; advisory committees; adult education and other community services. Prereqs: 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. Prereqs: 2240, 3240. To be taken by students in the quarter immediately preceding student teaching. W.

4400 Teaching in Community-Based Home Economics Programs (4) Planning and implementing community-based home economics programs. Procedures, methods, and evaluation of home economics courses. Prereq: Consent of instructor. S/N only.

4500 Field Experience in Home Economics Community-Based Programs (2) 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 community agencies which utilize home economics skills and knowledge. Prereq: Consent of instructor. S/N/C only. May be repeated.

4510 Teaching Occupational Home Economics (2) Methods, organization and curriculum development for Home Economics Related Occupational programs. Prereq: or coreq: 4240 and 4509.

4610 Student Teaching in Vocational Home Economics (10) Off-campus teaching centers. Prereqs: 2240, 3240, and 4240. S/N/C.

4611 Student Teaching in Vocational Home Economics (2) Taken with 4610. Prereqs: 2240, 3240, 4240. Coreq: 4610. S/N/C.

4718-28-38 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. Engine tune-up and engine overhaul techniques and procedures are studied and practiced.

1620 Graphic Communications (3) Drafting as a means of communication in technology. Orthographic and multi-view drawing, projection, strain gauge, pictorial techniques, and applications of photography.

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

1640 General Metals (3) An introductory course dealing with processes, equipment, materials, products, and organization of the industry. Introduction to ironwork processes in basic machining, foundry, sheetmetal, forging, heat treatment, arc and gas welding, fabrication and the use and care of common metalworking tools.

1642 Welding and Cutting Practices (3) Prereq: 1640.

1661 General Woodworking (3) Basic course dealing with processes, tools, equipment, products, organization of the industry. Emphasis placed on safety and use of hand tools and basic machinery.

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

2830 Industrial Graphics (3) Auxiliary views, sections, conventional practices, fasteners, dimensioning, working drawings, and machine drafting. Prereq: 1620.

2850 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.

2852 Electronics Technology (3) Basic principles and application of electronics. Undergraduate credit only.

2841 Machine Tool Processes (3) Introductory course of the function, care, set-up, operation, and theory of basic machine tools. Prereq: 1640.

2852 General Plastics (3) Characteristics of thermoplastics and thermal setting materials, methods of determination, and resin conversion to finished product.

2860 Furniture and Cabinet Construction (3) Comprehensive study of cases and carcass construction with emphasis placed upon furniture and built-ins. Prereq: 1661.

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.

3612 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 treat- ment, fabrication, and precision measurement. Prereq: 2641.

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

3651 Plastic Processing (3) Plastics production equipment and related product design and processing of plastics. Prereq: 2552 and 1651.

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

3672 Graphic Arts Reproduction Processes (3) Graphic arts skills in printing and duplicating techniques and other modes of graphic communication.


3810 Related Science, Mathematics, and Technology (6) Undergraduate department approval for registration. Applicants must show evidence of

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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.

3812 Knowledge of Related Subjects in Occupations and Personal Qualifications (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)

3860-61 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, trouble-shooting, and synthesis of systems, including microprocessor applications. Prereq: 3630.

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


4860-51 Curriculum Building in Trade and Industrial Subjects (3, 3) Arranging 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.

4860-61-62 Problems in Industrial Education (3, 3, 3)

4870 Numerical Control (3) Tooling, manual programming, automatic programming, 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.

4880-81-82 Seminar in Industrial Education (3, 3, 3) Educational innovations, current events, problems, and other topics associated with the field of industrial education.

4885 Organization and Development of Vocational Industrial Clubs of America (VICA) (3) Designed to give the industrial education teacher experiences and an understanding of the organization and operation of VICA. Prereq: Undergraduate degree and 3 year teaching experience when taken for graduate credit.

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

4891 New Developments in Industrial Education (3) Educational innovations, current events, problems, and other topics associated with the field of industrial education.

4892 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, 9, 15) Cooperative work experience as a trainer or supervisor in an industry, business or health institution. Supervision of the experience is conducted by a person in management and the university coordinator. Seminar required. Prereq: Senior standing and VTE 4815. S/NC only.

GRADUATE

Consult the Graduate Catalog for listing of graduate level courses.
College of Engineering

William T. Snyder, Dean
William A. Miller, Associate Dean
William K. Stair, Associate Dean
Andrew W. Spickard, Associate Dean

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

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

The college had its beginnings early in the history of the University when surveying was introduced into the curriculum in 1858. In 1877 civil engineering was first recognized as a curriculum. The first mechanical course appeared in about 1847; other mechanical courses followed, and in 1877 this body of engineering was designated as mechanical engineering. By 1877 mining had found a place in the University, but it was later dropped. Electrical engineering appeared about 1896, when a Professor of Physics and Electrical Engineering was appointed. Although metallurgy was announced in the catalog as early as 1888, the program was dormant until it was revived in the Department of Chemical Engineering shortly after 1940. A separate degree in metallurgical engineering was authorized in 1947. Although the rudiments of chemical engineering appeared in the form of industrial chemistry shortly after 1900, a full chemical engineering program and a department were not established until 1936. Industrial engineering was introduced in 1940, was dropped for a time during the war years, and was reinstated in 1947.

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

The first dean of the college, Professor Charles E. Ferris, was appointed in 1912. Prior to that time the engineering programs were organized as a school, with a chairman of the faculty. Other former deans are Nathan W. Dougherty, who served from 1940 to 1956, Armour T. Granger, who served from 1956 to 1965, Charles H. Weaver, who served from 1965 to 1968, Fred N. Peebles, who served from 1968 to 1980, and Robert E. C. Weaver, who served from 1981 to 1983.

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 build-
ing 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 Departments 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 engineering education, classrooms, and laboratories of the Department of Industrial Engineering.

**Berry Hall**

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

**Tau Beta Pi National Headquarters**

The college is honored to have the National Headquarters of Tau Beta Pi, the National Engineering Honor Society, housed on our campus. This honor was earned in part through the untiring efforts of R.C. "Red" Matthews, who served as secretary-treasurer for the organization from 1905 to 1947. The suite of offices, located in Dougherty Hall, is occupied by Mr. 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 for 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. This experience in an industrial and professional environment contributes to the student’s maturity, increases the scope of acquaintances and concepts, and enables the student to define more clearly educational and career interests and objectives. Some of the experience received is at a subprofessional 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 conducted in early October is the source of most candidates placed for the following summer or fall; a late application period may be held in May for students who failed to apply during the previous fall and who hope for placement the subsequent winter. Students must be attending the College of Engineering at the time of application. Those in school full quarter who are undecided about co-op participation should nevertheless apply during the fall application period, and then request that the applications be held until they are ready to make a definite commitment, since fall applicants are placed according to all placements for which they are qualified.

In general, students begin their work periods after completing their freshman academic work and continue their studies until beginning their second year in the main campus. Applicants must be able to schedule a minimum of five work periods alternating with academic quarters prior to beginning their senior year in the main campus. With very few exceptions, transfer students must complete a minimum of two academic quarters in the College of Engineering at UTK before beginning co-op participation.

Students in the Cooperative Engineering Program are classified as follows in terms of quarter hours credit completed in the standard undergraduate program for their anticipated degree in engineering:

- Freshman: 0 - 49.9
- Sophomore: 50 - 100.9
- Junior: 101 - 149.9
- Senior: 150 - up

Second degree and transfer students will be assigned "equivalent quarters completed" (not dependent upon hours completed) which will indicate progress toward the engineering degree. Total hours completed are not an applicable measure of the progress of such students.

Such students who wish to co-op must plan very carefully in order to fit into the established in order to qualify for co-ops. Students planning to transfer should begin working as soon as possible with an advisor from the department they plan to enter in order to meld into the co-op schedule at an optimum time. A brochure with further details may be obtained from the Cooperative Engineering Program Office, University of Tennessee, Knoxville, Tennessee 37996-2350.

**Graduate Program**

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

**Graduate Program at the UT Space Institute**

At The University of Tennessee Space Institute near Tullahoma, graduate-level courses are offered in engineering fields such as aerospace, electrical, and mechanical engineering, and in mathematics and physics. Current programs lead to the M.S. and Ph.D. degrees. Information may be obtained from the Registrar, The University of Tennessee Space Institute, Tullahoma, TN 37388.

**Engineering Experiment Station**

William T. Snyder, Director

The management of the Engineering Experiment Station is vested in the president of the University, the dean of engineering and the director.

An advisory committee consisting of the heads of the departments of the college and 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 UTK include aerospace, agricultural, chemical, civil, electrical, engineering science, industrial, mechanical, metallurgical, and nuclear.

**DESIGNATION OF A MINOR**

An engineering undergraduate may declare a minor in a non-engineering subject area and have the minor listed on the permanent record under the following conditions:

1. Only one minor may be declared and officially designated.
2. The minor must be one officially approved and described in the UTK catalog. No unofficial minors will be recognized. Minors exist in Architecture and Business Administration, and in numerous departments in Agriculture and Liberal Arts. Presently no engineering student can minor in another engineering discipline, nor can a non-engineering student declare an engineering minor.
3. Courses taken to satisfy the minor may also be used to satisfy engineering degree requirements, provided that the courses would be a part of engineering degree requirements even if no minor was declared. Completion of a minor often involves the taking of some courses which cannot be used to satisfy the minimum requirement for an engineering degree.
4. A student should notify his or her advisor and major department office when beginning work on a minor. The intention to complete a minor must be declared at the
time of application for a degree if the minor is to appear on the final transcript. Departmental approvals are handled by the UTK Records Office.

**COURSE LOAD**

The maximum number of hours which can be taken by an undergraduate engineering student without special permission is 19. The Associate Dean for Academic Affairs must give permission to take 20 hours or more.

**DROP DEADLINE**

The drop deadline for all undergraduate courses administered by any department in the College of Engineering shall be the end of the eighth calendar day of each quarter, counted from the beginning day of classes. This coincides with the Campus add deadline. Any drop action after this date on the part of any student (regardless of major) is subject to late drop regulations if the course is an engineering course. For other drop deadlines, refer to 'Changes in Registration' in the general section of this catalog.

**GENERAL REQUIREMENTS**

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

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

**Transfer Credit.** Every attempt will be made to give maximum credit for courses taken elsewhere and transferred to the college. Discussions concerning the evaluation of transfer credits should be conducted with the head of the department (or his designate) into which the student proposes to transfer (following the evaluation of transfer credits by the Admissions Office).

**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 51).

**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 three-fold 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 there is an 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 subject areas 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 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
D. Anthropology
Area III. Technology and Society
A. Human Habitat
B. Technology Assessment
C. Communication
D. Resources

Courses in the list which follows are selected by the committee with revisions as course offerings and needs change. They are recommended as satisfying the non-technical (humanities-social sciences) elective requirements 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 specialists in another field (such as education), or which are very elementary in nature are usually not approved as humanities-social science electives in an engineering curriculum. A minimum of 24 quarter hours of acceptable humanities-social science electives are required in all programs.

**ELECTIVE COURSES IN HUMANITIES AND SOCIAL SCIENCES**

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

IA. Governance and Political Science
Economics 3340
Geography 3610
History 3785, 4310-20, 4370, 4360
Political Science 2510-20, 3545-46,
3555, 3566, 3710-20, 3750-60, 3801-02-03-04, 3880, 4060, 4353-36, 4540-50, 4545, 4665-66
Sociology 3030, 4530, 4560

IB. Economics
Economics 2510-20, 3210-11, 3220,
3230, 3240, 3210, 3310, 3410-20
Geography 2110-20, 3210-30

IC. Sociology and Psychology
Geography 3000, 3600, 3660
Psychology 2500, 2520, 2540, 3120,
3220, 3240
Rural Sociology 3420
Sociology 1510-20, 3010, 3030, 3150,
3220, 3320, 3330-40-50, 3410-20,
3610, 4330, 4560

ID. Human Values
Geography 3000
History 3060-70-80, 3270
Philosophy 1510-20, 2310, 2510, 3111-
21-31-41-51, 3440, 3690
Religious Studies 2610, 3600-10-20,
3611, 3740
Zoology 3410 (Bioethics)

Area II. Society—Its Culture, History, and Literature

IIA. Fine Arts
Nature-Environment Courses are not acceptable.(

IA. Governance and Political Science
Economics 3340
Geography 3610
History 3785, 4310-20, 4370, 4360
Political Science 2510-20, 3545-46,
3555, 3566, 3710-20, 3750-60, 3801-02-03-04, 3880, 4060, 4353-36, 4540-50, 4545, 4665-66
Sociology 3030, 4530, 4560

IB. Economics
Economics 2510-20, 3210-11, 3220,
3230, 3240, 3210, 3310, 3410-20
Geography 2110-20, 3210-30

IC. Sociology and Psychology
Geography 3000, 3600, 3660
Psychology 2500, 2520, 2540, 3120,
3220, 3240
Rural Sociology 3420
Sociology 1510-20, 3010, 3030, 3150,
3220, 3320, 3330-40-50, 3410-20,
3610, 4330, 4560

ID. Human Values
Geography 3000
History 3060-70-80, 3270
Philosophy 1510-20, 2310, 2510, 3111-
21-31-41-51, 3440, 3690
Religious Studies 2610, 3600-10-20,
3611, 3740
Zoology 3410 (Bioethics)

IIA. Fine Arts (Note: No more than 8 quarter hours may be taken in the performing and—band, chorus, etc. Individual performance courses are not acceptable.)
Art 1705, 1815-25, 3704-05, 3715-16,
3725-26, 3735-36, 3745-46, 3750,
3755-60
English 2660, 3111-12-20-30-40
Music 1210-20-30, 2310-30-40-40,
3350
Philosophy 2410, 3910
Theatre 3252-53-54

IB. Culture
American Studies 3010
Anthropology 3410
cannot be used as humanities-social science 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 their 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. Inattention to such matters may delay graduation.

**ADVISING CONFERENCE.** The relationship between an engineering student and an advisor is an important one, and a student should go to the advisor for assistance or information at any time. All students are required to see their advisor during the Fall Quarter (or during one other quarter if they are not in school during the fall). Engineering students normally are asked to see their advisors during the two-week period immediately preceding the advance registration period. A record of the advising conference is needed in order to advance register. During other quarters of the year, the student's department determines whether or not an advisor must be consulted prior to advance registration. An advising conference record card must be presented in order to advance register for these quarters also, though an actual conference is required only once a year for most students.

**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 the course; questions about a particular curriculum 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 description to determine what is needed. In addition to specific prerequisites listed, it is assumed that a student taking sophomore 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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Hours Credit</th>
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<tbody>
<tr>
<td>Freshman</td>
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<tr>
<td>Math 1460-50</td>
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</tr>
<tr>
<td>Chemistry 2110-20</td>
<td>4 4</td>
</tr>
<tr>
<td>English 1010-20</td>
<td>3 3 3</td>
</tr>
<tr>
<td>Physics 2140-20</td>
<td>3 3 3</td>
</tr>
<tr>
<td>Basic Engineering 2130-20</td>
<td>4 4 4</td>
</tr>
<tr>
<td>Basic Engineering 1410</td>
<td>- 2</td>
</tr>
<tr>
<td>Sophomore</td>
<td></td>
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<tr>
<td>Aero. Engr. 2040</td>
<td>1</td>
</tr>
<tr>
<td>Math 2840-50</td>
<td>4 4 4</td>
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<tr>
<td>Engineering 2130-20</td>
<td>3 3 3</td>
</tr>
<tr>
<td>Eng. Science &amp; Mech. 3310, 3700</td>
<td>4 4</td>
</tr>
<tr>
<td>Mech. Engr. 2110</td>
<td>- 3</td>
</tr>
<tr>
<td>Computer Science 3150</td>
<td>- 3</td>
</tr>
<tr>
<td>Junior</td>
<td></td>
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<tr>
<td>Aero. Engr. 3511</td>
<td>- 4</td>
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<tr>
<td>Aero. Engr. 3610-20</td>
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<tr>
<td>Aero. Engr. 3630-40</td>
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<tr>
<td>Elect. Engr. 3110-20</td>
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<tr>
<td>Engr. Sci. &amp; Mech. 3320</td>
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<tr>
<td>Mech. Engr. 3311, 3321-30</td>
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<tr>
<td>Mech. Engr. 3410</td>
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<td>Mech. Engr. 3440, 4420</td>
<td>- 3</td>
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<tr>
<td>Mech. Engr. 3910</td>
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<tr>
<td>Senior</td>
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<td>Aero. Engr. 4210-50-61</td>
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<td>Aero. Engr. 4220, 4510, 4230</td>
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<td>Aero. Engr. 4471-91</td>
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<td>Mech. Engr. 4511-21</td>
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<td>Tech. electives</td>
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<tr>
<td>Humanities/social science electives</td>
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<tr>
<td>Industrial Engr. 4520</td>
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<td>Total: 204 hours</td>
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### Agricultural Engineering

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<td>Agricultural Engineering 1130</td>
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<tr>
<td>Agriculture 1130-40</td>
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<tr>
<td>Basic Engineering 1550-20-30</td>
<td>4 4 4</td>
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<tr>
<td>Basic Engineering 1410-20</td>
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<tr>
<td>Chemistry 1110-20</td>
<td>2 2</td>
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<tr>
<td>Agriculture 1010 or 1011; 1020; 1033</td>
<td>3 3 3</td>
</tr>
<tr>
<td>Graphs 1410-20</td>
<td>3 3</td>
</tr>
<tr>
<td>1Mathematics 1840-50-60</td>
<td>4 4 4</td>
</tr>
<tr>
<td>Sophomore</td>
<td></td>
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<tr>
<td>Biology 1210 or 1220 or 1230</td>
<td>- 4</td>
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<tr>
<td>*Chemistry 1110-20-30</td>
<td>4 4 4</td>
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<tr>
<td>Engineering Science and Mechanics 3311</td>
<td>- 4</td>
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<tr>
<td>Engineering Science and Mechanics 3700</td>
<td>- 4</td>
</tr>
<tr>
<td>English or communications elective</td>
<td>- 3</td>
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<tr>
<td>*Mathematics 2840-50-60</td>
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</tr>
<tr>
<td>Physics 2510-20-36</td>
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<tr>
<td>Junior</td>
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<td>Agricultural Engineering 3100</td>
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<tr>
<td>Agricultural Engineering 3610-20-30</td>
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<tr>
<td>Electrical Engineering 3110-20 or 2010-20</td>
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<td>Engineering Science and Mechanics 3110</td>
<td>- 3</td>
</tr>
<tr>
<td>Engineering Science and Mechanics 3120 or 3320</td>
<td>- 3</td>
</tr>
<tr>
<td>Engineering Science and Mechanics 3510 or Civil Engineering 3710</td>
<td>- 3</td>
</tr>
<tr>
<td>Computer Science 3150</td>
<td>- 3</td>
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<tr>
<td>Mechanical Engineering 3311</td>
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<td>Mechanical Engineering 3540</td>
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<td>Speech 2311 or 2361</td>
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*Humanities/social science electives: minimum of 24 hours required.

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
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<tbody>
<tr>
<td><strong>FRESHMAN</strong></td>
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</tr>
<tr>
<td>Math 1840-50-60</td>
<td>4</td>
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<tr>
<td>Chemistry 1110-20-30</td>
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<tr>
<td>Physics 3210-23-9</td>
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<tr>
<td>Engr. Sci. &amp; Mech. 3410</td>
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<tr>
<td><strong>JUNIOR</strong></td>
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</tr>
<tr>
<td>Engr. Sci. &amp; Mech. 3311-3700</td>
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<td><strong>SENIOR</strong></td>
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<td>Engr. Sci. &amp; Mech. 3710, 3110</td>
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<td><strong>TOTAL</strong></td>
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### Electrical Engineering

<table>
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<td><strong>FRESHMAN</strong></td>
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</tr>
<tr>
<td>Math 1840-50-60</td>
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<tr>
<td>Chemistry 1110-20-30</td>
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<td>Physics 3210-23-9</td>
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<tr>
<td>Engr. Sci. &amp; Mech. 3410</td>
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<tr>
<td><strong>JUNIOR</strong></td>
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<tr>
<td>Engr. Sci. &amp; Mech. 3311-3700</td>
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<td><strong>SENIOR</strong></td>
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<tr>
<td>Engr. Sci. &amp; Mech. 3710, 3110</td>
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<td><strong>TOTAL</strong></td>
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### Biomedical Engineering

<table>
<thead>
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<tbody>
<tr>
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<td>Chemistry 1110-20-30</td>
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<td>Physics 3210-23-9</td>
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<td>Env. Engr. 3110-20</td>
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<td>Env. Sci. &amp; Mech. 3320</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>198 hours</td>
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</table>

1. *Chemical Engineering* courses must be approved by the student's advisor prior to registration in the course.
2. *Electrical Engineering* courses must be approved by the student's advisor prior to registration in the course.
3. *Biomedical Engineering* courses must be approved by the student's advisor prior to registration in the course.

### Systems and Networks

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<thead>
<tr>
<th>Year</th>
<th>Course</th>
<th>Hours Credit</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>Electrical Eng. 4370</td>
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<td>Electrical Eng. 4350</td>
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<td>Electrical Eng. 4340</td>
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### Plasma and Electrodynamics

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<td>Electrical Eng. 4470</td>
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<td><strong>TOTAL</strong></td>
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## Notes

1. Required for pre-medical, pre-dental, and pre-veterinary medicine programs. Students in other biomedical engineering options should consult their advisor to replace this series by Chemistry 2230 and technical electives.
2. Humanities/social science courses approved by the department.
3. Appropriate courses in the College of Engineering approved by the department.
4. Upper-division courses in mathematics, computer science, statistics, natural science, or engineering approved by the department. Zoology 3050 or 3080 recommended for pre-med.
5. Humanities/social science electives must be approved in advance by the department.
### Engineering Physics

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Credit</th>
</tr>
</thead>
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<td><strong>Freshman</strong></td>
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<td></td>
</tr>
<tr>
<td>Mathematics 1840-50-60</td>
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<td>4</td>
</tr>
<tr>
<td>English 1110-20-30</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Sophomore</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics 2840-50-60</td>
<td>4</td>
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<tr>
<td>English 3010-20-30</td>
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<tr>
<td><strong>Junior</strong></td>
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<tr>
<td>Math electives</td>
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<tr>
<td>Physics lab electives</td>
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<td>Physics 4240 (or 3330)</td>
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*To be taken from Liberal Arts distribution requirements.*

### Industrial Engineering

<table>
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<tr>
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<th>Hours</th>
<th>Credit</th>
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<td><strong>Freshman</strong></td>
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</tr>
<tr>
<td>Math 1840-50-60</td>
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<td>4</td>
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<tr>
<td>Chemistry 1110-20-30</td>
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<td><strong>Sophomore</strong></td>
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<tr>
<td>Math 2840-50-60</td>
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<tr>
<td><em>Technical electives</em></td>
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<tr>
<td><strong>Junior</strong></td>
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<tr>
<td>Computer Science 3150</td>
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<td>3</td>
</tr>
<tr>
<td><strong>Senior</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Science 3150</td>
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<td>3</td>
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<tr>
<td><em>Technical electives</em></td>
<td></td>
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</tr>
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*To be taken from Liberal Arts distribution requirements.*

### Engineering Science

<table>
<thead>
<tr>
<th>Course</th>
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<td><strong>Freshman</strong></td>
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<td>English 1010-11-20-33</td>
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<td>Graphics 1410-20</td>
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<td>Basic Engineering 1510-20-30</td>
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<td>Basic Engineering 1410-20-30</td>
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<td><strong>Sophomore</strong></td>
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<td>Mathematics 2840-50-60</td>
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<td><em>Humanities/social science electives</em></td>
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<tr>
<td><strong>Junior</strong></td>
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<td><strong>Senior</strong></td>
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<td>Engr. Sci. &amp; Mech. 4010</td>
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<tr>
<td><strong>Humanities/social science electives</strong></td>
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<tr>
<td><strong>Total: 197 hours</strong></td>
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*To be taken from Liberal Arts distribution requirements.*
### Departments of Instruction

#### Agricultural Engineering

*(See College of Agriculture)*

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<tr>
<th>Math 2840-50-60</th>
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<td>Chemistry 4110</td>
<td>- 3</td>
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<tr>
<td>Total: 199 hours</td>
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#### Basic Engineering and Graphics

**Basic Engineering (179)**

**Coordinator:** J. E. Stoneking

**Basic Engineering I (4)**

- Forces in a plane; free body diagram analysis; equilibrium in two dimensions; application to frames and machines; friction; introduction to forces in space. Required of all engineering students except engineering physics majors.

**Basic Engineering II (4)**

- Position and displacement vectors; particle kinetics using Newton’s laws, impulse-momentum, work-energy; introduction to simple harmonic motion. Prereq: 1310; coreq: Math 1850. 4 hrs. lec.

**Basic Engineering III (4)**

- Introduction to thermodynamics fluid statics, and mechanics. Buoyancy, forces on submerged surfaces; Bernoulli’s equation; first and second law of thermodynamics; internal energy; work and heat energy. Must be taken in sequence. Prereq: 1310; coreq: Math 1850. 4 hrs. lec.

**Basic Engineering IV (4)**

- Graphical representation of three-dimensional shapes; and size by orthographic and pictorial projection; sketching and dimensioning; tolerances, Problem solving utilizing spatial relationships and graphical vector analysis, and graphic presentation of engineering data. Must be taken in sequence. Two 3-hr. periods or three 2-hr. periods.

**Basic Engineering V (4)**

- Graphical representation of three-dimensional shape and size; space relationships. Graphic presentation of engineering data. Required of all engineering students. Must be taken in sequence. One lecture and three 2-hr. periods or two 3-hr. periods.

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#### Engineering Studies

*(Non-Departmental Unit)*

**Coordinator:** E. E. Stansbury

**4100 History of Engineering (4)**

- History of technology and engineering with emphasis on identification of and developments in major areas such as transportation, communication, energy, manufacturing, design, and materials. Relationship to social and political structures of historical periods. Open to all students.

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#### Chemical, Metallurgical, and Polymer Engineering

**Professors:**

- H. F. Johnson (Head), D. Eng., Yale, P.E.; D. C. Bogue, Ph.D. Delaware; C. R. Brooks, Jr., Ph.D. Tennessee; E. S. Clark, Ph.D. California (Berkeley); G. L. Culberson (Emeritus), Ph.D. Texas; L. W. Crawford, Ph.D. Cincinnati; J. F. Fellers, Ph.D. Akron; G. C. Frazier Jr., D. Eng., Johns Hopkins; J. M. Holmes, Ph.D. Tennessee; H. W. Hsu, Ph.D. Wisconsin; C. D. Lundin, Ph.D. Rensselaer Poly-

**Associate Professors:**


**Assistant Professor:**

- F. Weber, Ph.D. University of Minnesota.
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 rolls.

Transfer Students at the Upper-Division level are admitted on a Provisional Status basis only. Any student presenting more than 40 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 with majors in Chemical Engineering, metallurgical engineering, or polymer engineering are offered.

A program leading to the M.S. and Ph.D. degrees with specialization in polymer science and engineering in chemical engineering is offered in concurrence with the Department of Chemistry which offers a degree with similar specialization.

These programs have been strengthened by fellowships or grants provided by industrial agencies. The University's Graduate School is available through research assistantships on contract with industry and governmental agencies. The University's Graduate School operates a Resident Graduate Program at Oak Ridge, Kingsport, and Chattanooga. See the Graduate Catalog for detailed information.

Chemical and Metallurgical Engineering (227)


2011 Sophomore Inspection Trip (0) Inspection trip to industrial plant. Usually scheduled in fall on ETEA day. Required for chemical engineering and metallurgical engineering majors. S/N/C. F.


2030 Process Principles and Materials III (4) Materials structure—property relationships for metals, inorganic and organic compounds, with emphasis on mechanisms of control of properties by chemical composition, thermal and mechanical treatment; crystallography, imperfections, mechanical properties, heat treatment, molecular weight, and particle size distributions. Prereq: Chemistry 1130, Math 1860. 3 hrs. and 1 lab period. F, S, SU.

3100 Introduction to the Materials of Technology (4) Examination of sources, processing, and properties of metallic, ceramic, polymeric, and composite materials based upon an historical perspective and current practices in technology, architecture, and art. Lectures and demonstrations. Open to students in all colleges. Prereq: Introductory science course.

4310-20 Seminar (1,1) Presentation and discussion of economic, political, humanistic, and other topics of interest to chemical and metallurgical engineers. S/N/C. 4310 - F; 4320 - W, S.

Chemical Engineering (226)

3010 Industrial Inspection Trips (1) Technology of chemical processes industry in northeastern Tennessee; plant trips. S/N/C. S.


3230 Special Problems (3) Investigation of chemical engineering problems.

3410 Flow of Fluids (4) Differential and overall momentum balances, mechanical energy balances; flow in pipes, tubing systems, and packed beds; metering devices, pumps. Prereq: Chemet. Engr. 2020, 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 simple geometries, heat transfer in tubes and heat exchangers; condensation and boiling radiation. Prereq: 3410. 3 hrs. and 1 lab. F, W.

3420C Stagewise Operations (3) Analytical and graphical methods to stagewise separatory operations. Prereq: Chemistry 3420. W, S.

3450 Diffusional Operations (3) Diffusion simultaneous heat and mass transfer, applications including humidification, gas absorption, extraction. Prereq: 3420, Chemistry 3420. 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. S, SU.

3820 Industrial Process Control (3) Design and theory and practice for industrial process control. Experimental process modeling (process identification), feedback control, cascade control, feedforward control, degrees of freedom, stability analysis, control tuning. Control systems will be designed for a number of typical industrial unit operations. Lab. Prereq: 3610. F.

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

4110 Chemical Engineering Data Analysis (3) Analytical and experimental techniques including statistics, probability, and statistical properties of samples and source systems; modeling of chemical and engineering systems. Prereq: 3410-50, 3420. W, S.


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

4150 Computers in Chemical Engineering (3) Introduction to computer solutions of Chemical Engineering problems. Applications of existing computer programs. The applications studied include: Process design, statistics, mathematical modeling, computer graphics, and computer-aided design. The courses studied are: ASPEN, CSS, CSM, NAGL, IMSL, and various applications on the personal computer. Coreq: 4110. Prereq: Math 3150. Limited enrollment.

4220 Chemical Engineering Laboratory (3) Laboratory investigations of controlling factors in chemical engineering operations. Prereq: 3440-50, 4530. F, W, S.

4330 Project Laboratory (3) Laboratory investigation of chemical engineering problem, stressing techniques of group effort. May be repeated.


4430 Special Problems in Design and Economics (3) Extension of 4420 for student participation in A.I. Ch. Eng. design contest; other advanced design projects. Prereq: 4420.

4450 Hydrocarbon Processing (3) Study of specialized 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: 3440.

4470 Sulfur Removal from Coal and Associated Problems (3) Chemical and physical properties of domestic and imported coals; solubility behavior and beneficiation system; physical and chemical methods; fluidized bed combustion with both natural and synthetic SOX sorbents; stack gas scrubbing; computer modeling; computer instructor.

4480 Coal Processing to Liquid Fuels (3) Characterization of various coals with respect to current liquefaction methods; modeling of conversion processes and estimating expected yields; maximum yield conversion processes; requirements; pyrolysis; catalytic hydrogenation; reactor design considerations; review critique of selected articles from both the current literature and patents. Prereq: Consent of instructor.

4530 Chemical Engineering Reaction Kinetics (3) Chemical reaction rates in closed and flow systems; interpretation of laboratory and pilot data; reactor design. Prereq: 3420, Chemistry 3430. W.

4540 Fluid-Solid Operations (3) Heat and mass transport in fixed and fluidized beds; applications include absorption, ion exchange, crystallization. Prereq: 3440-50.

4620 Advanced Process Dynamics, Simulation, and Control (3) Development of process models, experimental process identification, computer simulation of processes and control strategies, and analog versus digital process control. Design using advanced control concepts as feedforward, ratio, cascade, and multivariable control; digital control and novel process control. Lab. Prereq: 3820 or equivalent background in basic control theory and digital system equations.

4730 Mass and Energy Flow in Biological Systems (3) Basic physiochemical and organizational principles applicable to biological systems. Derivations of general equations of biomass and energy transfer. Thermodynamics of transport and equilibrium in biological systems. Discussion of Voltterra's equation and biological clocks, etc. Prereq: Consent of instructor.

4740 Introduction to Transport Phenomena in Biological Systems (3) Application of principles of transport phenomena to biological systems. Transfer of chemical energy and various cellular active transports; structure and rheology of physiological fluids, membrane and interfacial phenomena; analysis and design of artificial organs. Prereq: 3440 and 3450, or consent of instructor.

4750 Microbiological Process Engineering (3) Application of chemical engineering principles and design concept to microbiological processes. Controversy of biosphere and society, environmental systems. Prereq: 3440, 3450, or consent of instructor.

4760 Principles of Biochemical Separation (3)Fundamentals of separations used in the development and practice of modern biochemical separation methods; classroom demonstrations, design of production and analytical systems. Prereq: Consent of instructor.

4800 Special Problems in Chemical Engineering (3) Chemical engineering problems related to recent develop-
opments in industrial practice or engineering research. Prereq: Consent of Instructor. May be repeated. Maximum credit 9 hours.

4910-20 Engineering Internship in Industrial Problems (0) Provides students with an opportunity to work on small scale industrial problems. Work will be directed by a faculty instructor and by engineers from a host company. Internship will require two quarters of participation. Prereq: 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) Lectures provide subject bases for laboratory experiments. Experiments are conducted in groups. Use of heat-cell furnace, x-ray diffractometer, computer and electrical data acquisition and recall, kiln, calorimeter and mechanical testing equipment. Each student prepares a report. 2 hrs. and 2 labs. Prereq: 2030. S.

2110 Engineering Materials I (3) Introductory course covering atomic structure and properties of solids and solvents to produce changes in engineering properties. 3 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 operating principle and applications of the electron microscope and its application to scientific problems. Prereq: Physics 2030-2100. 3 hrs. lab. S.

3010 Industrial Inspection Trips (1) Technology of metalurgical industries, emphasizing Tennessee industry; plant trips. S/N/C.

3040 Metallurgical Thermodynamics (4) Applications of laws of thermodynamics to problems of metallurgical interest. Second law and entropy; auxiliary functions; relationship between free energies and phase diagrams; reaction equilibria in gases and between gases and solids; solidification and free energy data in calculations. Concepts of activity and activity coefficient and their variation with T, P, and composition. Prereq: Chem. Engr. 2020; Chemistry 1130; coreq: Math 2840, 3 hrs. and 1 lab. F.

3050 Production Metallurgy (3) Principles of roasting, smelting, and refining. Gas-liquid equilibrium, slag-metal, or solid-liquid equilibrium for iron and steel. Solution behavior, correlation equations, and stoichiometry of simple and complex systems. Prereq: 3220. 3 hrs. and 1 lab. S.

3100 Biomedical Applications of Materials for Life Sciences (3) Principles of engineering materials; metals, ceramics, and polymers; methods of fabrication of components; corrosion; applications of prosthetic devices and dental materials. Prereq: Chemistry 1110-20. S.

3170 Metallurgical Engineering (3) Lecture and laboratory course treating unit operations of plastics processing, polymer blending, and fabrication. Emphasis on quantitative aspects. Prereq: Senior standing in engineering or science. S.


4250 Design and Analysis (3) Design and laboratory testing of steel components; corrosion; applications of prosthetic devices and dental materials. Prereq: Chemistry 1110-20. 3 hrs. and 1 lab. S.

4270 Metallurgical Applications in Manufacturing Technology (3) Fabrication methods and principles of mechanical/thermal processing for finished and semifinished products; design, powder metallurgy, plastic forming, joining, heat treatment. Prereq. 2110.

4280 Materials Behavior and Chemical Process Equipment Design (3) Mechanical, mechanical, and chemical considerations in design of chemical processing equipment. Prereq. Chem. Engr. 2030 or equivalent; 3150; Chem. Engr. 3420.

4760 Casting and Welding (3) Principles of casting and welding; heat transfer, solidification, segregation, gas porosity, contraction stresses, thermal treatments, associated stresses. Prereq: 3120 or 3520. 3 hrs. or 2 hrs. and 1 lab.

4910 Applied Polymer Science (3) First course in physical, chemical, and mechanical properties of polymers, and the applications of fiber, plastics, and rubber industries: dimensional analysis and scale-up, flow through dies and pipelines, screw extrusion, spinning of fibers, injection molding. Prereq: Senior standing in engineering or science. Not for graduate credit by polymer engineering majors.

4930 Principles of Fiber Textile Engineering (3) Chemical and physical structure of important fibers; melt, wet and dry spinning of man-made fibers; drawing and texturizing; preparation of yarn; dyeing, weaving, knitting, and finishing. Emphasis on quantitative aspects. Prereq: Senior standing in engineering or science. S.

5490 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 to include extrusion, compounding, injection molding including structural foam, thermofoming, blow molding, rotational molding, etc. Prereq: 3170. 3 hrs. and 1 lab. S.

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

Civil Engineering

Including Environmental Engineering

Professors:


Associate Professors:

3210 Stresses in Framed Structures (3) Reactions, moments, shears, and stresses in trusses and framed structures from fixed loads; influence lines and reactions, members, and joints. Prereq: Engr. Science Mech. 3311.

3230 Design of Framed Structures (3) Selection of rolled beams; design of compression and tension members for axial and combined 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: 2960.

3600 Transportation Planning (3) Emphasis on transportation problems and perspectives, both rural and urban; use of the planning process to establish existing travel patterns, modeling of demand, proposing alternatives and their evaluation, and plan implementation. Prereq: Junior standing.

3610 Transportation Engineering (3) Introductory course on design, construction, maintenance, and operation of various transportation systems. 2 labs. Prereq: 4110 and 4440.


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; footing and retaining walls. Prereq: 4110 and 4440.


4230 Legal and Ethical Aspects of Engineering (3) Legal principles underlying engineering work; laws of contracts, torts, agency, real property; problems of professional registration and ethics.

4240 Structural Design (3) Plate girders, composite steel and concrete beams, connections, 2-hr. lecture and 1 lab. Prereq: 4320 and 4410.

4260 Photogrammetry (3) Methods of plotting maps from aerial photographs; stereoscopic plotting instruments; applications. Prereq: 2260, 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 theories. 2 hrs. lecture and 1 lab.

4320-30 Seminar (2, 1) Selected topics dealing with historical and modern civil engineering achievements and professional and ethical responsibilities. Prereq: Senior standing and completion of all junior level non-elective engineering courses.

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

4420 Analysis of Framed Structures (3) Maximum stresses due to moving loads; use of influence lines; lateral forces due to earthquake and wind; analysis of portal and space frames, and space frames. Coreq: 4410.

4430 Construction Methods and Equipment (3) Fundamental operations in construction and selection of equipment; production rates, balancing of equipment, and cost estimates. Prereq: 3710.

4460 Land Surveying (3) Procedures of locating properties; evaluating evidence; procedures to describe property; to create land divisions, and to prepare plots; laws of land surveying. Prereq: 2260 or equivalent.

4510-20 Advanced Structural Design (3, 3) Plastic design of steel in 4510; design of typical short span steel highway bridges in 4520. Prereq: 3230 for 4510; 3320 and 4110 for 4520.


4560 Stabilization of Soils (3) Mechanical stabilization of soils by compaction, drainage, and blending; chemical stabilization of soils with admixtures; waterproofing and modifying soils and additives. 2 hrs. of lecture and 1 lab. Prereq: 3310.

4600 Highway Engineering I (3) Design, construction, operation, and maintenance of highway facilities; includes integration of system planning and project planning to design and construction procedures. Prereq: 2360, 3000 and 3610.

4620 Airport Planning and Design I (3) Emphasis on airport master planning. Included for consideration on the air side are the runway configuration, capacity, geometrics, and lighting, and on the land side are included terminal layout and design, and ground access systems and parking. Prereq: 3500, 3610.

4640 Traffic Engineering (3) Characteristics of driver, vehicle, and roadway and their interrelationship; traffic studies; basic considerations of traffic circulation and control. Two 3-hr. labs. Prereq: 3500, 3610 and 3710.

4650 Highway Engineering II (3) Integration and application of various engineering principles and techniques to process of planning, locating, and design of highway facilities through integration of team project. 1 lecture and 2 labs. Prereq: 4500.

4680 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: 4500.

4710 Portland Cement Concrete Mix Design (3) Properties and tests of portland cement concrete, methods of concrete mix design, non-destructive concrete evaluation testing, use of concrete admixtures. 2 lectures and 1 lab. Prereq: 3710.

4720 Asphalt and Bituminous Concrete (3) Properties and tests of asphalt and bituminous mixes, mix design and bituminous concrete. Emphasis on use of asphalt in transportation construction projects. 2 lectures and 1 lab. Prereq: 3710.

4731-32 Earthquake Resistant Structure I, II (4, 4) (Same as Architecture 4731-32)

4800 Introduction to Civil Engineering Systems (3) Methods of modeling civil engineering systems and their specific application to problems of transportation, environment, water resources, and materials. Prereq: Senior standing or consent of instructor.

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

4860 Structural Wood Design (3) The application of structural design and analysis to structural members of various combinations of wood products. Beams, columns, and diaphragm construction with plywood are covered; sound deadening applications, and types of fastenings and connections. Prereq: 3230.

4890 Civil Engineering Systems Design and Management (3) Introduction to basic systems engineering concepts within civil engineering context; discussion of the role of decision maker and use of optimal principles of engineering planning. Prereq: College Science 3150.

4910 Special Topics (1-3) Topics relating to recent developments and current practice in civil engineering through supervised self-study. Prereq: Consent
4530 Environmental Engineering Laboratory (3) Standard analytical techniques for evaluation of specific air, water, and solid waste pollutants. 2 hrs. and 1 lab. Prereq: 4030.

4600 Solid and Hazardous Waste Management (3) Magnitude and characteristics of solid and hazardous waste problems; collection systems; disposal systems including landfill, incineration, composting; fixation, resource recovery, and proposed new technologies; current and future regulations. Prereq: Junior standing.

4700 Air Pollution-Air Resource Management (3) Introductory course on concepts of air pollution; analysis of relationship among emission sources, meteorology and topographic factors, and adverse effects on receptors; engineering approaches for air pollution control. Prereq: Senior standing.

4820 Environmental Engineering Law (3) Legal aspects of water and air pollution, drainage, land use controls, and environmental impact statements with emphasis upon federal-state relations, recent legislation and court decisions, and enforcement. Prereq: Senior standing.

4910-20-30 Special Topics (1-3, 1-3, 1-3) Topics relating to recent developments and current practice in environmental engineering through supervised self-study. Prereq: Consent of individual instructor and approved by department head. May be repeated.

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

Electrical Engineering (320)

Professors: W. L. Green (Head), Ph.D. Texas A & M; I. Alexoff, Ph.D. Wisconsin, P.E.; J. M. Bailey, Ph.D. Georgia Institute of Technology; A. O. Bishop, Jr., Ph.D. Clemson; T. V. Balicko, Ph.D. Tennessee; R. E. Bodenheimer, Ph.D. Northwestern; D. W. Boulton, Ph.D. Vanderbilt; R. C. Gonzalez, Ph.D. Florida; J. M. Googe, Ph.D. Georgia Institute of Technology; P. E. E. L. Hall, Ph.D. Missouri; G. W. Hoffman, Ph.D. Harvard; J. C. Hung, Ph.D. New York; P. E. J. Kennedy, Ph.D. Tennessee; P. E. W. O. Leftiell (Emeritus), M.S. Tennessee; H. P. Neff, Ph.D. Auburn, P.E.; M. O. Pace, Ph.D. Georgia Institute of Technology; J. F. Pierce, Ph.D. Pittsbugh; R. W. Rochelle, Ph.D. Maryland; J. R. Roth, Ph.D. Clemson; B. Smith, Jr. (Emeritus), M.S. Illinois, P.E.; F. W. Symonds, Ph.D. Nottingham (England); J. D. Tillman, Jr., Ph.D. Auburn; C. H. Weaver, Ph.D. Wisconsin, P.E.


Assistant Professors: D. Brzakovic, Ph.D. University of Florida; R. D. Joseph, Ph.D. Case Institute of Technology.

1Halliburton Professor
2IBM Professor
3On Leave of Absence
4Distinguished Professor
5Weston Fulton Professorship
6John Fisher Young Professorship
7Tenneco, Inc. Professor
8Space Institute, Yutamoha

UNDERGRADUATE
The Bachelor of Science in Electrical Engineering is planned to provide a foundation in both the basic sciences and specialized areas of modern engineering. The curriculum also contains a suitable amount of cultural work to enhance the growth of the student toward the goal of becoming a professional person with strong social awareness. In the senior year, the student may specialize in any one of the following areas of electrical engineering: bioelectric engineering, computer engineering, electromagnetic fields and communications, electronics and instrumentation, energy conversion and power systems, plasma and electro-optics engineering, and systems and networks. All of these areas except the bioelectric engineering option are continued through the M.S. and Ph.D. programs. The senior year curriculum is sufficiently flexible to allow a student to take several courses outside of the chosen area of specialization.

Generally, all scheduled courses and junior course work is offered every quarter and the senior work is scheduled so that the student may enter at the beginning of any quarter. This arrangement allows maximum flexibility, since the student may elect the normal four-year schedule, may choose to graduate in three calendar years, or may take the Cooperative Engineering Program. In addition to the usual research and teaching facilities, there are electronic, microwaves, solid state devices, and control equipment, the department has both digital and analog computers.

PROGRESSION TO UPPER-DIVISION STATUS
Progression of electrical engineering majors to the upper division programs of the department is competitive and is based on the space available in the department. Factors considered will include overall grade point average, grades earned in courses required in the lower-division curricula of the College of Engineering, and seriousness of purpose and interest in departmental programs as exemplified by regular and orderly progress through the prescribed curriculum without abuse of withdrawal and course repeat privileges.

Students will be evaluated during the quarter registered for Electrical Engineering 2030. Transfer students may take none (0) quarter hours in departmental courses before evaluation if EE 2030 transfer credit is given. Those who are not accepted into the upper-division program of the department will not be permitted to register for any upper-division courses within the department. Such students will also be counseled and advised of certain educational alternatives.

MASTER OF SCIENCE PROGRAM
Graduate work leading to the Master of Science degree may be completed during one academic year of full-time study or the degree may be obtained in two or more years of study in the evening.

Graduate assistants 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 with a major in electrical engineering is offered. The department also participates in the engineering science doctoral program.

General policies of the Graduate School, residence, language, research, examination, and admission to candidacy requirements are explained in the Graduate Catalog.


2030 Circuits III (3) Polyahe networks considered as networks with more than one source. Magnetically coupled circuits. Transient analysis of circuits containing more than one storage element using classical methods. Steady-state analysis of networks containing sinusoidal sources of more than one frequency. Prereq: 2020. Coreq: Physics 2360, Math 2860. 3 hrs. including biweekly lab. E.


3050 Basic Field Theory (3) Forces between charged, electric and magnetic fields Gauss' law and divergence, potential and line integrals, material bodies, polarization. Magnetic circuits, Maxwell's equations, electric and magnetic fields. Gauss' law and divergence, potentials, Maxwell's equations, electric and magnetic fields. Prereq: Math 2850. 3 hrs. including biweekly lab. E.

3060 Propagation I (3) Propagation of waves in transmission lines and in other guiding systems. Impedance and reflectance analysis of waves, standing wave analysis. Reflection and transmission of waves. Transformation of waveguide systems for microwave communication. Prereq: 3050, Math 2860. 3 hrs. including biweekly lab. E.


3090 Energy System Operation (3) Power system component modeling and system structure. Basic analysis techniques in loadflow, economic dispatch, transient stability, faults, and system protection. Prereq: 3050, E.


3110 Basic Electrical Engineering—Circuits and Fields (3) For non-electrical engineering majors. Prereq: Math 2850, Physics 2350 or equivalent. 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—Mechanics (3) For non-electrical engineering majors. Prereq: 3110. 3 hrs. including biweekly lab. E.

3180 Logic Design of Digital Systems (3) Introduc- tion to boolean algebra and design of combinational circuits. Present gate and flip-flop characteristics. Design of clocked sequential circuits and other sys- tems containing memory. Introduction to minicomputer design. Prereq: 3010. 3 hrs. including biweekly lab. E.

4310 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 and assignment grading applications of optimal control theory. Topics include state-space representation of systems, controllability and obser- vability. Prereq: 4370 and admission to the Hamilton-Jacobi equation for deterministic sys- tems, optimal linear systems design with quadratic criteria, pole placement and observers for linear sys- tems, stability theory. Prereq: 3720, Computer Science 3150, Math 2860 and 4120.


4410 Power System Components and Control (3) Modeling of transmission lines and cables; RLC calculations and power flow limitations. Control of real and reactive power flows in interconnected power systems; the PF and QV control problems. Prereq: 3090.


4470 Magnetohydrodynamics (3) Course involves the study of electrically conducting fluids flowing through a magnetic field. Industrial applications to be studied include dispersive–conductive media, magnetic separation, liquid–metal pumps and electromagnetic guns. Prereq: Senior standing.

4480 Kinetic Theory (3) Course involves the study of the motion of particles in a gas. Topics include the study of microscopic travelling-wave tubes, and the recently developed Gyrotrons and free–electron lasers. Plasma applications include the production of microwave beams by plasma–beam interaction, and instabili- ty theory applied to electromagnetic isotope separators and thermonuclear fusion machines. Prereq: Senior standing.


4500 Electro-Optic Detection and Instrumentation (3) Sensitivity, resolution (frequency response) and noise performance of various optical systems for both spatial recording media (e.g. photographic emulsions) and temporal detectors (e.g. photodiodes) will be discussed. The basic theory of the course will be directed toward selected electro-optic instrumentation systems (e.g. laser light scattering, optical data processing, holo- graphic interferometry). Prereq: Senior standing.


4560 Analog Signal Processing Circuits for Elec- tronic Instrumentation (3) Use of operational amplifiers, instrumentation amplifiers, and other integrated circuits in signal processing. Design examples such as active filters, amplifiers, attenuators, function genera- tors, active rectifiers, and synchronous demodulators. Analysis of interfacing problems between transduc- ers and signal processors. Prereq: 3530. 3 hrs. including project laboratory.
4610 Analog-Digital Systems (3) Principles of analog computing components. Applied to analog computing to include operational amplifiers, feedback networks, thermal, and light-sensitive components. Design specifications are described. Prereq: 128 and 3180. 3 hrs. including biewlly lab.


4630 Digital System Organization and Design (3) Organization and design of digital systems including microcomputer systems and microprocessor architectures. Instrinsic and characteristics of ALU and CPU structures, storage systems (RAM, ROM, and PROM building blocks), and input/output systems. Control Unit organization to include serial-parallel modes of operation, synchronous/asynchronous time sequencing, and microprogramming of control functions. Prereq: 3180. 3 hrs. including biewlly lab.

4660 Biologic Instrumentation (3) Nature and origin of biologic transducers, amplifiers, requiring requirements, and noise problems. Prereq: Senior Standing.

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

4690 Communications Electronics (3) Receiver and transmitter circuits for communications. Prereq: 3040, 3830. 3 hrs. including project laboratory.

4700 Digital Integrated Electronics (3) Comparators, logic gates, flipflops, registers, counters, memories, analog-to-digital and digital-to-analog converters. Prereq: 3720. 3 hrs. including project laboratory.

4720 Circuit Theory (2) Processing and fabrication. Analysis of active and passive components for monolithic and hybrid circuits. Design techniques for linear and digital circuits. Prereq: 3830. 3 hrs. including project laboratory.

4750 Interactive Computer Graphics (3) (Same as Computer Science 4750 and Geography 4750.)

4780 Synchronous Machines (3) Construction and application of synchronous machines, analysis of performance from equivalent circuit models for round rotor, salient pole, and rotating machine. Park's transformation to the 2-axis model, use of this model in transient studies; extension of the 2-axis concept to the general theory of electrical machines. Prereq: 3690.

4790 Controllable Motor Drives (3) Constructional features and design parameters. The usual variations of the d.c. motor; A.C. servomotor; stepping motor; development of transfer functions and examples which fit their application in control system. Prereq: 3090.

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

4810 Discrete-Data Systems (3) Introduction to analysis and design of discrete data control systems used frequently for digital techniques. Quantizing techniques; application of digital computers in closed-loop feedback systems. Prereq: 3720.

4820 Introduction to Pattern Recognition (3) Role of pattern recognition within framework of artificial intelligence and digital techniques. Chaotic, 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 techniques. Image processing for image operations. Prereq: 3150 and Computer Science 3150, or Statistics 3450 and Computer Science 1510. (Same as Computer Science 4830.)

4850 Small Computer Systems (3) Basic structure of small computer systems, input-output techniques, interrupt structures, peripheral devices, system software, and assembly language programming. Course is project oriented. Prereq: Basic Eng. 1410, Computer Science 1510 or 3150, or consent of instructor. (Same as Computer Science 4850.)

4910-20-30 Special Electrical Engineering Problems (3,3,3) Problems in electrical engineering involving library and experimental research.

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

Engineering Physics
Professor W. M. Bugg (Head); Physics staff as shown on page 197.

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 191. Descriptions of the physics courses are found on page 198.

Engineering Science and Mechanics

Associate Professors: B. Antar, Ph.D., Texas; E. K. Boyce, M.S., Tennessee, J. E. Caruthers, Ph.D., Georgia Institute of Technology; R. J. Jendrucko, Ph.D., Virginia, P.E.; W. A. Lyday, M.S., Tennessee; A. Matthews, Ph.D., Illinois, P.E.; T. F. Moriarty, Ph.D., Illinois, P.E.; W. E. Scott, Ph.D., Johns Hopkins; M. O. Sollman, Ph.D., Tennessee, P.E.; J. Steinheir, Ph.D., Illinois, P.E.; J. F. Wasserman, Ph.D., Cincinnati, P.E.

Assistant Professors: J. A. M. Boulet, Ph.D., Stanford; W. F. Jones, Ph.D., Clemson.

Bachelor of Science Program
The curriculum in engineering science provides students an opportunity for education which is broad in engineering science, and mathematics, and physical (or biological) science. Such a program prepares students for a career in engineering development and research, professional education at the M.S. level, and for additional study leading to the master's or the doctoral degrees. The curriculum provides 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 provides 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 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 in some technical areas such 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, analyze medical data, and 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 analysis of engineering systems 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. Such, heavy emphasis is placed on the use of digital computers in the study leading to the master's degree.

The environmental sciences elective group provides the opportunity for the student to apply engineering principles to the solution of environmental and ecological problems. This program offers an opportunity for the necessary background to achieve a high level of...
competence in professional practice or graduate study.

The engineering materials elective group provides background in the use of materials in the solution of practical problems. This includes the selection of the proper materials to support the anticipated loads during the design life of the structural 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 techniques for evaluating material properties and determining material flaws. Demand for this background is increasing in high technology industries. Techniques studied include ultrasounds, X-rays, dye penetration, photoelasticity.

The basic engineering sciences curriculum offers an opportunity to study significant blocks of the engineering science areas recognized by the American Society for Engineering Education such as (1) 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; and (7) environmental sciences. No student will fulfill the engineering science requirements 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.

For students with more than 90 quarter hours, this course plan must be filed with the Office of Admissions and Records before they can register for additional courses, and before a senior standing sheet can be prepared.

MASTER 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 and engineering science option, interdisciplinary study is designed to meet individual needs or interests. Each applicant is 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 prospective students 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 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.

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. 1350, Math 2840.
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. 3311 or equivalent.

3310-20 Mechanics of Materials (4) Concepts of stress and strain, stress strain relations, and Mohr's circle; stresses and displacements in thin-walled pressure vessels, shafting; determine, indeterminate, and non-homogeneous 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 use in the field. Subjects include anatomy, physiology, biomaterials, mathematical models of body systems, etc. Coreq: Math 2820 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. Prereq: 3311 and Met. Engr. 2110 or Must. Must be taken in sequence. Prereq: Basic Engr. 1320, Math 2840.

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. Not for 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 or Math 2850.

4010 Project in Design and Development (4) Investi- gation, 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 techniques for designing and analyzing mechanical systems, structures, and components. Evaluation of design alternatives. Prereq: 4810 or consent of instructor.

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

4520 Biomedical Fluid Mechanics (3) Discusses objectives, review foundations, and present developments in biomedical fluid mechanics. Properties of human blood and blood vessels, determinants of cardiac performance, analysis and measurement of flow and pressure in arteries, nonthermodynamic study of circulatory system, mechanics of microcirculation. Applications to areas of hemodynamics, 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 biomechanical properties of living tissues, biomechanics of injury and prosthesis, material compatibility of prosthetic devices, and biomechanical problems related to impact. 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, residual stress, and fracture toughness. This includes fracture, R-curves, stress intensity factors, and J-integrals; the use of these properties in design. 3 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. Reviews developments in artificial internal organs 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: 2811, Elec. Engr. 2920 or 3110. 2 hrs. and a 3-hr. lab.

4620 Dynamic Data Acquisitio (4) Instrumentation of measuring systems for dynamic events and responses; signal conditioning; oscilloscopes, oscillographs, and computer-aided measurement; telemetry; digital data transmission; data processing. Prereq: 3311, 4710, Elec. Engr. 3120. 3 hrs. and a 3-hr. lab.

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

4710 Fundamentals of Vibrations (3) Free and forced vibrations of damped and undamped lumped parameter systems; energy methods. Prereq: 2720 or 3700, Math 2840.


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) Problems related to recent developments and practice. Open to juniors or seniors with consent of instructor. May be repeated for credit.
methodology to traditionally non-engineering problem areas as provided through the industrial engineering curriculum, leads to participation by industrial engineers in an unlimited range of fields including, among others, retail distribution, banking, health care delivery, corporate management, municipal management, aerospace systems, research groups, and government as well as in the traditional area of manufacturing.

MASTER OF SCIENCE PROGRAM

A graduate program leading to the degree of Master of Science is open to graduates of A.B.E.T. - accredited undergraduate curricula in Industrial Engineering or to graduates of other technical curricula who take an approved list of prerequisite course work. A non-thesis option with 48 hours of course work plus a 3-hour project is available.

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

MASTER OF ENGINEERING PROGRAM

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


3440 Quality Control (3) Application of statistical methods to control quality of manufactured parts and techniques of experimentation. Prereq: 3430.

3510 Introduction to Operations Research I (3) Introduction to methodology of operations research and the application of operations research to industrial problems. The problem-solving process, statistical inference, decision theory, and queuing theory. Prereq: 3430 and Computer Science 3150.

3520 Introduction to Operations Research II (3) Introduction to mathematical programming including classical optimization methods, linear programming (with emphasis on the simplex 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, time and motion study, 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.

3820 Work Methods and Design (3) Design of workplace layouts, flow charting, activity chart analysis, methods improvement, micromotion study, job analysis, job evaluation, and design of wage structures and wage administration. Prereq: 2310.

3830 Work Measurement (3) Use of work measurement tools such as time and motion study, predetermined time standards, work sampling, and historical data analysis. Development of standard time data design of wage incentive systems. Prereq: 3629, and Statistics 3450.


4060 Production Systems Planning and Control I (3) Theory and application of production systems, 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 safety stocks, and distribution requirements planning. Prereq: 4060.

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

4150 Project Control with CPM and PERT (3) A study of project planning and control based primarily on “network diagram” techniques of activity sequencing, 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 operating procedures design. Prereq: 3630, 3510-20, 4060, 4520.

4230 Scheduling Systems (3) Performance measures for flow shop and flow shop scheduling, including both static and dynamic conditions, as well as techniques for 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: 3510.

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

4520 Engineering Economy (3) Methods and prob-
systems and the laws governing energy transformation. This area 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. Possible topics include the design and analysis of air conditioning, refrigeration, and heat pump devices encompassing heating, cooling, ventilation, humidifying, and noise control. The central courses are Mech. Engr. 4710-20-30.

**Manufacturing**. A study of manufacturing methods and production processes common to mass production industries. The study areas include the selection of processes, design of tools and fixtures, numerical control and analysis and design 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. 4680 and 4690.

**Propulsion**. The study of propulsion devices for ground vehicles, aircraft, and spacecraft. The topics include the analysis and design of internal combustion engines, gas turbines, jet and rocket engines using conventional and non-conventional fuels. The central courses are Mech. Engr. 4810 and Aero. Engr. 4250-60.

**Aerospace**. The study of aircraft and spacecraft including the mechanics of flight and related systems and propulsion devices. Key elements include the analysis and design of a variety of aerospace vehicles and systems. The central courses are Aero. Engr. 4240-50-60.

**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, class standing, 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 (excluding 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 Eng. and Aero Engr. 3040. 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 processed on a Progional 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 curricula 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)


3660 Manufacturing Processes (3) Selection of processes as related to the design of machine parts. Casting, hot and cold forming, metal removal, and welding. Manufacturing tolerances and surface finishes. 2 hrs. and one 2-hr. lab. Prereq: Met. Engr. 2110. 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 direct conversion techniques. Prereq: 3330; coreq: 4420.

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

4160 Design of Energy Conversion Systems (3) Synthesis and design of complete energy conversion system including economic and technical aspects. Participation in team design effort including formal presentations and design report. Prereq: 4150 and Ind. Engr. 4520.

4170 Turbo-Machinery (3) Basic principles of turbomachinery; 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 conservation schemes. Prereq: Senior standing in engineering or consent of instructor. A.

4220 Environmental Noise (3) Basic principles of acoustics—measurement and control of noise in industrial and community environments. 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/N/G. F.

4320 Seminar (1) Formal oral presentations by students on engineering topics of 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 Engr. 3511. E.

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

4471-91 Experimental Mechanical Engineering (3,3) Experimental methods and measurements of force, length, time, temperature, pressure, transport rates, and physical properties. Planning, conducting, analyzing, and reporting experimental tests run according to test standards and other specifications. Prereq: 3321, 3410, 3440, Engr. Sci. & Mech. 3320 for 4471; 4471 and 4420 for 4491. 4471-F, W, S; 4491-W, S, SU.

4511-21 Systems and Controls I and II (3,3) Analytical models of physical systems comprised of control elements and feedback systems; classical control; electrical, and thermal components; feedback control systems, transient and frequency response analysis; non-linear control of linear systems; sampled data systems, digital filters. Prereq: 3620 or AE 3620, AE 3511, and Elec. Engr. 3110; coreq: 4471 for 4511. Prereq: 4511 for 4521, 4511-F, W; 4521-W, S.

4611 Manufacturing Processes (3) Comparison of machining methods; plastic production, metrology. Prereq: 3330, 3440, and senior standing. A.

4621 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.

4623 Numerical Control Processing (3) Application of numerical control technology to mechanical and thermodynamic systems; digital filters. Prereq: 3330 and 3440. F.

4631 Manufacturing Process Engineering (3) Product specification: dimensional analysis of size and form; true position tolerance theory; tolerance analysis; and workplace control for production to tolerance. Prereq: 3660 or Ind. Engr. 4040.

4650 Materials and Manufacturing Process (3) Selection of materials in design process, emphasizing relationships between stress and strain analysis, material properties, environmental temperature, manufacturing technology, and cost. Prereq: 3650, 3660.


4691 Machine Design (5) Innovative design of complete machine; documentation including specifications, design calculations, working drawings, and cost analysis. Written and oral report. Prereq: 4670-80, Ind. Engr. 4520. F, S.

4710 Thermal Environmental Systems (3) Vapor compression and absorption cycles; heat pump systems; moist air properties; psychrometric processes. Prereq: 4471, 4472, 4473.

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

4730 Thermal Environmental Systems (3) Design of heat transfer systems and air conditioning systems. Prereq: 4720 and Ind. Engr. 4520.

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 thermal systems and components; environmental impact; combustion, turbomachinery, solar energy. 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; design of first and second law analysis. Prereq: 3330 and 4420. W.

4791 Thermal Engineering Design (5) Design of complete fluid-thermal systems including economic, technical and optimization aspects. Participation in team design effort including formal presentations and
4310 Seminar (1) Discussion of topics related to engineering; includes inspection trips to industrial plants. Prereq: Senior standing. S/N/C. F.

4320 Seminar (1) Formal oral presentations by students on current research. Prereq: Senior standing. W.


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

4510 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.

4520 Selected Topics in Aerospace Science (1-4) Current problems and topics in aerospace science; topics in science and engineering required for an understanding of the several areas of aerospace science. Prereq: Consent of instructor. Title will vary.

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. S/N/C. F., W., S.

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


3620 Mechanical Vibrations (3) Free and forced vibrations of single and multiple degree vibrating systems, balancing of vibrating machinery. Prereq: 3619 and Mech. Engr. 3910. W.


4010 Thesis (3) Problem investigation and report. Prereq: Senior standing. F., W., S.

4110 Aerodynamic Fundamentals (2) Atmosphere, dynamics and thermodynamics of perfect gases, fluid flow types, airfoil theory, wing theory, drag. For non-aerospace engineering majors only. Prereq: Consent of instructor.

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

4210 Compressible flow (3) One-dimensional internal flow, shock and expansion waves; friction and non-adiabatic flow. Prereq: 3511 and Mech. Engr. 3321. F.

4230 Viscous Flow (3) Boundary layer theory; laminar and turbulent flow; compressibility effects; numerical solution methods. Prereq: 3511 and Mech. Engr. 3610, 4420. S.


4261 System Design (3) Synthesis and design of a complete aerospace system including economic and technical aspects. Participation in team design effort including formal presentations and design report. Prereq: 4250 and Ind. Engr. 4520. S.

4300 Dissimilar Metal Joining (3) Joins using various methods; welding, brazing, and soldering. Prereq: 4250. F.

4320 Seminar (1) Formal oral presentations by students on current research. Prereq: Senior standing. W.


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

4510 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.

4520 Selected Topics in Aerospace Science (1-4) Current problems and topics in aerospace science; topics in science and engineering required for an understanding of the several areas of aerospace science. Prereq: Consent of instructor. Title will vary.

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

Nuclear Engineering (7/16)

Professors:

P. F. Pasqua (Head), Ph.D. Northwestern, P.E.; G. de Saussure, Ph.D. Massachusetts; H. L. Dodds, Ph.D. Tennesse, P.E.; J. B. Fussell, Ph.D. Geor-

gin Institute of Technology; T. W. Kerlin, Jr., Ph.D. Tennesse; H. G. MacPherson (Emeritus), Ph.D. California (Berkeley); J. T. Milneal, Ph.D. Tennes-

ee; R. B. Perez, Ph.D. University of Madrid; H. C. Roland, Ph.D. Tennesse; P. N. Stevens, Ph.D. Northwester, P.E.; N. Uckan, Ph.D. University of Michigan.

Associate Professors:

E. M. Katz, Ph.D. Tennesse, P.E.; L. F. Miller, Ph.D. Texas A & M, P.E.; B. R. Upadhyaya, Ph.D. California (San Diego), P.E.

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 degree to a degree of Master of Science and Master of Engineer-

ing is available to graduates of recognized undergraduate curricula in engineering and physics. Each applicant will be advised as to the necessary prerequisites courses before entering the program.
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.

4830 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. Belck, Dean
Jay Stauss, Associate Dean, Graduate
Studies and Research
Jane R. Savage, Associate 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 better 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 many 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 opportunity for training 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 in home economics options. Announcements are sent upon request.

The Continuing Education Program provides advanced courses in all areas of home economics and 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−Coordinated 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:

Option 1−Furnishings
Option 2−Textile Science
Option 3−Apparel and Textiles

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

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 above 3000 and above at The University of Tennessee, Knoxville. The prospective transfer student is advised to preplan 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 utilization of credit and sequence of course work. All new freshmen 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 course requirements before transferring to the college.

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 138.

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.

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.

The 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 at the centers across the state for fiber production, fabric and clothing manufacturers, and consumers. Laboratories are well equipped for the physical and chemical analyses of fabrics, yarns, and fibers.

Field training provides the 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:

- Home Economics 1510 Family Systems: Human Development 4
- Home Economics 1520 Family Systems: Aesthetic Environment 4
- Home Economics 2510 Family Systems: Physiological Well-being 4
- Home Economics 3510 Family Systems: Consumer Resources 4

Optional Minors

Minors are offered in the three departments in the College of Home Economics. A minor in a department of this college requires a minimum of 25-29 credit hours with the majority of credit hours the 3000- and 4000-level. At least 12 of the credit hours required for the minor must be completed at UTK. Specific requirements are listed by each department offering a minor and it is assumed that prerequisites to these courses will not count toward the minor.

Minors in the College of Home Economics are open to students in home economics and students in other colleges who have approval of their advisor and their college or school. Minors are recorded on students' transcripts without regard to course overlap among majors and minors.

All courses taken for a minor as offered in the College of Home Economics must be taken for a grade unless the course is offered on a satisfactory/no credit basis. A student seeking a minor as offered in the College of Home Economics must declare the minor in the College of Home Economics form prior to completing more than one-half of the total hours required for the minor. A student seeking a minor as offered in the College of Home Economics must indicate their intention upon the application for graduation.

Child and Family Studies

A minor in Family Studies consists of 28 credit hours as follows:

A minor in Child Development consists of 27 credit hours as follows:

A minor in Child and Family Studies consists of 28 credit hours as follows:

A minor in Nutrition and Food Studies consists of 24-28 credit hours as follows:

Textiles, Merchandising and Design

A minor in Textile Science consists of 26 credit hours as follows:

A minor in Merchandising consists of 25 credit hours as follows:

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). A background in science is necessary 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.

Freshman

- Home Economics 1510  4
- Home Economics 1520  4
- Natural science 12
- English 1010 or 1020  6
- English 1031 or 1032 or 1033  3

Sophomore

- Home Economics 1510  4
- Home Economics 1520  4
- Physical education electives 2
- Speech 1221 or 2021 or 2351  3
- Physical or biological science elective 4
- Social sciences 12
- History or political science elective 4

Junior

- Child & Family Studies 3125  3
- Child & Family Studies 3210-20  6
- Child & Family Studies 3330  3
- Child & Family Studies 3350-55  3
- Child & Family Studies 3420 or 4830  3
- Child & Family Studies 3510 or 3515  3
- Home Economics 2510  4
- Economics 2510  4
- Philosophy or religious studies elective 4
- Special Education 3333  3
- Physical Education 3560 or 3570  2-3
- Public Health 3210  4

Senior

- Child and Family Studies 4110, 4111  12
- Child and Family Studies 3200  3
- Child and Family Studies 4260 or 4810  3
- Child and Family Studies 4350  3
- Child and Family Studies 4610  3
- Child and Family Studies 4420  3
- Child and Family Studies 4620  3
- Child and Family Studies 4210 or IDH 4320  3
- Home Economics 3510  4

Total: 152 hours

*Twelve hours selected from the following: Biology 1210-20-30, Chemistry 1510-20-30, Physics 1410-20-30, Zoology 2510-20-30, Zoology 2920-30.

*Requirement may be satisfied by Mathematics 3000 or Psychology 3150 to be taken in the junior year.

*Requirement may be satisfied by Nutrition and Food Sciences 3120 to be taken in junior year.

*Selected from at least two of the following areas: Psychology 2500, 2530, 2540, Sociology 1510-20, Anthropology 2510, 2520, 2530.
OPTION 2. HUMAN DEVELOPMENT AND FAMILY STUDIES

This option is for undergraduate CFS majors who want a general background in individual and family studies. This option does not prepare for a career in preschool education. Students interested in the Cooperative Extension Service, community agencies, general family counseling, social work, and graduate study would choose this undergraduate option.

Freshman

Home Economics 1510

Home Economics 1520

Nutrition and Food Sciences 1130

Natural science .............................. 12

English 1010 or 1011; 1020

English 1031 or 1032 or 1033

Mathematics 1450

Philosophy 1510 or 2510 or 2520 or 2210 or upper-division foreign language

Music 210 or Art 1815 or 1826

Electives

Sophomore

*Child & Family Studies 2120

*Literature elective

*Nutrition and Food Sciences 1130

Home Economics 2510

Physical science elective

Speech 1221 or 2021 or 2351

Physical or biological science elective

*Majors elect one course from the following:

History or political science elective

Elective

Junior

Child & Family Studies 2410 or Sociology 3150

Child & Family Studies 3210

Child & Family Studies 3220

Child & Family Studies 3510

Child & Family Studies 3515

Child & Family Studies 3520

Home Economics 3510

Economics 2510

History or political science elective

Philosophy or religious studies elective

Electives

Senior

Child & Family Studies 3200 or 4350

Child & Family Studies 4260

Child & Family Studies 4420 or 4610

Child & Family Studies 4430

Child & Family Studies 4810 or Educational Psychology 4800

Child & Family Studies 4630

Sociology elective

Electives

Total: 192 hours

English 1031 or 1032 or 1033

Music 1210 or 1211 or Art 1815 or 1825

Math 2110-20-30

Philosophy or religious studies elective

Sophomore

Home Economics 2510

Child & Family Studies 3210

Health elective

Art Education 2100-10

Music Education 2100

Physical Education 3450

Physical science elective

Literature elective

Culture and society elective

History elective

Social science elective

Economics 2510

Junior

Home Economics 3510

Child & Family Studies 3360

Edu. Curriculum & Instruction 4450

Edu. Curriculum & Instruction 4300-70-80-91

Edu. Curriculum & Instruction 3350

Edu. Curriculum & Instruction 3720

Edu. Curriculum & Instruction 4303

Edu. Curriculum & Instruction 4110-20-30

Music Education 3110

Public Health elective

Physical Education 3660

Library & Information Science 3510

Sociology elective

Child & Family Studies 3200 or 3220 or 4350

Child & Family Studies 4610

*Child & Family Studies 4110-11

Edu. Curriculum & Instruction 4100, 4600-51

Edu. Curriculum & Instruction 4451

Edu. Curriculum & Instruction 4452

Special Education 3333

Total: 192 hours

OPTION 3. NURSERY SCHOOL-THREE GRADE

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.

Freshman

Home Economics 1510

Home Economics 1520

Child & Family Studies 1500

English 1010 or 1011; 1020

Hours Credit

138

Total: 190 hours

Professional Curricula in Home Economics Education

OPTION 1. VOCATIONAL HOME ECONOMICS EDUCATION

This 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 subjects including home economics subject matter. State certification require-

ments are met plus provision for capitalizing on one's area of interest. Requirements for admission to teacher education, to student teaching, and for recommendation for certification are listed on page 94-95.

All freshman, 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 option. Course requirements for each endorsement are in addition to those of the basic consumer and homemaking education requirements.

Freshman

Chemistry 1510-20-30

English 1010 or 1011; 1020

English 1031 or 1032 or 1033

Nutrition and Food Sciences 1510

Home Economics 1510

Mathematics elective

Physical Education or health elective

Speech elective

Textiles & Clothing 1160

Textiles & Clothing 1170

Sophomore

Home Economics 1520

Economics electives

Electives

Home Economics Education 2540

Humansities electives

Literature elective

Psychology 2500

Social science electives

Zoology 2920-30

Junior

Child & Family Studies 3210, 3510

Educ. Curriculum & Instruction 3030, 4304

Special Education 3333

Economics 3020

Electives

Nutrition and Food Science 3020

Home Economics Education 3240

Child & Family Studies 4110

Nutrition and Food Sciences 3120

Interior Design & Housing 3110

Textiles & Clothing 3420

Textiles & Clothing 3429

Senior

Child & Family Studies 3210

Educ. Curriculum & Instruction 3030, 4304

Special Education 3333

Electives

Home Economics 3510

Home Economics Education 4240

Home Economics Education 4610, 4611

Interior Design & Housing 4320

Child & Family Studies 3515

Child & Family Studies 4440

Nutrition and Food Sciences 4160

Textiles & Clothing 3170

Total: 190 hours

1 Twelve hours selected from the following: Biology 1210-20-30, Chemistry 1510-20-30, Physics 1410-20-30, Zoology 2510-20-30, Zoology 2920-30.

2 Requirement may be satisfied by Mathematics 3000 or Psychology 3150 to be taken junior year.

3 Requirement may be satisfied by Educational Psychology 4110 to be taken senior year.

4 Requirement may be satisfied by Nutrition and Food Sciences 3120 to be taken junior year.

5 Selection from at least three of the following areas: Psychology 2550, 2560, 2560, Sociology 1510-20, Anthropology 2510, 2520, 2530.

OPTION 3. NURSERY SCHOOL-THREE GRADE

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.

Freshman

Home Economics 1510

Home Economics 1520

Child & Family Studies 1500

English 1010 or 1011; 1020

Hours Credit

138

Total: 190 hours

1 Elective hours may be used for additional endorsement in one or more of the occupational areas.

2 See College of Education Curriculum for Secondary Education.

3 Requires admission to Teacher Education Program.

Occupational Areas Requirements

1. FOOD MANAGEMENT

ENDORSEMENT

19 hours

Nutrition and Food Sciences 3210

Nutrition and Food Sciences 3220

Nutrition and Food Sciences 3230

Home Economics Education 4509, 320

Home Economics Education 4510

2. CARE AND GUIDANCE OF CHILD

ENDORSEMENT

16 hours

Child & Family Studies 3125 or 3350

Child & Family Studies 3360

Child & Family Studies 4420 or 4610

Child & Family Studies 4620

Textiles & Clothing 3170

3
Professional Curricula in the Department of Nutrition and Food Sciences

**Nutrition and Food Sciences Major**

Entering freshmen in Options 1 and 2 enroll as NFS majors and a departmental advisor will be assigned. Freshman interest in Option 2 should progress into that option by their third quarter in residence. Transfer students must apply to the Director of Admissions, be admitted to the University of Tennessee, Knoxville, and associate with the College of Home Economics prior to the declaration of a major within the department.

**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, government, a dietetic internship, and graduate study.

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 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</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 1110-20-30</td>
<td>12</td>
</tr>
<tr>
<td>English 1010 or 1011; 1020</td>
<td>6</td>
</tr>
<tr>
<td>English 1031 or 1032 or 1033</td>
<td>6</td>
</tr>
<tr>
<td>Nutrition and Food Sciences 1010</td>
<td>3</td>
</tr>
<tr>
<td>Home Economics 1510</td>
<td>4</td>
</tr>
<tr>
<td>Child &amp; Family Studies 1130</td>
<td>4</td>
</tr>
<tr>
<td>Mathematics elective</td>
<td>3</td>
</tr>
<tr>
<td>Physical Education or health electives</td>
<td>3</td>
</tr>
<tr>
<td>Spanish elective</td>
<td>3</td>
</tr>
<tr>
<td>Textiles &amp; Clothing 1160</td>
<td>3</td>
</tr>
<tr>
<td>Textiles &amp; Clothing 1170</td>
<td>3</td>
</tr>
</tbody>
</table>

1 Electives and/or supporting courses 4

**Sophomore**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Economics 1520</td>
<td>4</td>
</tr>
<tr>
<td>Home Economics 2510</td>
<td>4</td>
</tr>
<tr>
<td>Economics electives</td>
<td>4</td>
</tr>
<tr>
<td>Home Economics Education 2240</td>
<td>4</td>
</tr>
<tr>
<td>Humanities electives</td>
<td>8</td>
</tr>
<tr>
<td>Literature electives</td>
<td>4</td>
</tr>
<tr>
<td>Psychology 2500</td>
<td>4</td>
</tr>
<tr>
<td>Social science elective</td>
<td>3</td>
</tr>
<tr>
<td>Zoology 2920-2930</td>
<td>8</td>
</tr>
</tbody>
</table>

1 Electives and/or supporting courses 4

**Junior**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child &amp; Family Studies 3515</td>
<td>3</td>
</tr>
<tr>
<td>Child &amp; Family Studies 3210, 3510</td>
<td>6</td>
</tr>
<tr>
<td>Educational Psychology 3810 or Child &amp; Family Studies 3520.</td>
<td>3</td>
</tr>
<tr>
<td>Nutrition and Food Sciences 3020</td>
<td>3</td>
</tr>
<tr>
<td>Nutrition and Family Studies 3420 or 4830</td>
<td>3</td>
</tr>
<tr>
<td>Nutrition and Food Sciences 3020</td>
<td>3</td>
</tr>
<tr>
<td>Interior Design &amp; Housing 3110</td>
<td>3</td>
</tr>
<tr>
<td>Rural Soc. 3420</td>
<td>3</td>
</tr>
<tr>
<td>Sociology 3420</td>
<td>3</td>
</tr>
<tr>
<td>Textiles &amp; Clothing 3420</td>
<td>3</td>
</tr>
<tr>
<td>Textiles &amp; Clothing 3429</td>
<td>3</td>
</tr>
</tbody>
</table>

1 Electives and/or supporting courses 12

**Senior**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child &amp; Family Studies 4210</td>
<td>3</td>
</tr>
<tr>
<td>Child &amp; Family Studies 4260 or Sociology 3690</td>
<td>3-4</td>
</tr>
<tr>
<td>Child &amp; Family Studies 4440</td>
<td>4</td>
</tr>
<tr>
<td>Child &amp; Family Studies 4610</td>
<td>3</td>
</tr>
<tr>
<td>Home Economics Education 4000</td>
<td>4</td>
</tr>
<tr>
<td>Home Economics Education 4500</td>
<td>6</td>
</tr>
<tr>
<td>Interior Design &amp; Housing 4320</td>
<td>3</td>
</tr>
<tr>
<td>Nutrition and Food Sciences 4150</td>
<td>3</td>
</tr>
<tr>
<td>Nutrition and Food Sciences 4160</td>
<td>4</td>
</tr>
<tr>
<td>Textiles &amp; Clothing 3170</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives and/or supporting courses 8

Total: 190 hours

**NUTRITION AND FOOD SCIENCES**

- optimum education components as in Option 1,
- comprehensively the curricular 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.

---

1 Requires Math 1560 as a prerequisite.
2 Select from anthropology, art, literature (other than required), foreign language (beyond introductory level), music (history or appreciation), philosophy, and religious studies. Students meeting ADA Plan IV must take Anthropology 2530.
4 Select from 4020, 4050, 4110, 4140, 4160, 4190, 4340. Students meeting ADA Plan IV must take NFS 4110 and 4190.
5 Select from Microbiology 3810-19, Biology 3110, Zoology 3920, Food Technology and Science 4810, Students meeting ADA Plan IV must take Biology 3110.

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**OPTION 2. COORDINATED UNDERGRADUATE PROGRAM IN DIETETICS**

The Coordinated Undergraduate Program in Dietetics is a generalist program, educating entry-level dietitians in administrative and clinical dietetics, and is accredited by the American Dietetic Association (ADA). The program incorporates the equivalent of a fifth year dietetic internship into a four-year academic curriculum. The curriculum includes a two-year pre-professional sequence that meets general education requirements and prerequisites for professional courses, and a professional phase in the junior and senior years. The junior year provides an introduction to dietetics, and accredited course work for the professional phase, and food systems administration. The senior or fourth year consists of advanced application of knowledge acquired in the junior year to increasingly complex administrative and clinical experiences. During the professional phase, academic courses are coordinated with planned experiences in selected hospitals and community facilities. The assignment of students to each clinical site is made by the program director.

**Progression Policies**

A student may progress into the professional phase of the program provided all requirements or equivalents of the program up to that time, as well as University of Tennessee and College of Home Economics standards, have been satisfactorily met. Preprofessional courses may be taken at The University of Tennessee or at any accredited college. The program has been planned to permit transfer students to apply prior to the beginning of the junior year. Application should be made to the program director by March 15.

Criteria for selection include (1) evidence that the student will successfully complete the two-year pre-professional phase, (2) an overall GPA of 2.2 or higher, (3) personal interview, and (4) recommendations from
faculty of selected pre-professional courses. The number of qualified students accepted into the Coordinated Undergraduate Program in Dietetics is contingent on the number of clinical sites available. Criteria for progression to the professional phase must be maintained throughout the pre-professional phase.

Criteria for progression within the junior and senior professional phase years will include (1) satisfactory completion of each required professional course as scheduled, with a minimum grade of C, and (2) periodic assessment of professional performance by academic and clinical faculty. The maximum credit hours carried per quarter should not exceed 18 hours without special permission from the program director.

Upon satisfactory completion of the program, students receive the Bachelor of Science Degree in Home Economics and 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.).

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Hours</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 1510-20-30</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Math 1540-50</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>English 1010 or 1011; 1020</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>English 1031 or 1032 or 1033</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Home Economics 1510</td>
<td>4</td>
<td></td>
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<tr>
<td>Home Economics 1520</td>
<td>4</td>
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<tr>
<td>Home Economics 2510</td>
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<td>Economics 2510</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Psychology 2520</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

**Sophomore**

| Nutition and Food Sciences 3130-40-50 | 12 |        |
| Nutrition and Food Sciences 3210 | 3 |        |
| Nutrition and Food Sciences 3220 | 3 |        |
| Microbiology 2910-19 | 5 |        |
| Economics 2520 | 4 |        |
| Zoology 2920-30 | 8 |        |
| Statistics 2100 or Plant and Soil Science 3610 | 3 |        |
| Speech 2311 or 2361 | 4 |        |
| English Literature Elective | 3 |        |
| Electives | 3 |        |

Application and selection by a faculty committee required for progression to junior year.

**Junior**

| Nutrition and Food Science 3010-20 | 7 |        |
| Nutrition and Food Sciences 3160-51 | 7 |        |
| Nutrition and Food Sciences 3220-30 | 6 |        |
| Nutrition and Food Sciences 3230 | 5 |        |
| Nutrition and Food Sciences 4000-01 | 5 |        |
| Nutrition and Food Sciences 4130-31 | 6 |        |
| Nutrition and Food Sciences 4140 | 4 |        |
| Home Economics 3510 | 4 |        |
| Accounting 2110 | 3 |        |
| **Total:** | 65 |        |

**Senior**

| Nutrition and Food Sciences 4010-11 | 4 |        |
| Nutrition and Food Sciences 4140-41 | 6 |        |
| Nutrition and Food Sciences 4150-51 | 6 |        |
| Nutrition and Food Sciences 4170 | 4 |        |
| Nutrition and Food Sciences 4240-41 | 6 |        |
| Nutrition and Food Sciences 4250-51 | 6 |        |
| Nutrition and Food Sciences 4270 | 4 |        |
| Economics 3420 or Psychology 4460 | 3 |        |
| Anthropology 4250 or Philosophy 3611 | 3 |        |
| Electives | 3 |        |

**Total:** 190 hours

**Nutrition and Food Sciences 1010** | 3 |
**Nutrition and Food Sciences 1130** | 3 |
**Nutrition and Food Sciences 210** | 2 |
**Statistics 2100** | 12 |
**English 1010 or 1011; 1020** | 5 |
**English 1031 or 1032 or 1033** | 3 |
**Math 1540-50** | 8 |
**Home Economics 1510** | 4 |
**Electives** | 4 |
**Total:** 190 hours

**Sophomore**

| Nutrition and Food Sciences 3210-30 | 9 |
| Microbiology 2910 or Public Health 3220 | 3 |
| Economics 2520 | 4 |
| Accounting 2110-2310 | 9 |
| Speech 2311-2361 | 4 |
| English Literature Elective | 4 |
| **Statistics 2100** | 12 |
| **Plant and Soil Sciences 3010** | 4 |
| Sociology 1510 | 4 |

**Total:** 190 hours

**Note:** Prior to taking any 4000-level NFS course, Tourism, Food and Lodging majors must complete Computer Science 1410, a statistics course, Accounting 2130 and Marketing 3120.

**Junior**

| Nutrition and Food Sciences 3230 | 5 |
| Nutrition and Food Sciences 4210-20 | 6 |
| Nutrition and Food Sciences 4270 | 4 |
| Economics 3420 | 3 |
| Marketing 3110-20 | 6 |
| Textiles & Clothing 3390 | 3 |
| Interior Design and Housing 3110 | 3 |
| Computer Science 1410 | 3 |
| Electives | 3 |
| **Total:** | 46 |

**Senior**

| Nutrition and Food Science 4230 | 15 |
| Nutrition and Food Sciences 4240-50-50 | 10 |
| Nutrition and Food Sciences 4930 | 3 |
| Home Economics 3510 | 4 |
| Business Law 4110 | 3 |
| Electives | 11 |

**Total:** 190 hours

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**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.

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 the curriculum may apply toward satisfying the 15 hour elective requirement.

Students wishing to major in the Tourism, Food and Lodging Program will be enrolled as Nutrition and Food Sciences majors and a departmental advisor will be assigned to assist with program planning. In order to progress into the Tourism, Food and Lodging Administration program, students must:

1. Participate in an interview with two TFL faculty members.
2. Participate in an evaluation of work experience, if appropriate.
3. Complete the application form, including a statement of career goals.
4. Complete the following prerequisite courses with a grade of C or better: NFS 1010 Food Principles, ECS 2150 Introduction to TFL Administration, NFS Food Service Systems Management.

In order to progress through the TFLA major, students must:

1. Complete Computer Science 1410, a statistics course, Accounting 2130 and Marketing 3120 prior to registration for any 4000-level NFS course.
2. Make a grade of C or better in all 3000- and 4000-level NFS courses.
3. Maintain a cumulative GPA of 2.3.

**Application Deadlines**

Students must apply fall, winter, or spring quarter for progression into the TFLA program after completion of prerequisite courses and a cumulative GPA of 2.3. However, enrollment in NFS 3220 or any upper-division NFS course will not be permitted until the student has progressed in to the TFLA program.

**Freshman**

| Nutrition and Food Sciences 1010 | 3 |
| Nutrition and Food Sciences 1130 | 3 |
| Nutrition and Food Sciences 210 | 2 |
| Statistics 2100 | 12 |
| English 1010 or 1011; 1020 | 5 |
| English 1031 or 1032 or 1033 | 3 |
| Math 1540-50 | 8 |
| Home Economics 1510 | 4 |
| Home Economics 2510 | 4 |
| Economics 2520 | 4 |

**Sophomore**

| Nutrition and Food Sciences 3210-30 | 9 |
| Microbiology 2910 or Public Health 3220 | 3 |
| Economics 2520 | 4 |
| Accounting 2110-2310 | 9 |
| Speech 2311-2361 | 4 |
| English Literature Elective | 4 |
| Statistics 2100 | 12 |
| Plant and Soil Sciences 3010 | 4 |
| Sociology 1510 | 4 |

**Total:** 190 hours

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1. Natural science electives (12 hr. sequence) from one of the following areas: Biology 2200-20-30, Chemistry 1510-20-30, or Physics 1410-20-30.
2. Statistics 2110 requires Math 1560 as a prerequisite; for the business minor Statistics 2100 is required.

**Professional Curricula in the Department of Textiles, Merchandising and Design**

**Acquisition and Exhibition**

The department reserves the right of acquisition and exhibition of work completed in its studios under the guidance of the faculty.

**Interior Design Major**

The Interior Design major is for students who are interested primarily in becoming professional interior designers. This program has received provisional accreditation by FIDER.

**Association and Progression Policies**

Applications in Interior Design must be received by the Director of Admissions no later than March 1 for association in the summer and fall quarters. Selection will be made by April 1. November 1 is the deadline for applications for the spring quarter; enrollment is closed for the winter quarter. An applicant who is not accepted may be reconsidered if an application is made for a future class.

Progression to junior level interior design studio requires (1) satisfactory completion of the sophomore level interior design design series (2115-16) with a cumulative grade point average of at least 2.3, exceptions by petition only, (2) application to the Department of Textiles, Merchandising and Design no later than the eighth week of the quarter in which the student is enrolled in IDH 2116, and (3) a personal interview and evaluation of the applicant's portfolio by designated members of the interior design faculty.

* A minimum of 72 hours of upper-division courses are required for graduation.
Students whose competencies suggest other programs will be counseled to enter other departmental curricula or assisted in the transfer to other college or University programs.

Students must maintain an overall 2.3 grade point average by the end of 96 hours in order to maintain full status in the program. Academically deficient students will be put on temporary status during which the students must raise their overall GPA to 2.3, or have a minimum of 2.3 for each quarter's work until the overall average is raised to 2.3. If the GPA is not raised to 2.3, the student will be dropped from the interior design program. Students must earn a C or better in each required upper-division interior design course in order to graduate from the program.

### Professional Curriculum in Interior Design

#### Freshman
- English 1010 or 1011, 1020, 1033 9
- Anthropology 1120 4
- Art 1815, 1825, 2117 12
- Interior Design & Housing 2450-51-52, 2435, 2791 20
- Home Economics 2510 4
- Economics 2510 4
- *Natural Science elective* 4

#### Sophomore
- Architecture 3116 4
- Home Economics 3510 4
- *Social science elective* 4
- *Humanities elective* 4
- *Art elective* 4

#### Junior
- Interior Design & Housing 3260, 3450-51-52, 3791 20
- Home Economics 3510 4
- *Social science elective* 4
- *Humanities elective* 4
- *Art elective* 4

#### Senior
- Interior Design & Housing 4440, 4450-51, 4791 20
- Art 3745 4
- *Social science elective* 4
- *Humanities elective* 4
- *Electives* 16

Total: 192 hours

1. Select eight hours from one of the following areas: Biology 1210-20, Chemistry 1510-20, Physics 1410-20, Botany 1110-19.
4. Select 4 hours from: Art 2105, 2115, 2205, 2215, 2265, 2266, 2285, 2295, 2285, 2305, 2315, 2405, 2407, 2408, 2409, 2415, 2465, 2565, 2515, 2590.
5. 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 textile 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 2110-20-30, 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.

#### Freshman
- *Chemistry 3110-20-30 or 1110-20-30* 8
- English 1010 or 1011, 1020, 1033 9
- Math 1540-50 8
- Home Economics 1510, 1520 8
- Textiles and Clothing 1160, 1165, 1170 10
- Textiles and Clothing 1420, 1429 4

#### Sophomore
- *Textiles and Clothing 2110, 2170* 6
- Home Economics 2510 4
- Economics 2510-20 4
- Sociology 1510 4
- Psychology 2120 4
- *Humanities electives* 8
- *Accounting 2110* 3
- *Economics 2520* 4
- *Statistics 2100* 3
- *Lower-Division Elective* 3

#### Junior
- *Textiles and Clothing 3420, 3510* 6
- Textiles & Clothing 3460 4
- *Humanities electives* 8
- *Accounting 2110* 3
- *Economics 2520* 4
- *Statistics 2100* 3
- *Lower-Division Elective* 3

#### Senior
- *Textiles and Clothing 3410* 3
- *Textiles and Clothing 4010, 4120, 4520, 4660* 12
- *Upper-Division Electives* 6
- *Humanities electives* 8
- *Art elective* 4
- *Electives* 16
- *Electives* 16

#### Total: 192 hours

**OPTION 2. TEXTILE SCIENCE**

This curriculum is designed to prepare students who are interested in graduate study to become college teachers and researchers. Students may also use electives in Management or Industrial Engineering to prepare for careers in apparel production management.

#### Freshman
- *Chemistry 3110-20-30* 8
- English 1010 or 1011, 1020, 1033 9
- Math 1400-50-60 8
- Home Economics 1510 4
- Textiles & Clothing 1420, 1429 4
- Textiles & Clothing 1160, 1165, 1170 10
- *Sophomore* 8
- *Economics 2520-3110-3111* 8
- *Anthropology 3520-3140-3450* 8
- *Psychology 2500-2530* 8
- *Sociology 1510-3150-3130* 8
- *Speech 2311 or 2361* 4
- *Anthropology 2530* 4
- *Advertising 3030 or Marketing 4150 or 4210* 6
- *Upper-Division Electives* 13

#### Total: 191 hours

1. Prequisite to Textiles and Clothing 4630, 4640.
2. Six or eight hour sequence from any foreign language, philosophy, history, art history, music, religious studies, or political science.
3. Spring quarter only.
4. *A GPA of 2.0 is required prior to registration for T&C 4620. Application should be obtained from the TMD Department and submitted to coordinator by December 15 of year preceding textbook.*
5. *Advisor approved upper-division courses may be substituted.*
6. *Twelve quarters must be at 3000-4000 level.*

#### OPTION 3. APPAREL AND TEXTILES

This curriculum is designed to prepare students who are interested in graduate study to become college teachers and researchers. Students may also use electives in Management or Industrial Engineering to prepare for careers in apparel production management.

#### Freshman
- *Chemistry 1510-20-30 or 1110-20-30* 12
- English 1010 or 1011, 1020, 1033 9
- Math 1400-50-60 8
- Home Economics 1510 4
- Textiles & Clothing 1420, 1429 4
- Textiles & Clothing 1160, 1165, 1170 10
- *Sophomore* 8
- *Economics 2520-3110-3111* 8
- *Anthropology 3520-3140-3450* 8
- *Psychology 2500-2530* 8
- *Sociology 1510-3150-3130* 8
- *Speech 2311 or 2361* 4
- *Anthropology 2530* 4
- *Advertising 3030 or Marketing 4150 or 4210* 6
- *Upper-Division Electives* 13

#### Total: 191 hours

1. Or English 2560 or 2570 or 2580.
2. Eight-hour sequence from foreign language or philosophy or history or art history or music.
3. A minimum of 72 hours of upper-division courses is required for graduation.

1. Eight-hour sequence from foreign language or philosophy or history or art history or music.

#### Electives
- *Economics 2510-20* 6
- *Humanities electives* 8
- *Journalism 2210* 3
- *Physics 2210-20 or 1210-20* 3
- *Statistics 2100 or 3450* 3
- *Textiles & Clothing 3420* 3
- *Home Economics 3510* 4
- *Upper-Division Electives* 11

#### Senior
- *Child & Family Studies 4830* 3
- *Interior Design & Housing 3130* 3
- *Textiles & Clothing 3170* 3
- *Textiles & Clothing 4220* 4
- *Textiles & Clothing 4010, 4120, 4140, 4210* 12
- *Upper-Division Electives* 22


**Total: 192 hours**
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: N. H. Bates (Dean), Ph.D. Michigan State; M. L. Battle (Emerita), Ph.D. Cornell; J. D. Cunningham, Ph.D. Michigan State; G. L. Fox (Head), Ph.D. Michigan State; C. T. Edgart (Emerita), Ed.D. Cornell; R. L. Higberger (Emerita), Ph.D. Iowa; N. P. Logan (Emerita), Ed.D. Tennesee; V. M. Nordquist, Ph.D. Tennessee; E. L. Speer (Emerita), M.A. Columbia; P. N. White, Ed.D. Tennessee.

Associate Professors: D. B. Eastwood, Ph.D. Tufts; J. H. McInnis, Ph.D. Florida State; S. W. Miller, Ph.D. Ohio State; G. W. Peterson, Ph.D. Brigham Young; J. H. Stauss, Ph.D. Washington State; S. L. Twardosz, Ph.D. Kansas.

Assistant Professors: J. E. Allen, Ph.D. Purdue; C. A. Buehler, Ph.D. University of Minnesota; J. S. Kidwell, Ph.D. Purdue; K. G. Waddell, Ph.D. Tennessee.

Lecturer: A. E. Cox, M.S. Tennessee.

1120 Management and its Contribution to Family Living (3) Decision making process, relationships among decision makers, and the organization for implementing decisions; evaluation procedures; factors affecting management process; application of management principles to problems.

1500 Introduction to Early Education (3) Introduction and overview of early childhood education; conceptions of children, teachers, and teaching. Includes field observation.

2110 Human Socialization (3) Human development with emphasis on socialization process from infancy through adulthood 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 relationship. Issues such as power, 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.

3152 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) Developmental process 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 problems and advances at various levels - intellectual, emotional, social, and physical. Prereq: 3200 be 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. Emphasis on influence of family and community. Special attention to different social and cultural settings. Recommended 3200 and 3210 be taken prior to this course. 3 hrs. 1 hr. observation per week.

3300 Observational Methods in Child Development (5) Overview of methods of observing teacher and child behaviors in the classroom and in the child’s environment. Emphasis on research skills in observational assessment. Prereq: 3200 or 3210 or 3220 or consent of instructor.

3350 Program Planning (3) Philosophies of preschool education. Analysis of program and teacher-child interaction. Prereq: 3210; 3300 recommended.

3360 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 the family’s position and reduce income insecurity. Prereq or coreq: Economics 2320.

3510 Intimacy: Marriage and Alternatives (3) Examination of primary relationships from perspectives of both individual development and relationship development. Emphasis on dating, marriage, and variant family forms.

3515 Family Relationships (3) Focus on emerging and declining family roles and changing relationships among family members across the family life cycle, from various theoretical approaches. 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 a head teacher, includes 2-hr. weekly seminar. Prereq: 1500, 3210, 3300, 3350; 3360 recommended; coreq: 4111. S/NC.

4111 Student Teaching of Preschool Children (3) Increasing responsibility for planning and guiding groups of young children under the supervision of a head teacher, includes 2-hr weekly seminar. Prereq: 1500, 3210, 3300, 3350, 3360 recommended; coreq: 4110. S/NC.

4210 Family Finance (3) Analysis of alternative ways of meeting financial problems encountered during life cycle of family.

4220 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.

4260 Adult Development and Aging (3) Adult life in our society. Adjustment to internal and environmental changes through middle and aged years. Prereq: 2110 or Home Economics 1510 or equivalent background in adult development or consent of instructor.

4350 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. S/NC.

4420 Learning Experience with Parents (3) Dynamics of parent—teacher interaction. Emphasis on a variety of techniques for developing communication and working relationships of 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.


4510 Child in the Community (3) Needs of children; community agencies in 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: 3110 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 constraints, and opportunities for 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, 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 rate. 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 consumer organizations associated with government protection of consumers.

4978 Honors: Child, Family, and Consumer Studies (3) Individual special problems for juniors and seniors showing special ability and interest. Prerequisites: Maximum credit 9 hrs. (GRADUATE)

Consult the Graduate Catalog for listing of graduate level courses.

Nutrition and Food Sciences (725)

Professors: R. E. Beauchene, Ph.D. Kansas State; M. R. Buckley (Emerita), M.A. Columbia; A. M. Campbell (Emerita); Ph.D. Cornell; B. R. Carruth (Head), Ph.D. Missouri; G. W. Disney (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 (Emerita), Ph.D. Tennessee.

Associate Professors: F. E. Andrews, Ph.D. Ohio State; G. W. Disney, Ph.D. Tennessee; D. E. Lyen (Emerita), M.S. Cornell; N. L. Marable, Ph.D. Massachusetts; D. S. S. Mason, Ph.D. Illinois; M. N. Traylor, M.S. Georgia; M. P. E. Andrews, Ph.D. Ohio State; G. W. Disney, Ph.D. Tennessee. (Emerita), M.A. Columbia; A. M. Campbell (Emerita); Ph.D. Cornell; B. R. Carruth (Head), Ph.D. Missouri; G. W. Disney (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 (Emerita), Ph.D. Tennessee.

Assistant Professors: M. D. Brooks (Emerita), Ph.D. University of Kentucky; H. L. Fleshcott, Ph.D. Wisconsin; E. A.
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 3120 may not receive credit for this course. F, W, S.

2210 Introduction to Tourism, Food and Lodging Administration (2) Overview of tourism including food and lodging industries; analysis of basic operating systems and problem areas in the hospitality complex. F.

2220 Dimensions of Tourism (3) Economic and cultural impact of tourism on society; examination of forces influencing the domestic and international tourist industry. W, S.

3005-15 Nature of Food (4,4) Chemical and physical characteristics of food in relation to its functional and nutritional properties. Prereq: 3130 or equivalent. 3hrs. and 1 lab. F, S.

3020 Food and the Consumer (3) Economic considerations in food management, including food legislation, quality, consumer acceptability, and convenience. Prereq: 1010 or 3015 or 6 hrs. FTS; 4 hrs. econometrics. 2 hrs. and 1 lab. W, S.

3120 Fundamentals of Nutrition (3) Basic human nutrition. Not open to graduate or undergraduate majors in the department. Prereq: Chemistry 1510-20 or equivalent; Zoology 2920-30 or equivalent. A student who has received credit for NFS 1130 may not receive credit for this course. E.

3130 Applied Organic Chemistry (4) Basic nutrients as organic chemicals. Prereq: Chemistry 1510-20-30. Not for graduate credit for departmental majors. F.

3140 Physiological Chemistry (4) Metabolism of carbohydrates, lipids, and proteins; role of vitamins and minerals in metabolism. Prereq: 3130 or equivalent. Not for graduate credit for departmental majors. W, S.

3150 Food and Clinical Analyses (4) Quantitative analyses; methods of food and clinical analyses. Prereq: 3130 or equivalent and 3140 or equivalent. 2 hrs. and 2 labs. F.


3161 Clinical Experience in Dietetics (2) Planned experiences for applications 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. F.

3210 Foodservice Systems Management (3) Effective and efficient use of management resources in foodservice systems; fundamental management processes, 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: 3160 and 1130 or 3160 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. SNC only. F.

3320 Survey of Dietetics I (1) Overview of dietetics and careers. Prereq: 3120 or equivalent. Coreq: 3330. 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.

4011 Clinical Experience in Dietetics (1) Planned experiences in applying food science principles to modification of diets for patients. Coreq: 4010. Open only to students in the Coordinated Undergraduate Program in Dietetics. S.

4020 Introduction to Sensory Evaluation of Foods (3) Sensory evaluation of fats, protein foods, and the consumer. Prereq: 3015 or 9 hrs. FTS; PSSc 3610 or equivalent. 2 hrs. and 1 lab. W.

4040 Food in Contemporary Society (3) Consumers' options, responsibilities, and potential influence with respect to the food supply. Prereq: 3120 or 3160. F.

4050 Food Preservation (3) Application of basic principles of amendment and research findings to food preservation in home. Prereq: 3015 and 4 hrs. microbiology. 2 hrs. and 1 lab. W.

4110 Introduction to Nutrition Research (3) Nutrition principles and laboratory experiences involving small animals. Prereq: 3160; a statistics course. 2 hrs. and 1 lab. W.

4130 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: 4140. Open only to students in the Coordinated Undergraduate Program in Dietetics. W.

4140 Nutrition in Disease II (3) Interdisciplinary lectures and discussions on the metabolic processes of normal and diseased conditions; for junior and senior students. Coreq: Designed for senior students in the Coordinated Undergraduate Program in Dietetics. F.

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. F.

4150 Community Nutrition (3) Nutrition problems and services in the community. Supervised field experiences. Prereq: 3120 or 3160. F.

4151 Clinical Experiences in Dietetics (3) Supervised field experience in the community. Prereq: 4131; 4001; or consent of instructor; coreq: 4150. F.

4160 Nutrition Throughout the Life Cycle (4) Application of nutrition principles throughout the life cycle with emphasis on communication of nutrition information. Prereq: 3120 or 3160 or consent of instructor. W.

4170 Clinical Experience in Dietetics (4) Experience in providing coordinated and continuing nutrition care in health delivery systems. Prereq: 4151. Open only to students in the Coordinated Undergraduate Program in Dietetics. S.

4180 Environmental Effects on Nutrition (3) Effect of natural and synthetic food toxins, drugs both social and therapeutic, and extreme environmental conditions upon the nutritive needs and health status of humans. Prereq: 8 hrs. natural science.

4190 Diet and Drug Therapy (3) Effect of drug therapy on absorption and utilization of nutrients, and effect of diet 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 hotel-motel complex; computer application in the hospitality industry. Prereq: 3220, Act. 2130, Comp. Science 1410; Marketing 3120; and a statistics course. S, SU.

4230 Tourism, Food, and Lodging Managerial Field Experience (5-15) Planned educational managerial experience in selected food services 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, 3230, Act. 2130, Comp. Sci. 1410, Marketing 3110-20; and a statistics course. S, SU.

4340 Food Systems Personnel Development (2) Development of training programs and personnel management plans for food systems personnel. Prereq: 3120. W.

4241 Clinical Experience in Dietetics (3) Development 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 Program 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 systems. Prereq: 3220, a statistics course, Act. 2110, Econ. 2520. W.

4251 Clinical Experience in Dietetics (3) Development 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 Program 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: 3220, 4210, Act. 2130, Comp. Sci. 1410, Marketing 3120, and a statistics course. 3 hrs. and 1 lab. W.

4270 Tourism and Lodging Administration (3) Marketing management principles for the tourism and lodging industries; current problems in the marketing of hospitality services. Prereq: 3220, Act. 2130, Comp. Sci. 1410, Marketing 3120. W.

4280 Clinical Experience in Dietetics (4) Planned educational experiences at increasing levels of administrative responsibility in selected food systems. Prereq: 3220. Coreq: 4280. Open only to students in the Coordinated Undergraduate Program in Dietetics. S.

3360 Reading in Nutrition and Food Sciences (3) Reports and discussions of current literature. Prereq: 3160. S.

3430 Field Experience (1-15) Planned educational experience in selected food, food service, nutrition related industries or laboratories or community facilities. Prereq: Consent of instructor. Hrs. and credit arranged. E.

4710 Contemporary Developments (1-3) Student or instructor initiated course for study of special topics 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.
Home Economics Education (490)

**Professors:**
- I. Brown (Emerita), Ph.D. Ohio State; N. P. Logan (Emerita), Ed.D. Tennessee.

**Associate Professors:**
- J. H. McInnis, Ph.D., Florida State; S. W. Miller, Ph.D. Ohio State.

The Department of Home Economics Education is included as an instructional unit in the Department of Child and Family Studies (see page 114 for course offerings).

Professional subject matter courses are offered by the departments of the College of Home Economics for those preparing for secondary school teaching programs and extension and community service careers.

The vocational home economics education curriculum is designed to provide the requirements for certification in vocational home economics. The curriculum is listed on page 138.

Textiles, Merchandising, and Design

**Professors:**
- R. G. Blakemore, Ph.D. Florida State; J. O. De Jonge (Head), Ph.D. Iowa State; A. Delong, Ph.D. Pennsylvania State; M. F. Drake, Ph.D. Pennsylvania State; B. C. Goswami, Ph.D. Manchester (England); M. Heard (Emerita), M.A. Columbia; A. J. Treece (Emerita), Ph.D. Ohio State.

**Associate Professors:**

**Faculty Associate:**
- T. L. Vigo, Ph.D. Tulane.

**Assistant Professors:**
- C. E. Cox, Ph.D. Tennessee; B. A. Oliver, Ph.D. Florida State; J. Rabun, M.S. Tennessee.

**Lecturer:**
- B. B. Thompson, B. Arch. Iowa State.

Interior Design and Housing (582)

**1430 Introduction to Interior Design (4)**

Introduction to interior design, basic creative design skills, drawing, spatial organization, color, and design awareness.

**1440 Visual Studies I (4)**

Introduction to classification and properties of two-dimensional visual organizations as applied to interior design, relationships 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 organization 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 behavior. 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.

**2435 Materials and Methods of Design (4)**

The development and application of materials and 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, interior design, presentation 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 microenvironments using the design process. Communication of design solutions through perspective drawing, model building, and experimentation with various media types. Prereq: 2450 and full admis- sion 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, audio and photographic techniques as presentation methods. Prereq: 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.) W, S

**3110 Beginning Interior Design (3)**

Individual and design factors influencing selection, arrangement, and combination of furnishings to derive the greatest satisfactions from homes and places of work. Prereq: 1419 or equivalent. 1 hr. and 2 labs. F, W, S.

**3130 Color (4)**

Experimentation based on an understanding of systematic theories of color. Color communication of total design solutions using a variety of graphic, audio and photographic techniques as presentation methods. Prereq: 2451 or consent of instructor. S

**3260 Professional Procedures (4)**

Preparation of interior design major for practicum experience. Emphasis on interpersonal relationships and business prac- tices related to interior design. F

**3450-51-52 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, design methods, spatial organization and planning of micro- and macro-environments. Prereq: 2442 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 for 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: Junior standing in interior design major, 3256, and consent of instructor. E

**4300 Field Experience (2-15)**

Supervised field experience; subject to departmental approval. Prereq: Senior standing and consent of faculty. SU

**4320 Family Housing Problems (3)**

Housing requirements of families. Reading and judging house plans; effective use of space; maintenance problems; local building codes, zoning and restrictions; site selection and neighborhood development; financing procedures. Prereq: 6 hrs. from Economics 2110-230-30. F, W

**4440 Furniture Design (4)**

Analysis of human factors data in the design of body support, task support and...
storage furniture pieces and systems; 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 systemic 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.

4810 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) Study 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 patterns in historical development as revealed in interior architectural spaces and the decorative arts of America. Colonial through Federal periods. Design forms analyzed 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, fitting, and 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 drafting techniques. Comparison of these methods for style variations and cost of garments. Prereq: 1160, proficiency or 1165 or equivalent. 2 hrs. and 2 labs. F, W, S.


1429 Textiles Laboratory (1) Laboratory examination of fibers, yarns, fabrics and finishes. Coreq: 1426. Required of departmental majors. 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.

3410 Cultural and Functional Aspects of Textiles and Clothing (3) Cultural, socio-psychological, functional, and technological developments in textiles and clothing. Prereq: 3 hrs. each of the following: child development and family relationships, economics; 4 hrs. of sociology or anthropology or psychology. F, S.


3450 Consumer Issues: Clothing for Contemporary Families (3) Problems of clothing consumption encountered during various stages of family life cycle. Prereq: Junior standing. F.

3480 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 (3) Analysis of fashion merchandising practices and problems focusing on application of decision mechanisms. Prereq or coreq: 2170 and Accounting 2110. W.


4110 Fashion Buying (3) Analysis of buying practices, procedures, activities, techniques and underlying concepts fundamental to fashion merchandising. Prereq: 3510. S.


4130 Research Experiences (3-15) Individual juniors and seniors showing special abilities may be assigned to ongoing research within department or work in research and development laboratory or quality control department of fiber, chemical, or textile company. Prereq: Recommendation of department head and research advisor, 4101, 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 (4) Chemistry of textile fibers with emphasis on structure, preparation, and reactions. Implications relating to dying and finishing of fabrics. Prereq: One quarter of organic chemistry. 3 hrs and 1 lab. W.

4290 Design Analysis: Functional Apparel (2) 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 and management of human resources. 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 field demonstrations. Prereq: 3440, senior standing. 1 hr. and 2 labs.

4520 Principles of Retail Management (3) Indepth analysis of retail sector of economy from management perspective. Emphasis on approaches to decision-making in retail operations; promotion, pricing, financial planning and control, product mix strategy. Prereq: Marketing 3110, 3120 or equivalent. F, W, S.

4620 Introduction to Field Experience in Merchandising (3) Interviews with store personnel, placement and planning for field experience. Prereq: Economics 2516-20, 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 program with business establishments which merchandise textiles and/or apparel. Prereq: 3510, 4110, 4820, 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 topics pertinent to the field; topics selected to be determined by students and instructor with departmental approval. Elective credit only. Prereq: Consent of instructor. May be repeated with departmental approval for credit up to 9 hrs. W.

4978-98-99 Honors: Textiles and Clothing (3,3,3) Individual problems for juniors and seniors showing special 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 16.)

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 interdepartmental 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 and 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 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. A chemical industry student may 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 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 in ceramics, graphic design/illustration, drawing, fiber-fabrics, inter-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 represents intensive study preparing 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 persons 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 major 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 prescriptive 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 reserving most of the final years 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 100 credit hours; (3) At least 60 credit hours in courses numbered 3000 or above;
3. 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).
4. 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;
5. Beginning in fall 1987, no credits earned for removal 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 of 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 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.
2. By earning a score of 4 or 5 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.
3. By completing three hours of freshman English followed by a minimum of six hours in one of the following courses: 1031, 1032, or 1033 (English Composition) students who complete 1032 with a grade of B or better.
4. By earning a score of 25 or above on the English ACT exam and a composite ACT score of or above and by passing a proficiency examination in writing administered by the Department of English.
5. By obtaining CLEP credit for English composition (as described on page 22 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;
1. To acquire the basic techniques of language learning;
2. To develop insight into the phenomenon of language;
3. To complement the study of certain aspects of a foreign culture or civilization.

**Requirement:** Completion of the intermediate level (for most languages, the 2000-level) sequence of a foreign language, or demonstration of competence on a waiver or proficiency examination. A student who has taken two or more years of a foreign language in high school and makes the introductory level sequence in the same language (usually the 1000-level sequence) may not use such credit to satisfy requirements for graduation. However, if students elect to take a foreign language in which they have had no previous training, both the elementary and intermediate level sequence may be counted for graduation. Students whose native language is not English may meet this requirement by passing English 1431-41-51 and by passing two English language literature courses at the 2000-level. These literature courses may also be counted toward the Humanities distribution requirement. (Beginning Fall 1987, no credit for coursework completed in order to remove an association deficiency in foreign language coursework completed in order to remove an association deficiency in foreign language may be used to satisfy graduation requirements.)

Under the conditions stated above, the following courses may be used to satisfy the foreign language requirement:
- **Asian Studies 2431-32-33**
- **Elementary Modern Standard Arabic I, II, III**
- **Asian Studies 2431-32-33 Intermediate Modern Standard Arabic**
- **Asian Studies 2531-32-33 Elementary Chinese I, II, III**
- **Asian Studies 2631-32-33 Intermediate Chinese I, II, III**
- **Asian Studies 2731-32-33 Intermediate Japanese I, II, III**
- **Asian Studies 2831-32-33 Elementary Persian I, II, III**
- **Asian Studies 3831-32-33 Intermediate Modern Hebrew**
- **Classics 1110-20-30 Elementary Latin**
- **Classics 2511-15-21 Intermediate Latin**
- **Classics 2120-20-30 Elementary Greek**
- **Classics 2610-20-30 Intermediate Greek**
- **French 1510-20 Elementary French**
- **French 1110-20-30 Intermediate French**
- **French 2510-20 (2118-28-38) Intermediate French (Honors)**
- **German 1110-20-30 Elementary German**
- **German 2110-20-30 Intermediate German**
- **German 1518-2518-28 Honors: Elementary & Intermediate German**
- **Italian 1510-20 Elementary Italian**
- **Italian 1110-20-30 Elementary Italian**
- **Italian 2110-20-30 Intermediate Italian**
- **Italian 2510-20 Intermediate Italian**
- **Portuguese 1510-20 Elementary Portuguese**
- **Portuguese 2510-20 Intermediate Portuguese**
- **Spanish 1110-20-30 Elementary Russian**
- **Russian 2110-20-30 Intermediate Russian**
- **Russian 1630-40-50 Elementary Serbo-Croatian**
- **Russian 2631-41-51 Intermediate Serbo-Croatian**
- **Spanish 1110-20-30 Elementary Spanish**
- **Spanish 1510-20 Elementary Spanish**
- **Spanish 2110-20-30 Intermediate Spanish**
- **Spanish 2510-20 (2518-28) Intermediate Spanish (Honors)**

(3) **Mathematics, Computer Science, or Logic**

**Purpose:**
1. To develop the basic calculation skills necessary to fully appreciate the course of study at the university;
2. To understand the logical processes involved in mathematics, inductive or deductive reasoning, or computing;
3. To acquire the skills that will aid in the process of critical analysis, problem solving, and decision.

**Requirement:** One course chosen from those listed below (total: 3 to 4 hours).

- Students with a Math ACT score of 24 or above, or those who pass a waiver or proficiency examination on material equivalent to courses at the intermediate level, may be exempted from this requirement. Standards for waiver or proficiency examination will be set by the appropriate department. Exemption from this requirement will also be granted to students who complete a three-course mathematics package under Divisional Distribution.

Under the conditions stated above the following courses fulfill this requirement:
- **Philosophy 1110 Introduction to Symbolic Logic**
- **Mathematics 1140 Basic Mathematical Skills**
- **1700 Pre-calculus Mathematics**

**Distribution**

(1) **Divisional Distribution**

**Non-U.S. History**

**Purpose:**
1. To acquire an appreciation for the richness of the past as a statement on human capability, 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 the critical importance in one scientific discipline;
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:
- **Asian Studies 2510-20-30 Basic Civilizations - Traditional Culture and Their Modern Developments**
- **History 1510-20 Western Civilization, History 1518-28 1610 in Western Civilization**
- **History 1610-20 World Civilization, Latin American Studies 2510-20 Introduction to Latin American Studies**

**Natural Science**

**Purpose:**
1. To know and understand the basic vocabulary of at least one scientific discipline;
Purpose: 1. To promote understanding of society and individual relationships.
2. To develop a critical understanding of social 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 3150, Sociology 3150, Sociology 1530 (Honors), Sociology 1520 (1528), Sociology Psychology 2540, Psychology of the Individual, Psychology 2530, Psychology as a Social Science, Political Science 2510, Principles of Economics, Biological Sciences 1840-50-60 (1848-58-68), and Political Science 3150. Other courses may be approved for this requirement by the appropriate department.

The following courses are designated as literature packages: English 2560-70-80 (2 out of 3 in chronological order) Literature of the Western World; English 2570-80-90 Literature of the Dark Ages (5th-10th centuries) - Literature of the Middle Ages (11th-15th centuries); English 2580-90-100 Literature of the Later Middle Ages (11th-15th centuries); Religious Studies 3230-33 Themes in the Christian Tradition; Religious Studies 3370-80 The Concept of Woman-Philosophy of Feminism (Same as Phil. 3430-35). The following are designated practice of the arts courses: Art 1815, World Art I; Art 1825, World Art II.

Part I: Literature or Philosophical Perspectives. A two- or three-course package in either literature or a philosophical perspective (total: 8-9 hours).

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)

Part I and II will be satisfied by selecting packages/courses from the following four lists in accordance with the instructions above.

The following course packages are designated as literature packages:

2. Classics 2510-20 Greek Literature in English Translation (Roman Literature in English Translation).
3. 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 2560-70-80 (2 out of 3) Introduction to Literary Genres.
5. German 2210-20-30 German Literature in English Translation.

The following course packages are designated as philosophical perspectives packages:

1. Classics 2510-20 Greek and Roman Mythology.
2. Philosophy 1511-21 Value and Reality; Consciousness and Reality; 1611-21 Philosophy Antiquity to 1500-1500 to Early 20th Century.
4. Religious Studies 2210-20 Founders of Religion; Religious Studies 2310-20 Criticism of Religion; Religious Studies 3370-80 The Christian Tradition; Religious Studies 3605-06 Professional Responsibility-Responsible Professionalism (Same as Phil. 3605-06).
5. Women's Studies 3430-35 The Concept of Woman-Philosophy of Feminism (Same as Phil. 3430-35).
4830 Black Women in American Society (Same as Women's Studies 4830).
Anthropology 3575 Afro-American Anthropology; Anthropology 3511 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 3445 Film and American Culture; English 4640 Black American Literature and Aesthetics.
Geography 3910 Geography of the U.S. and Canada; Geography 3920 Geography of the American South; Geography 3940 Geography of the U.S.; Geography 4240 Historical Geography of the U.S.
Music 3950 Evolution of Jazz; Music 4241 Music of the United States; Religion 3511 American Philosophy (Colonial Period-19th Century); Philosophy 3340 Ethics and American Society; Philosophy 3570 Philosophical Foundations of Democratic Societies.
Political Science 3130 Popular Culture & American Politics; Political Science 3390 Contemporary Issues in American Public Policy; Political Science 3415 Law in American Society; Political Science 3880 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 Religion in the United States (Same as Afro-American Studies 3560).
Sociology 3420 Urban Problems; Sociology 3780 American Society; Sociology 4030 Society and Law; Sociology 4820 American Minority Groups.
Speech 4300 Studies in American Public Address.
Theater 3282 History of American Theater; Theater 3263 History of American Theater:
Women's Studies 3010 Emergence of the Modern American Woman; Women's Studies 4290 Women in American History (Same as History 4290); Women's Studies 4560 Rhetoric of the Women's Rights Movement (Same as Speech 4560).
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, the 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 Prehistory.
Geography 3830 Geography of Africa. Political Science 3615 Dynamics of Black African Politics; Political Science 3616 Dynamics of Black African Politics.
Asia
Art 3775 Art of India; Art 3777 Art of China; Art 3777 Art of Japan.
Asian Languages 3320 Chinese Culture; Asian Studies 3320 Chinese Culture; Asian Studies 3330 Japanese Culture; Asian Studies 3610 The Literature of India in English Translation.
Economics 4232 The Political Economy of Asian Development.
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 3650 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 (Same as Sociology 3672).
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-Asia-Africa); Classics 3810 Greek Civilization; Classics 3820 Roman Civilization.
English 3050 English Culture (Up to 1660); English 3051 English Culture (1660-Present); English 3920 Comparative European Literature; English 3930 Comparative European Literature.
Geography 3880 Geography and the Soviet Union.
German 3510 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 Western 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 (Same as French 3240); Women's Studies 3830 Women in the Greek and Roman World (Same as Classics 3830).
Latin America
Anthropology 3580 Peoples and Cultures of Mesoamerica (Same as Latin American Studies 3580).
Economics 4231 The Political Economy of Latin America (Same as Latin American Studies 4231).
Geography 3790 Geography of Middle America (Same as Latin American Studies 3790); Geography 3800 Geography of South America (Same as Latin American Studies 3800).
History 3870 History of Latin America (to 1825) (Same as Latin American Studies 3870); History 3880 History of Latin America (1825-Present). (Same as Latin American Studies 3880).
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
Asian Languages 3340 Islamic Culture; Asian Studies 3670 Islamic Literature in Translation.
History 3780 The Traditional Middle East; History 3780 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
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 3805 Political Change in the Developing Areas; Political Science 3701 Introduction to International Relations; Political Science 3796 Contemporary Problems of Soviet Foreign Policy.
Sociology 3340 Comparative Poverty and Inequality (Same as Afro-American Studies 3340); Sociology 4540 Development and Underdevelopment (Same as Religious Studies 4540).
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. Con-