

niques and approaches in the observation, supervision, and empowerment of teachers and in the facilitation of teaching and learning environments.

EDL 8163. Educational Budgeting and Resource Allocation. (3) Three hours lecture. Administrative leadership for organization, management, allocation of resources to enhance and support teaching and learning; four modules: budgeting, facilities, personnel, student and family services.

EDL 8173. Legal and Ethical Perspectives of Leadership in Schools. (3) Three hours lecture. Examination of legal and ethical issues in educational leadership. Analysis of impact of laws and legal decisions on policy formation and decision implementation in education.

EDL 8193. Educational Environments. (3) (Prerequisites: EDL 8201 and EDL 8202). Three hours lecture. Capstone course of Master's/Specialist AA Certification program. Theories, roles, functions of leadership in educational environments; organizational structures; community and board relationships; policy; strategic planning.

EDL 8213. Internship I: Observation and Field Applications. (3) (Prerequisites: EDL 8113, EDL 8123 and EPY 8223). Interns experience designated observation, authentic application, and mentorship ac-

tivities at educational sites under joint supervision of university and school-based leaders.

EDL 8223. Internship II: Administrative Applications. (3) (Prerequisites: EDL 8163, EDL 8173, EPY 9263, and EDL 8213). Interns observe and apply techniques of administrative leadership in authentic educational situations under joint supervision of university and school-based staff at school sites.

EDL 8233. Internship III: Instructional Applications. (3) (Prerequisites: EDL 8223, EDL 8143, EDL 8193, EDL 8213, EDL 8223 or approval of the instructor). Focus on instructional leadership experiences; designated culminating internship activities at school sites; joint supervision by university staff and school-and/or district-based leadership.

EDL 8990. Special Topics in Educational Leadership. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Course limited to two offerings under one title within two academic years.)

SECONDARY EDUCATION

Office: 314 Allen Hall

(For departmental information, see CURRICULUM and INSTRUCTION.)

EDS 2990. Special Topics in Secondary Education. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Course limited to two offerings under one title within two academic years)

EDS 3411. Practicum in Secondary Education. (1) Field-based observation (20 hours) of secondary age children and participation in classroom activities prior to the directed teaching.

EDS 4000. Directed Individual Study. Hours and credits to be arranged.

EDS 4633/6633. Teaching of Mathematics. (3) Admission to Teacher Education required. Three hours lecture. Field based (50 hours). Aims and purposes of teaching mathematics in high school, curriculum problems, organization and presentation of subject matter, methods of teaching and evaluation.

EDS 4643/6643. Teaching of Social Studies. (3) Admission to Teacher Education required. Three hours lecture. Field based (50 hours). Purposes and objectives of social studies; program includes methods, techniques, and materials. Designed primarily for secondary school teachers.

EDS 4653/6653. Teaching of Science. (3) Admission to Teacher Education required. Three hours lecture. Field based (50 hours). Aims and techniques of teaching science in high schools including selection, organization, and presentation of subject matter.

EDS 4673/6673. Teaching of Language Arts. (3) Admission to Teacher Education required. Three hours lecture. Field based (50 hours). Objectives of English; includes content, organization, methods of teaching language, literature, and composition. Designed primarily for secondary school teachers of language arts, foreign language, speech.

EDS 4873. Professional Seminar in Secondary Education. (3) (Prerequisites: Admission to Teacher Education and senior standing. To be taken concurrently with EDS 4886 and EDS 4896). Three hours lecture. A seminar dealing with legal, professional, administrative, and curriculum issues as they relate to secondary education in the schools.

EDS 4886,4896. Student Teaching in Secondary Education. (6,6) (Both courses to be taken concurrently). (Prerequisites: Admission to Teacher Education and senior standing). Supervised observation and directed teaching in respective field of endorsement.

EDS 4990/6990. Special Topics in Secondary Education. (1-9) Credit and title to be arranged. This course is to be used on a limited

basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

EDS 7000. Directed Individual Study. Hours and credits to be arranged.

EDS 8000. Thesis Research/Thesis. Hours and credits to be arranged.

EDS 8103. Advanced Methodologies in Middle and Secondary Education. (3) (Prerequisite: TKT 1273 or equivalent). Three hours lecture. Using technology as instructional tools, evaluate software, consider ethical issues; design technology-based classrooms, mini-grants, and lesson modules aligned with curriculum standards.

EDS 8613. Middle and Secondary School Curriculum. (3) Three hours lecture. Principles of curriculum construction as they apply to the middle and secondary school and the various subject areas. Fall term.

EDS 8633. Problems of Secondary Education. (3) (Prerequisite: Master's degree or consent of instructor). Three hours lecture. Study of critical problems in secondary education. Spring term.

EDS 8643. Directed Reading in Secondary Education. (3) Intensive supervised readings in the field of secondary education.

EDS 8713. Curriculum Adjustments. (3) Three hours lecture. Adjusting the school curriculum to meet individual pupil differences.

EDS 8990. Special Topics in Secondary Education. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years.)

EDS 9000. Dissertation Research/Dissertation. Hours and credits to be arranged.

EDS 9413. Practicum in College Teaching. (3) Three hours practicum. Teaching of at least one course in education, under the supervision of a senior staff member. (Same as EDE 9413)

EDS 9603. Practicum in College Teaching of Secondary Education. (3) Teaching of at least one course in education under the supervision of a senior staff member. Supervision of student teachers.

SPECIAL EDUCATION

Office: 508 Allen Hall

Professors Arnault, Coffey, Devlin, Elrod and Obringer

(For departmental information, see COUNSELING, EDUCATIONAL PSYCHOLOGY and SPECIAL EDUCATION.)

EDX 2101. Laboratory Experiences in Special Education. (1) Observation of children in special education and participation in classroom activities prior to the directed teaching.

EDX 2990. Special Topics in Special Education. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years.)

EDX 3203. Introduction to Learning Disabilities. (3) Three hours lecture. Integrities for learning; receptive, associative, and expressive disorders; specific learning disabilities.

EDX 3213. Psychology and Education of Exceptional Children and Youth. (3) Three hours lecture. Introduction to exceptional children and youth who deviate from the average in physical, mental, emotional, and social characteristics. Program planning is surveyed.

EDX 3223. Introduction to the Emotional/Behavioral Disorders. (3) Three hours lecture and field trips. Survey to acquaint students

with emotionally disturbed and behaviorally disordered children, giving an overview of the theoretical approaches in their education.

EDX 3233. Contingency Management with Exceptional Children (3) Three hours lecture. Competency-Based Instructional Sequence and field experience. A study of the components of contingency management with emphasis on application in the field with exceptional children.

EDX 4000. Directed Individual Study. Hours and credits to be arranged.

EDX 4113/6113. Diagnostic-Prescriptive Methods and Materials for Early Childhood Disabled. (3) Admission to Teacher Education required. Three hours of lecture and laboratory work including assessment and individualized programming utilizing methods and materials for EMR and LD preschool and primary level children.

EDX 4123/6123. Diagnostic-Prescriptive Methods and Materials for Elementary Age Disabled. (3) Admission to Teacher Education required. Three hours of lecture and laboratory work including assessment and individualized programming utilizing methods and materials for EMR and LD elementary school-age children.

EDX 4133/6133. Diagnostic-Prescriptive Methods and Materials for Secondary Age Disabled. (3) Admission to Teacher Education required. Three hours of lecture and laboratory work including assessment and individualized programming utilizing methods and materials for EMR and LD secondary school-age children.

EDX 4353/6353. Assistive Technology in Special Education. (3) Admission to Teacher Education required. Three hours lecture. Application of adaptive technology with microcomputers in the education of students with special needs.

EDX 4413/6413. Working with Parents of Exceptional Children. (3) Admission to Teacher Education required. Three hours lecture. A study of the development, goals, and objectives of organized parent educational groups. A study of problems of parents of children who have disabilities.

EDX 4423. Teaching the Disadvantaged Child. (3) The study of the disadvantaged child in terms of theories, cultures, and techniques of teaching and exploration of curricular innovations.

EDX 4503/6503. Teaching the Severely and Profoundly Impaired Child. (3) Admission to Teacher Education required. Two hours lecture. One hour practicum. A survey of operational models and techniques to be implemented with the Severely/Profoundly Impaired; to include curriculum, methods and administrative educational adjustments.

EDX 4603/6603. Children and Youth with Physical/Multiple Disabilities. (3) Admission to Teacher Education required. Three hours lecture. Educational implications and adaptations of procedures in schools, homes, hospitals and special schools for children with orthopedic and/or neurological impairments.

EDX 4613/6613. Teaching Children and Youth with Physical/Multiple Disabilities. (3) Admission to Teacher Education required. Three hours lecture. Methods and materials applicable to teaching children and youth with physical or multiple conditions which are the results of neurological or orthopedic impairments.

EDX 4623/6623. Curricular and Mobility Adaptations for Physical/Multiple Disabilities. (3) Admission to Teacher Education required. Three hours lecture. The study of motor functions including range of motion, gait training, and other environmental adjustments that can be implemented by classroom teachers.

EDX 4887/4898. Student Teaching in Special Education. (7,8) (Both courses to be taken concurrently). (Prerequisites: Admission to Teacher Education and senior standing). Supervised observation and directed teaching in special education. In addition, there is a professional seminar dealing with current issues in special education.

EDX 4953/6953. Introduction to Sign Language. (3) Development of basic sign language skills, study of special needs of deaf persons, and understanding use of interpreters. (Same as COE 4363/6363).

EDX 4990/6990. Special Topics in Special Education. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Course limited to two offerings under one title within two academic years).

EDX 7000. Directed Individual Study. Hours and credits to be arranged.

EDX 8000. Thesis Research/Thesis. Hours and credits to be arranged.

EDX 8103. Advanced Contingency Management. (3) Three hours lecture. This course is designed to utilize the principles and procedures of contingency management and applied behavioral analysis research to design, implement, and evaluate behaviorally oriented programs.

EDX 8123. Organization and Supervision of Special Education. (3) Three hours lecture. Organizational theory of special education. Leadership behavior and role of special education supervisor; grant writing.

EDX 8133. Readings and Research in Exceptional Education. (3) Three hours lecture. Emphasis on current literature in all areas of exceptionality. Understanding and interpretation of psychological diagnosis. Individual and group research.

EDX 8143. Early Education for the Disabled. (3) Three hours lecture. Rationale; characteristics; educational approaches; exemplary programs; research in the field.

EDX 8153. Language Development-Assessment and Remediation. (3) Two hours lecture and two hours practicum. Administration and interpretation of the Illinois Test of Psycholinguistic Abilities and other selected instruments of language development. Remediation techniques will also be discussed as they relate to the assessment techniques.

EDX 8163. Teaching Strategies for the Gifted. (3) (Prerequisite: Consent of instructor). Teaching approaches, development of special problems, selection of materials, and remediation of problems related to learning.

EDX 8173. Special Education in the Regular Classroom. (3) Three hours lecture. Provides a greater understanding of the handicapped child who may be in the regular classroom and suggests methods and techniques for teaching the handicapped student in the regular classroom.

EDX 8183. Seminar in Learning Disabilities. (3) (Prerequisite: EDX 3203 or equivalent). Three hours lecture. An advanced course dealing with the condition of learning disabilities. Current research dealing with causes, treatments, and prevention strategies will be studied.

EDX 8203. Practicum: Diagnosis of Special Education Populations. (3) (Prerequisite: Approval of instructor). Hours and credits to be arranged. Practicum experience utilizing a multi disciplinary team approach to the diagnosis and educational planning for students suspected of being mildly, moderately, and multiply impaired.

EDX 8213. Practicum: Remediation of Special Education Populations. (3) One hour seminar, three hours practicum. Selection, utilization, and evaluation of specialized remedial materials and techniques with special education populations.

EDX 8223. Supervision: Diagnosis of the Educationally Handicapped Practicum. (3) Two hours lecture, two hours practicum. Provide guided responsibility for conducting diagnostic staffings, supervising testings, and coordinating case study interpretations between staff, home and school.

EDX 8303. Seminar in Mental Retardation. (3) (Prerequisite: EDX 8103). Three hours lecture. An advanced course dealing with the condition of mental retardation. Educational implication and research involving those classified as mentally retarded.

EDX 8333. Placement Services and Techniques. (3) Three hours lecture. Academic and job placement as a means of promoting the development and adjustment of students at all levels of education. (Same as COE 8333).

EDX 8393. Seminar in Education for the Emotionally Disabled. (3) (Prerequisite: EDX 8403.) One hour lecture, recitation, simulation, and field trips. A comprehensive study of contributing factors in emotional disturbance and the educational technology of the treatment of emotionally handicapped children.

EDX 8403. Teaching the Emotionally Disabled. (3) Three hours lecture and practicum. The curriculum, methods, and principles and problems of working with the emotionally handicapped.

EDX 8413. Personal, Social, and Work Adjustment Counseling. (3) Two hours lecture. Two hours laboratory. Personal, social, work adjustment counseling and employability skills training for disabled persons and others with special needs. Includes individual, group, and situational techniques. (Same as COE 8413 and TKT 8413.)

EDX 8780. Internship in Special Education. (3-6) Three hours practicum. Supervised observation, participation, and teaching of exceptional children in classrooms and resource rooms. Supervised experiences in community, state departments, supervisory positions.

EDX 8990. Special Topics in Special Education. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

ENGINEERING GRAPHICS

Office: 116 McCain Engineering Building

Associate Professor Emeriti Jasper; Assistant Professor Emeriti Branch; Instructor Bostick

EG 1142. Engineering Graphics. (2) Two hours lecture. One hour demonstration. Presentation of sketching techniques, lettering and computer aided drafting with traditional engineering drawing topics, including orthographic projection, engineering documentation, auxiliary views, and working drawings.

EG 1143. Graphic Communication. (3) One hour lecture. Five hours laboratory. Orthographic projection, instrumental drawing, point, line, plane identities, first and second auxiliaries, computer assisted design and drafting using personal computers.

EG 1411. AutoCAD. (1) (Prerequisite: Knowledge of projection graphics). Three hours laboratory. Practical application solutions to engineering graphic problems using a specific computer graphics software package, AutoCAD.

EG 1443. Technology Graphics. (3) (Prerequisites: EG 1143.) Two hours lecture. Four hours laboratory. Visualization/analysis using descriptive geometry principles applying specifically to technology. Computer aided drafting/design in industrial technology. Reading/drafting working drawings in technology fields.

EG 1513. Architectural Graphics. (3) One hour lecture. Five hours laboratory. Survey of various drawing systems. Practical exercises in orthographic multiview projection, isometric, oblique and perspective drawing systems, with emphasis on lettering, reflections and cast shadows.

EG 2513. Construction Drawing. (3) (Prerequisite: EG 1143 or EG 1413). One hour lecture. Five hours laboratory. Survey of building

and construction industries; materials and types of construction; specifications; use of architectural graphic standards and minimum construction requirements; construction details; drawings; lettering.

EG 2990. Special Topics in Engineering Graphics. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

EG 4000. Directed Individual Study. Hours and credits to be arranged.

EG 4990/6990. Special Topics in Engineering Graphics. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

EG 7000. Directed Individual Study. Hours and credits to be arranged.

EG 8990. Special Topics in Engineering Graphics. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

ENGINEERING MECHANICS

Office: 330 Walker Engineering

Professors Cinnella, Horstemeyer, Newman, Jr., Rais-Rohani;
Associate Professors Bridges, Daniewicz, Gatlin, Luck, and Newman III;
Assistant Professor Lacy

EM 2413. Engineering Mechanics I. (3) (Prerequisites: Grade of C or better in MA 1723 and PH 2213). Three hours lecture. Concepts of forces, moments and other vector quantities; analysis of force systems; conditions of equilibrium; friction; centroids and moments of inertia.

EM 2433. Engineering Mechanics II. (3) (Prerequisites: Grade of C or better in EM 2413 and MA 2733). Three hours lecture. Kinematics of particles and rigid bodies, kinetics of particles and rigid bodies using force-mass-acceleration, energy, momentum methods.

EM 2990. Special Topics in Engineering Mechanics. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

EM 3213. Mechanics of Materials. (3) (Prerequisite: Grade of C or better in EM 2413 and MA 2733). Three hours lecture. Free body diagrams, equilibrium of simple structures; shear and bending moment diagrams; analysis of stress and strain; deflections of beams.

EM 3313. Fluid Mechanics. (3) (Prerequisite: Grade of C or better in EM 2413). Three hours lecture. Fluid statics; analysis of fluid motion using the continuity, momentum and energy relationships; introduction to viscous flows.

EM 3413. Vibrations. (3) (Prerequisites: Grade of C or better in EM 2433 and MA 3253). Three hours lecture. Fundamentals of free vibration, energy methods; forced and damped vibration, single degree of freedom; two degrees of freedom.

EM 4133/6133. Mechanics of Composite Materials. (3) (Prerequisites: EM 3213 and MA 3253.) Three hours lecture. Stress, strain, constitutive relations for anisotropic material, lamina properties, laminate properties, composite beams and plates.

EM 4123/6123. An Introduction to the Finite Element Method. (3) (Prerequisite: Consent of instructor). Three hours lecture. Introduction to the finite element theory and formulation; use of existing computer programs, with applications to the area of mechanics.

EM 4213/6213. Advanced Mechanics of Materials. (3) (Prerequisite: EM 3213). Three hours lecture. Stress, strain, stress-strain relationships, strain energy, failure theories, curved beams, unsymmetrical

bending, shear center, torsion of noncircular sections, energy principles, Castigliano's theorem, inelastic behavior.

EM 4990/6990. Special Topics in Engineering Mechanics. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

EM 7000. Directed Individual Study. Hours and credits to be arranged.

EM 8000. Thesis Research/Thesis. Hours and credits to be arranged.

EM 8113. Theory of Continuous Media. (3) (Prerequisite: MA 3353 or consent of the instructor). Three hours lecture. An introduction to the general theory of continuous media and its application to the theories of elasticity and fluid mechanics.

EM 8203. Applied Elasticity. (3) Three hours lecture. Analysis of stress and strain; stress-strain relations; bending and torsion of beams; stress functions; strain energy.

EM 8223. Elastic Stability. (3) Three hours lecture. Bending and buckling of beams and columns; numerical methods; minimum of the total potential; bending and buckling of plates.

EM 8313. Advanced Dynamics. (3) (Prerequisites: EM 2433 and MA 3253). Three hours lecture. Fundamental considerations, Hamilton's principle, Lagrange's equations, rigid body dynamics.

EM 8323. Advanced Vibrations. (3) (Prerequisite: EM 3413). Three hours lecture. Oscillatory systems, matrix formulation by Lagrange's equations, natural modes of discrete and continuous systems, approximate methods, modal analysis.

EM 8990. Special Topics in Engineering Mechanics. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

Department of ENGLISH

Office: 316 Lee Hall

Professors Bonney, Creevy, Embree, Hargrove, Lyons, Myers, and Patteson
Associate Professors Bentley, Little(Head), Murray, Myers, White, Williams, and Wolf;
Assistant Professors Arent, Hagenston, Marsh, O'Gorman, Vice, and West;
Instructor Spurlock

NOTE: Entering freshmen may enter honors or special sections of first-semester composition depending on standard and other tests. Stu-

dents with ACT scores in English from 15 to 18 take EN 1003, from 19 to 28 take EN 1103, and of 29 and above take EN 1163 or EN 1103H (hon-

ors). International students of non-English background will be placed in composition sections appropriate to their needs as determined by TOFEL scores.

EN 0003. Developmental English. (3) Emphasizes the use of standard American English. Offered only to students required to enroll in developmental studies; prerequisite to any English courses applicable to requirements.

EN 0103. Basic English. (3) (Prerequisite: A score of 15 to 18 on the English section of the ACT). Three hours lecture. A study of grammar and mechanics as basic to composition, with emphasis on the sentence and the paragraph. Does not count toward any degree.

EN 1103. English Composition I. (3) (Prerequisite: A score of 19 or above on the English section of the ACT or EN 1003). Three hours lecture. A study of logical and rhetorical principles and organizational strategies that contribute to effective writing. **1103H.** Honors section open through invitation only. The analytical study and frequent practice of interdisciplinary writing coupled with the analytical study of major literary genres - fiction, poetry, and drama.

EN 1113. English Composition II. (3) (Prerequisite: EN 1103, 1163, or 1183). Three hours lecture. An expanded study of and practice in stylistics, logic, and research as contributions to analytical writing. **1113H.** Honors section open through invitation only. Continuation of EN 1103H.

EN 1163. Accelerated Composition I. (Prerequisite: A score of 29 or above on the English section of the ACT or consent of the instructor). Three hours lecture. An expanded study of and practice in stylistics, logic, and research as contributions to expository writing, designed for students who exhibit command of basic rhetorical principles.

EN 1173. Accelerated Composition II. (3) (Prerequisite: EN 1163 or consent of the instructor). Three hours lecture. An expanded study of and practice in stylistics, logic, and research as contributions to analytical writing, with emphasis on extensive study of diverse rhetorical models.

EN 2203. Introduction to Literature. (3) (Prerequisite: Completion of freshman composition). (Not open to English majors or honors students who complete EN 1183 or 1193). Three hours lecture. The critical and appreciative study of masterpieces in various genres chosen from English and world literature.

EN 2213. English Literature. (3) (Prerequisite: Completion of freshman composition). Three hours lecture. A survey of English literature from the beginning to the Romantic Period.

EN 2223. English Literature. (3) (Prerequisite: Completion of freshman composition). Three hours lecture. A Survey of English Literature from the Romantic Period to the present.

EN 2243. American Literature. (3) (Prerequisite: Completion of freshman composition). Three hours lecture. A survey of American literature from the beginning to Whitman.

EN 2253. American Literature. (3) (Prerequisite: Completion of freshman composition). Three hours lecture. A survey of American Literature from Whitman to the present.

EN 2273. World Literature. (3) (Prerequisite: Completion of freshman composition). Three hours lecture. Selected writings of Greece, Rome, and Medieval European translation.

EN 2283. World Literature. (3) (Prerequisite: Completion of freshman composition). Three hours lecture. Selected writings of the non-English-speaking world from the Renaissance through the Twentieth Century.

EN 2434. Literature and Film. (4) (Prerequisite: Completion of English composition requirements). Three hours lecture. One laboratory. Introduction to literary and cinematic techniques, methods of analysis, and structures.

EN 2443. Introduction to Science Fiction. (3) (Prerequisite: Completion of English requirements of the student's major field). Three hours lecture. A study of major science fiction writers of the past two centuries, with emphasis on human experience in a technological society.

EN 2453. The Icelandic Sagas. (3) (Prerequisite: Completion of freshman composition). Three hours lecture: A survey, in English, of the sagas and their relationship to history, mythology, and other medieval literatures. (Same as FL 2453).

EN 2990. Special Topics in English. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

EN 3223. Writing for Architects. (3) (Prerequisite: Completion of freshman composition; junior standing). Three hours lecture. Development of writing ability by reading, analyzing thematic architectural material, and by writing. Lecture; group discussions of grammar, rhetoric stylistics, etc.

EN 3303. Creative Writing. (3) (Prerequisite: Completion of freshman composition). Three hours lecture. Basic techniques in writing fic-

tion and poetry; meter and rhyme, metaphor and image, plot, characterization, dramatic detail.

EN 3363. American Literary History. (3) (Prerequisite: 3 hours of literature or consent of the instructor; students taking EN 3363 cannot earn credit toward an English major for EN 2243 or 2253). Three hours lecture. Major writers, genres, periods, and trends in American literature with particular emphasis on critical techniques and resources useful to students of literature.

EN 3413. Advanced Composition. (3) (Prerequisite: Twelve hours of English). Three hours lecture. An advanced expository writing course and general introduction to research methods and materials in language and literature.

EN 3423. Descriptive English Grammar. (3) (Prerequisite: Twelve hours of English). Three hours lecture. Advanced course in English grammar.

EN 3513. Women and Literature: Selected Topics. (3) (Prerequisites: Completion of freshman composition). Three hours lecture. A study of literary works by or about women. Texts are selected according to theme, genre, and/or historical period.

EN 4000. Directed Individual Study. Hours and credits to be arranged.

EN 4223/6223. Principles of Legal Writing. (3) (Prerequisites: Junior standing and completion of English requirements). Three hours lecture. Introduction to prose of the legal profession, emphasizing rhetorical strategy and style. Advanced composition, including work with contracts, letters, regulations, memoranda of law, and briefs.

EN 4303/6303. Craft of Poetry. (3) (Prerequisite: EN 3303 or consent of instructor). Three hours lecture. The craft and practice of writing poetry.

EN 4313/6313. Craft of Fiction. (3) (Prerequisite: EN 3303 or consent of instructor). Three hours lecture. The craft and practice of writing fiction.

EN 4323/6323. Literary Criticism from Plato to the Present. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. A survey of literary criticism from Plato to the present.

EN 4333/6333. Literature of the South. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. A critical survey of Southern writers past and present.

EN 4343/6343. African American Literature. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. A study of African American literature, especially that of the Twentieth Century.

EN 4353/6353. 20th Century Critical Theory. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. A study of major twentieth-century strategies of interpretation, including psychoanalysis, Marxism, structuralism, feminism, deconstruction.

EN 4403/6403. Introduction to Linguistics. (3) (Prerequisite: Twelve hours of English). Three hours lecture. The descriptive and historical study of language; linguistic analysis and comparisons; language classification; language in its social and cultural setting. (Same as AN 4403/6403)

EN 4413/6413. History of the English Language. (3) (Prerequisite: Twelve hours of English). Three hours lecture. The origin and development of the English language, structural and phonetic changes; conventions of modern usage.

EN 4433/6433. Approaches to TESOL. (3) (Prerequisite: EN 4403 or EN 3423 or consent of instructor). Three hours lecture. Methodology of Teaching English as a Second Language, with emphasis upon theory of second language acquisition, teaching techniques, and evaluation of relevant textbooks.

EN 4443/6443. English Syntax. (3) Three hours lecture. Grammatical analysis of English with emphasis on pedagogical applications to teaching English as a foreign/second language.

EN 4463/6463. Studies in Second Language Acquisition. (3) (Prerequisite: EN 4403/6403 or consent of instructor). Three hours lecture. A survey of the major theories of language acquisition, concentrating on accounts of second language acquisition.

EN 4503/6503. Shakespeare. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. Shakespeare's plays through 1599.

EN 4513/6513. Shakespeare. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. Shakespeare's plays from 1600.

EN 4523/6523. Chaucer. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. Studies in the major works of Chaucer. Readings in Middle English.

EN 4533/6533. Milton. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. The principal writings of Milton, including all of *PARADISE LOST* and *PARADISE RE-GAINED*, and some of the chief prose works.

EN 4623/6623. Language and Culture. (3) (Prerequisite: EN 4403/6403 or consent of instructor). Three hours lecture. Examination of language as a part of culture, a source of knowledge about other aspects of culture, and a social behavior. (Same as AN 4623/6623 and SO 4623/6623).

EN 4633/6633. Sociolinguistics. (3) (Prerequisites: EN 4403 or consent of instructor). Three hours lecture. Examination of relationship between language and society, and how, when, and why people in speech communities use language varieties. (Same as AN 4633/6633 and SO 4633/6633).

EN 4643/6643. The Eighteenth-Century British Novel. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. A study of major eighteenth-century British novelists.

EN 4653/6653. The Nineteenth-Century British Novel. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. A study of the major nineteenth-century British novelists.

EN 4663/6663. The Twentieth-Century British and Irish Novel. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. A study of British and Irish novelists from Conrad and Woolf to Rushdie and Byatt, as well as literary movements including modernism, postmodernism, and postcolonialism.

EN 4703/6703. English Literature of the Sixteenth Century. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. A study of Renaissance literature in England exclusive of Shakespeare's plays.

EN 4713/6713. English Literature of the Seventeenth Century. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. Seventeenth-century literature exclusive of Shakespeare's plays.

EN 4723/6723. The Restoration and Swift. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. British poetry, prose, and drama, 1660-1700, and Swift.

EN 4733/6733. Eighteenth-Century Literature. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. British poetry, prose, and drama of the Eighteenth Century excluding Swift.

EN 4803/6803. Types of Twentieth-Century Drama. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. The development of modern American, British, and Continental drama since Ibsen.

EN 4813/6813. The Twentieth-Century World Novel. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. Major world novelists of the Twentieth Century, excluding British, Irish, and American.

EN 4823/6823. Twentieth-Century Poetry. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. Chief American and British poets; their verse technique and their contribution to poetic art.

EN 4863/6863. The Romantic Poets and Prose Writers. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. An intensive study of the major Romantic poets—Wordsworth, Shelley, Keats, Byron, Coleridge—along with some of the non-fiction prose of the period.

EN 4883/6883. Victorian Poets and Prose Writers. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. Intensive study of Tennyson, Browning, Arnold, Swinburne, and other Victorian poets, along with some of the non-fiction prose of the period.

EN 4903/6903. American Literature: 1800-1860. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. Studies in Irving, Cooper, Poe, Hawthorne, the Transcendentalists, and Southern Humorists. This course cannot be taken before EN 2243.

EN 4913/6913. American Literature: 1860-1900. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. Studies in Twain, Whitman, Dickinson, James, Crane, and others. This course cannot be taken before EN 2253.

EN 4923/6923. Twentieth-Century American Novel. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. A study of the American novel since Dreiser.

EN 4933/6933. Survey of Contemporary Literature. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. Significant trends in European and American literature since the outbreak of World War II.

EN 4943/6943. Form and Theory of Fiction. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. Theoretical aspects of fictional technique, genre, style; readings include novels, short stories, and writings about the craft of fiction. Recommended complement to creative writing courses.

EN 4953/6953. Form and Theory of Poetry. (3) (Prerequisite: Completion of English requirements in the student's major). Three hours lecture. Poetic theory; formal conventions, techniques, and innovations in the tradition of English and American poetry. Recommended complement to creative writing courses.

EN 4990/6990. Special Topics in English. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

EN 6013. Internship in Compositional Theory and the Teaching of College Writing. (3) (Prerequisite: Acceptance as a teaching assistant in the Department of English). Three hours lecture. Compositional theory in relation to teaching and evaluating traditional modes of writing, coordinated with at least twenty hours per week of supervised professional experience.

EN 7000. Directed Individual Study. Hours and credits to be arranged.

EN 8000. Thesis Research/Thesis. Hours and credits to be arranged.

EN 8103. Graduate Research in English. (3) Three hours lecture. A required introduction to fields of study and to scholarly research and writing in English language and literature.

EN 8333. Studies in Southern Literature. (3) Three hours lecture. Studies in the literature of the U.S. South.

EN 8513. Studies in English Literature to 1485. (3)

EN 8523. Studies in English Literature 1485-1660. (3)

EN 8533. Studies in English Literature 1660-1832. (3)

EN 8543. Studies in English Literature 1832-1900. (3)

EN 8553. Studies in American Literature to the Civil War. (3)

EN 8563. Studies in American Literature from the Civil War to 1914. (3)

EN 8573. Studies in Twentieth-Century Literature. (3)

EN 8583. Selected Topics in Language and Literature. (3)

EN 8593. Studies in Post-Colonial Literatures. (3) Three hours lecture. Studies in the literatures of the English-speaking world, excluding Great Britain and the United States.

EN 8990. Special Topics in English. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

ENVIRONMENTAL SCIENCE

Office: 118 Hand Lab

Professor Oldham

ENS 2102. Introduction to Environmental Science. (2) Two hours lecture. A survey course to acquaint the beginning students with the various issues and disciplinary contributions regarding environmental science.

ENS 4102. Practicum. (2) (Prerequisite: Permission of ES advisor). A directed field experience of an assigned environmental problem and an associated weekly seminar.

Department of ENTOMOLOGY and PLANT PATHOLOGY

Office: 103 Clay Lyle Entomology Complex
104 Dorman Hall (Plant Pathology)

Professors Collison (Head), Ammon, Andrews, Baker, Batson, Brown, Chambers, A. Harris, Jarratt, Layton, Morgan, Nebeker, Pitre, Reed, Robbins, Sciumbato, Schneider, Trevathan, and Williams;
Associate Professors Baird, Caprio, Ingram, and Lawrence;
Assistant Professors Ma, and Parker

EPP 2213. Introduction to Insects. (3) Two hours lecture. Two hours laboratory. Introduction to structure, function, ecology, taxonomy and evolution of the largest and most diverse group of organisms and how they impact humans and their environment.

EPP 2313. Insects and Society. (2) Two hours lecture. Relationships of insects and related arthropods to human culture and beliefs. Emphasis will be on phobias, allergies, diseases, art, food, benefits, and misconceptions about insects.

EPP 2990. Special Topics in Entomology or Plant Pathology. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

EPP 3113. Introductory Plant Pathology. (3) (Prerequisite: BIO 1203 or consent of instructor). Two hours lecture. Three hours laboratory. Acquiring a general knowledge of the principles of plant pathology through a study of selected plant diseases of economic importance for Mississippi.

EPP 3124. Forest Pest Management. (4) Three hours lecture. Three hours laboratory. Study of the biology, damage, survey techniques, and control of forest diseases and insects. Pest management in southern forests will be emphasized. Fall semester.

EPP 3423. Ornamental and Turfgrass Insects. (3) Two hours lecture. Two hours lab. Study of the life history, damage, economic importance and control strategies of pests on ornamental plants and turfgrass.

EPP 3522. Turfgrass Diseases. (2) (Prerequisite: EPP 3113 or 3124). Four hours laboratory. Study of the life cycle, damage, economic importance and control strategies of disease turfgrass.

EPP 4000. Directed Individual Study. Hours and credits to be arranged.

EPP 4114/6114. Mycology. (4) (Prerequisites: BIO 1203 and BIO 1213). Three hours lecture. Three hours laboratory. Survey of the principal fungal classes. Morphology, cytology, and physiology of fungi, and their relations to natural ecosystems, including saprophytic and parasitic (agriculture) fungi. Spring semester, yearly.

EPP 4152/6152. Advanced Fungal Taxonomy - Fungi Imperfecti. (2) (Prerequisite: Consent of instructor). One hour lecture. Two hours laboratory. Methods and practice in identification of taxon-fungi imperfecti in different ecosystems. Includes conventional macroscopic and microscopic techniques for identification compared with molecular methods.

EPP 4154/6154. General Entomology. (4) Two hours lecture. Four hours laboratory. Fall semester. Biology of insects including morphology, physiology, development, ecology and emphasis on classification of orders and common families.

EPP 4162/6162. Advanced Fungal Taxonomy - Ascomycetes. (2). (Prerequisite: Consent of instructor). One hour lecture. Two hours laboratory. Methods and practice in identification of taxon-ascomycetes in different ecosystems. Includes conventional macroscopic and microscopic techniques for identification compared with molecular methods.

EPP 4163/6163. Plant Disease Management. (3) (Prerequisite: EPP 3113). Two hours lecture. Three hours laboratory. Techniques and fundamentals of plant disease management. Disease dynamics related to management, avoidance, exclusion, eradication of pathogens; principles of plant protection, spraying techniques; biological control. Spring semester.

EPP 4164/6164. Insect Taxonomy. (4) (Prerequisite: EPP 4154). Two hours lecture. Six hours laboratory. Spring semester. Advanced study of insect classification.

EPP 4172/6172. Advanced Fungal Taxonomy - Fleshy Basidiomycetes. (2) (Prerequisite: Consent of instructor). One hour lecture. Two hours laboratory. Methods and practice in identification of taxon-basidiomycetes in different ecosystems. Includes conventional macroscopic and microscopic techniques for identification compared with molecular methods.

EPP 4182/6182. Advanced Fungal Taxonomy - Oomycetes and Zygomycetes. (2) (Prerequisite: Consent of instructor). One hour lecture. Two hours laboratory. Methods and practice in identification of taxon-oomycetes and zygomycetes in different ecosystems. Includes conventional macroscopic and microscopic techniques for identification compared with molecular methods.

EPP 4214/6214. Diseases of Crops. (4) (Prerequisite: EPP 3113 or 3124). Three hours lecture. Two hours laboratory. Fundamentals and

practical aspects of identification and control of selected diseases of crop plants grown in the southern U.S. Spring semester.

EPP 4223/6223. Pest Control. (3) (Prerequisite: EPP 3113, PW 3133 or consent of instructor). Three hours lecture. Two hours laboratory for selected topics. Pesticide considerations; control, and control-related biology of structural and urban insect, rodent, and weed pests; and plant diseases.

EPP 4234/6234. Field Crop Insects. (4) (Prerequisite: EPP 2213 or 4154). Three hours lecture. Two hours laboratory. Fall semester. Recognition, biology, distribution, damage, economic importance and methods of control of insect pests of agronomic and horticultural crops.

EPP 4244/6244. Aquatic Entomology. (4) (Prerequisite: EPP 4154 or instructor approval). Three hours lecture. Two hours laboratory. Study of basic biological and ecological principles important to aquatic insects and related arthropods, including life histories, evolutionary adaptations, community and species and identification.

EPP 4263/6263. Principles of Insect Pest Management. (3) Two hours lecture. Two hours laboratory. Discussion of pest management concepts, insect control methods, sampling, and pest management systems. Laboratory involves sampling, calibration, and other exercises related to pest management.

EPP 4335/6335. Anatomy and Physiology of Insects. (5) (Prerequisite: EPP 4154). Four hours lecture. Three hours laboratory. Spring semester. Introduction to the basic principles of structure and function of insect organ systems from a comparative and evolutionary viewpoint. (Same as PHY 6335).

EPP 4543/6543. Toxicology and Insecticide Chemistry. (3) (Prerequisite: Organic Chemistry). Two hours lecture. Two hours laboratory. Spring semester. Chemistry, toxicity and mode of action of major groups of insecticides. Laboratory; bioassay methods, insecticide interactions, calculations.

EPP 4623/6623. Insect Ecology. (3) (Prerequisite: Upper division standing in one of the biological sciences). Two hours lecture. Two hours laboratory. Fall semester. Consideration of interactions determining the distribution and abundance of insects including diapause, movement, voltinism, population dynamics, competition, trophic habits and community structure.

EPP 4990/6990. Special Topics in Entomology or Plant Pathology. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

EPP 7000. Directed Individual Study. Hours and credits to be arranged.

EPP 7020. Advanced Research and Independent Study Topics. (1-5). Advanced studies and research in the subdisciplines of Entomology and Plant Pathology. Student/Faculty member study contracts are required.

EPP 8000. Thesis Research/Thesis. Hours and credits to be arranged.

EPP 8111-8121. Seminar. (1) One hour. Consideration of recent advances and problems in Entomology and Plant Pathology; student participation, general discussion.

EPP 8113. Plant Nematology. (3) (Prerequisite: EPP 3113). Two hours lecture. Three hours laboratory. Basic morphology, taxonomy, and nomenclature; discussion of plant pathogenic general, symptomatology, methods of isolation, control methods, and interrelationship of nematodes to other plant pathogens. Fall semester, even years.

EPP 8143. Advanced Plant Pathology I. (3) (Prerequisite: EPP 3113). Three hours lecture. The dynamic nature of disease. Genetics and variability of the major groups of plant pathogens. Epidemiology. Genetics of the host-parasitic interaction. Fall semester.

EPP 8144. Transmission Electron Microscopy. (4) (Prerequisite: Consent of instructor). One hour lecture. Six hours laboratory. Spring semester. Introduction to the transmission electron microscope, tissue preparation, ultra-microtomy and associated techniques.

EPP 8173. Clinical Plant Pathology. (3) (Prerequisites: EPP 3113 and EPP 4114). Two four-hour laboratories. Clinical techniques, procedures, and experience in diagnosing plant diseases in the laboratory and field. Covers diseases caused by bacteria, fungi, MLO, nematodes, unfavorable environment and viruses. Summer.

EPP 8223. Scanning Electron Microscopy. (3) (Prerequisite: Graduate Student, consent of instructor). Two hours lecture. Three hours

laboratory. Fall semester. Introduction to scanning electron microscopy and associated techniques.

EPP 8253. Advanced Plant Pathology II. (Prerequisites: EPP 3113, BIO 4214). Three hours lecture. Infection processes, weapons utilized by pathogens in attack, and resultant alterations in ultrastructure, function and metabolism.

EPP 8272. Empirical Research in Theory and Practice. (2) Two hours lecture. Fall semester. Introduction to the nature, process, and societal role of research; logical basis, role of chance, researcher attributes, grantsmanship, publication, ethics, and public policy.

EPP 8333. Advanced Toxicology. (3) (Prerequisite: EPP 4543). Three hours lecture. Fall semester. Physiological and biochemical actions of pesticides and therapeutic drugs. Pesticide metabolism and resistance. Insecticide synergism. Natural toxins and venoms. (Same as PHY 8333).

EPP 8453. Insect Pathology. (3) Two hours lecture. Two hours laboratory. Fall semester, even-numbered years. A study of abnormal condi-

tions among insects as caused by non-infectious and infectious diseases. Bacteria, fungi, protozoa, nematodes and viruses are examined in detail.

EPP 8483. Ecological Genetics. (3) (Prerequisites: PO 3103 or equivalent and BIO 4113/6113 or consent of instructor). Three hours lecture. Spring semester, odd-numbered years. Introduction to the application of genetic methods and theory to the study of adaptation in natural populations. (Same as GNS 8483).

EPP 8990. Special Topics in Entomology or Plant Pathology. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

EPP 9000. Dissertation Research/Dissertation. Hours and credits to be arranged.

EDUCATIONAL PSYCHOLOGY

508 Allen Hall

Professors D.Morse, L.Morse, and Watson;
Associate Professor Henington; Assistant Professors Doggett

EPY 2513. Human Growth and Development. (3) Three hours lecture. Psychological principles in the study of the child from birth to puberty; acquisition of motor skills; advance in perception; language, reasoning, and social behavior.

EPY 2990. Special Topics in Educational Psychology. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

EPY 3143. Human Development and Learning Strategies in Education. (3) (Prerequisites: PSY 1013 and admission to Teacher Education or consent of department head). Three hours lecture. A study of developmental perspectives of learning with emphasis on teaching.

EPY 3253. Evaluating Learning. (3) (Prerequisite: Admission to Teacher Education). Three hours lecture. A study of instructional evaluation for the purpose of assessing individual pupil progress and general effectiveness of instruction.

EPY 3503. Principles of Educational Psychology. (3) Three hours lecture. Application of psychological principles to the educational process; topics covered include learning, humanism, motivation, cognitive development, creativity, intelligence, exceptionalism, classroom management, measurement, and evaluation.

EPY 3513. Writing in the Behavioral Sciences. (3) (Prerequisite: EN 1103 and EN 1113; junior standing; EPY majors must enroll concurrently in EPY 3503). Three hours lecture. An introduction to writing skills in the behavioral sciences.

EPY 3543. Psychology of Adolescence. (3) Three hours lecture. Physical, intellectual, emotional, and social growth processes from late childhood toward early adulthood; pubertal problems; mental hygiene of adolescence; family and peer relationships.

EPY 3553. Giftedness/Creativity. (3) Three hours lecture. An introduction to giftedness and creativity emphasizing uniqueness of gifted/creative individuals; a survey of creative problem-solving approaches.

EPY 4000. Directed Individual Study. Hours and credits to be arranged.

EPY 4033/6033. Application of Learning Theories in Educational and Related Settings. (3) Three hours lecture. Critical review of literature on learning in applied settings.

EPY 4053/6053. Psychology and Education of the Mentally Retarded. (3) Three hours lecture. Definitions, etiology, evaluation, development, and learning strategies of the mentally retarded; the role of family, community, and school in programming for the mentally retarded.

EPY 4073/6073. Personality Adjustment in Educational and Related Settings. (3) Three hours lecture. Personality development with special attention to motivation, culture, and interpersonal relations; personality problems in educational settings; corrective techniques.

EPY 4113/6113. Behavioral and Cognitive Behavioral Assessments. (3) The study of behavioral and cognitive-behavioral assessments and change procedures with special emphasis on non-school settings. This course cannot be used for special education certification.

EPY 4214/6214. Educational and Psychological Statistics. (4) Three hours lecture and three hours laboratory. A course in statistics for education and educational psychology majors. Analysis, description of and inference from various types of data.

EPY 4313/6313. Measurement and Evaluation. (3) Three hours lecture. Measurement and evaluation of learning activities and achievement of elementary school pupils and high school students; standardized tests; test construction; statistical techniques.

EPY 4513. Introduction to Research in Educational Psychology. (3) Three hours lecture. (Prerequisites: EPY 4214 and 3503). An introduction to conducting educational research focusing on planning and designing research for applied education settings.

EPY 4610/6610. Seminar in Educational Psychology. (1-6) (Prerequisite: 9 hours in Psychology and consent of instructor). Credit and title to be arranged. One to six lectures. Examination of specific topics of interest to faculty and students.

EPY 4990/6990. Special Topics in Educational Psychology. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

EPY 7000. Directed Individual Study. Hours and credits to be arranged.

EPY 8000. Thesis Research/Thesis. Hours and credits to be arranged.

EPY 8214. Advanced Educational and Psychological Statistics. (4) (Prerequisite: EPY 4214/6214 or its equivalent.) Three hours lecture and three hours laboratory. A survey of advanced statistical methods with emphasis upon the design and analysis of research problems in education and psychology.

EPY 8223. Psychological Foundations of Education. (3) Three hours lecture. The role of psychology in a changing context of organized education; the learner, content, structure, and management of the learning situation; studies of persistent problems.

EPY 8253. Child & Adolescent Development & Psychopathology. (3) Three hours lecture. Critical survey of recent problems, methods, and research in both the normal and abnormal psychological development of children and adolescents.

EPY 8263. Psychological Testing in Educational and Related Settings. (3) Three hours lecture. Principles and techniques involved in selecting, administering, scoring and interpreting tests of personality, interest, vocational aptitude, achievement, and intelligence.

EPY 8273. Neuropsychology. (3) (Prerequisite: Consent of instructor). Three hours lecture. Study of brain-behavior relationships with emphasis on neuroscience. Overview of assessment techniques, rehabilitation planning, and research contributions.

EPY 8293. Cognitive Development. (3) Three hours lecture. The study of cognitive/intellectual development including the theories derived from the work of information-processing psychologists and Jean Piaget.

EPY 8493. Child Behavior and Personality Assessment. (3) (Prerequisites: EPY 8263 and consent of instructor). Three hours lecture. Selection, administration, scoring, and interpretation of behavior and personality instruments.

EPY 8523. Psychology of the Gifted. (3) Three hours lecture. Characteristics, identification and evaluation of gifted individuals. Social, physical, emotional, and intellectual development of the gifted.

EPY 8533. Practicum in Teaching Educational Psychology. (3) (Prerequisite: EPY 8223). One hour lecture. Two hours practicum. Establishing objectives; selecting and organizing learning experiences; guiding

and evaluating learning; supervised practicum in teaching educational psychology.

EPY 8694. Supervised Experiences in School Psychology: Assessment. (4) (Prerequisites: EPY 8933, EPY 8723, EPY 8493, and consent of instructor). Supervised assessment experiences in educational settings utilizing psychological principles and techniques in teaching/learning problems. Three hundred plus hours of applied-supervised assessment experiences in a school setting.

EPY 8703. School Psychology. (3) Two hours lecture, two hours field experience. A course covering the history, current objectives, organization and administration of school psychology combined with appropriate field experience.

EPY 8723. Individual Assessment for Educational and Related Settings. (3) (Prerequisite: EPY 6073 and EPY 8263 or equivalent). Two hours lecture, two hours practicum. Training in administering individual psychometric instruments; verbal and nonverbal linguistic techniques; interpretation of scores, writing psychometric reports.

EPY 8763. Advanced Child Behavioral & Cognitive-Behavioral Intervention. (3) Three hours lecture. Identification, analysis, treatment, and evaluation of behavioral and cognitive-behavioral problems presented by children and youth.

EPY 8773. Assessment and Interventions for Academic Skills Deficits. (3) Three hours lecture. Study of theories, techniques, and procedures that have been shown to prevent and remedy academic skills deficits.

EPY 8780. Internship in School Psychology. (3 or 6) (Prerequisite: Consent of instructor). Supervised professional experience in an appropriate setting. Three hundred clock hours required for three semester hours credit.

EPY 8794. Supervised Experiences in School Psychology: Consultation. (4) (Prerequisites: EPY 9713, EPY 8763, and consent of instructor). Supervised consultation and intervention experiences in educational settings utilizing psychological principles and techniques in teaching/learning problems. Three hundred plus hours of supervised consultation experience.

EPY 8890. Supervised Experiences in School Psychology: Clinic Settings. (1-6) (Prerequisite: Consent of instructor). Supervised school psychology experiences in clinic settings utilizing psychological principles and techniques in teaching/learning problems.

EPY 8913. Psychology of Creative Imagination. (3) (Prerequisite: EPY 8523). A study of creative intellectual functioning and advances in thought on imagination imagery as they apply to measurement, nurture, development and related dimensions.

EPY 8933. Integrated Psycho-Educational Assessment. (3) (Prerequisites: EPY 8493, EPY 8723, consent of instructor). Two hours

lecture, two hours practicum. Integration of assessment, interpretation, and report writing skills for intellectual, adaptive, personality, and academic instruments.

EPY 8990. Special Topics in Educational Psychology. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

EPY 9000. Dissertation Research/Dissertation. Hours and credits to be arranged.

EPY 9213. Advanced Analysis in Educational Research. (3) (Prerequisites: EPY 6214 and EPY 8214, or equivalent course work). Three hours lecture. An examination of quantitative problem-solving methods, with special emphasis on modern techniques for investigating multivariable research problems in education.

EPY 9313. Education Evaluation Methods. (3) Three hours lecture. (Prerequisites: EPY 8214; EDF 9373 or equivalent course work). Introduction to evaluation contract development procedures, and planning and management of program evaluation in education and related settings.

EPY 9263. Applied Research Seminar. (3) (Prerequisites: EPY 6214, EDF 8363, and EDF 9373). Three hours lecture. Study of advances in thought on research approaches and doing research in educational psychology.

EPY 9703. Contemporary, Legal, Ethical, and Professional Issues in School and Educational Psychology. (3) (Prerequisite: consent of instructor). Three hours lecture. Psychology as a profession: Foundations of practice, roles and functions, professional issues and standards with emphasis on legal and ethical means in psychology.

EPY 9713. Advanced Psychological Consulting: Theory and Practice. (3) (Prerequisite: Consent of the instructor). Two hours lecture. Two hours practicum. Systematic investigation and application of psychological consultation in schools/human service settings. Consultation as applied to individuals and organizational structures. Study of research contributions.

EPY 9723. Seminar in Contemporary School Psychology. (3) (Prerequisite: consent of instructor). Study of current issues and problems in school psychology. Includes the synthesis/refinement of students' personal philosophy of psychological practice in human-service settings.

EPY 9730. Doctoral Internship in School Psychology. (3 or 6) (Prerequisite: consent of instructor). Supervised internship involving the theory and practice of evaluations, consultation, interventions, research, and related activities within a school, clinic, or other human service agency.

ENGLISH as a SECOND LANGUAGE

Office: ESL Center, 46 Morgan St.

Instructor Watkins (Interim Manager); Lecturers Culbertson, Goettig, McMinn, Stamps and Whitten

ESL 5110. American Language and Culture I. (1-18) (Prerequisite: TOEFL score between 475 and 499 or consent of the instructor). Credit to be arranged. An intermediate level English language course designed to improve the oral communication and literacy skills of international students. (Does not count towards any degree).

ESL 5120. American Language and Culture II. (1-18) (Prerequisite: ESL 5110, or TOEFL score between 500 and 524, or consent of instructor). Credit to be arranged. An advanced level English language

course designed to improve the oral communication and literacy skills of international students. (Does not count towards any degree).

ESL 5130. English for Academic Purposes. (3-9) (Prerequisite: ESL 5120 or TOEFL score above 525). Credit to be arranged. An English language course designed to prepare second language speakers for university level reading, writing, and oral communication assignments. (Does not count toward any degree.)

EXPERIENTIAL LEARNING

Office: 608 Allen Hall

EXL 0190. Experiential Learning. (0) (Prerequisite: Permission of Department). Non-classroom learning experience arranged through agreement of student and department; written approval required. Registration provides equivalent of full time enrollment status but no academic credit. Coordinated through Academic Affairs.

EXL 3100. Career Center Professional Practice Internship I. (0) (Prerequisite: 60 hours, 2.75 GPA and permission of Career Center). Career-related work experience arranged through mutual agreement of

the student and employer with confirmation by the Career Center. Coordinated by the Career Center.

EXL 3200. Career Center Professional Practice Internship II. (0) (Prerequisite: EXL 3100, 2.75 GPA and permission of Career Center). Career-related work experience arranged through mutual agreement of the student and employer with confirmation by the Career Center. Coordinated by the Career Center.

FINANCE

Office: 326 McCool Hall

(For departmental information, see FINANCE and ECONOMICS)

FIN 2003. Personal Money Management. (3) Three hours lecture. The individual's acquisition and management of an optimal personal income and expenditure pattern over a lifetime to best meet his/her financial objectives.

FIN 2990. Special Topics in Finance. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing

subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FIN 3113. Financial Systems. (3) (Prerequisites: EC 2113, EC 2123 (or AEC 2713) and junior standing). Three hours lecture. Study of interest rates, basic security valuation, money and capital markets, finan-

cial institutions and the roles financial institutions play in the financial markets.

FIN 3123. Financial Management. (3) (Prerequisites: EC 2123, ACC 2023, and BQA 2113 and junior standing). Three hours lecture. Study of objectives, tools, methods, and problems of financial management; financial analysis, planning, control, sources/uses of funds, capital budgeting decisions and working capital.

FIN 3723. Financial Markets and Institutions. (3) (Prerequisite: FIN 3113 or equivalent.) Three hours lecture. Study of the functions of financial markets. Major topics include interest rates, their role in securities markets and financial institutions, and interest rate risk.

FIN 4000. Directed Individual Study. Hours and credits to be arranged.

FIN 4011. Banking Internship. (1) (Prerequisite: Approval of Department). Banking topics examined by students during work semester.

FIN 4021. Corporate Finance Internship. (1) (Prerequisite: approval of Department). Corporate Finance topics examined by students during work semester.

FIN 4031. Financial Services Internship. (1) (Prerequisite: Approval of Department). Financial Services topics examined by students during work semester.

FIN 4041. Financial Communications Internship. (1) (Prerequisite: Approval of Department). Financial Communications topics examined by student during work semester.

FIN 4223. Intermediate Financial Management. (3) (Prerequisite: FIN 3123). Three hours lecture. Building on foundational concepts, this course provides a more in-depth coverage of financial analysis, valuation principles, the financial environment, capital budgeting and capital structure.

FIN 4233. Working Capital Management. (3) (Prerequisite: FIN 3123.) Three hours lecture. Analysis of selected problems in the short-term financial management of the firm, including cash management, investment opportunities, financing requirements, budgeting and planning.

FIN 4243. Senior Seminar in Finance. (3) (Prerequisites: FIN 3723 and FIN 4223). Three hours seminar. Comprehensive case study to bring out the problems involved in organizing, financing, and managing various types of business enterprises.

FIN 4423. Investments. (3) (Prerequisite: FIN 3123). Three hours lecture. Survey of various financial instruments and their characteristics, investor choice, and an introduction to the basics of security analysis, portfolio management, and speculative markets.

FIN 4433. Security Analysis and Portfolio Management. (3) (Prerequisites: FIN 4423.) Three hours lecture. Analysis of individual investments, creation and management of investment portfolios to achieve specific investor goals, and evaluation of portfolio performance.

FIN 4723. Bank Management. (3) (Prerequisites: FIN 3113 and FIN 3723.) Three hours lecture. Study of banking environment, functional areas of banking, and tools and techniques required to effectively manage a bank in a highly competitive, dynamic environment.

FIN 4733. Advanced Bank Management. (3) (Prerequisites: ACC 3203, FIN 4423, and FIN 4723.) Three hours seminar. Applications of financial management techniques to bank management decisions through experiential learning opportunities. Computer-based analysis, simulations, and written and oral presentations.

FIN 4923/6923. International Financial Management. (3) (Prerequisite: FIN 3123 or consent of instructor). Three hours lecture. A study of the theory and actual behavior of international financial management, foreign financial markets, exchange rate risk management, and foreign direct investments.

FIN 4990/6990. Special Topics in Finance. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FIN 7000. Directed Individual Study. Hours and credits to be arranged.

FIN 8000. Thesis Research/Thesis. Hours and credits to be arranged.

FIN 8052. Survey of Finance. (2) (Prerequisite: Graduate standing; ACC 8013, and BQA 8033, and EC 8043, equivalent or concurrent enrollment) Two hours lecture. Survey of financial management, analysis, planning, controls, sources/uses of funds, capital budgeting, and working capital with word processing, spreadsheet and database applications.

FIN 8112. Capital Acquisition and Allocation. (2) (Prerequisite: FIN 8052 or equivalent). Two hours lecture. Integration of risk and return concepts, capital structure, cash flow estimation, the capital acquisition process and capital budgeting into one framework.

FIN 8122. Corporate Liquidity Analysis. (2) (Prerequisite: FIN 8052 or equivalent). Two hours lecture. The role working capital plays in the viability of the firm and the financial management tools used to analyze and manage the firm's liquidity position.

FIN 8223. Case Problems in Corporate Finance. (3) (Prerequisites: FIN 8112 and FIN 8122 or equivalent). Three hours seminar. Analyses of financial management cases involving working capital, financial analysis, valuation concepts, risk and return, capital budgeting, cost of capital, and financial planning.

FIN 8233. Advanced Financial Management. (3) (Prerequisites: FIN 8112 and FIN 8122 or the equivalent). Three hours lecture. A study of the theory and application of valuation, risk return analysis, capital budgeting decisions, and capital structure. Analysis of how these decisions affect firm value.

FIN 8313. Financial Management of Projects. (3) (Prerequisite: FIN 3123 or equivalent). Three hours lecture. Focuses on the financial aspects of project management. Topics include capital budgeting, risk assessment, cash flow forecasting, value estimation and identification and valuation of options embedded in the project.

FIN 8423. Portfolio Management. (3) (Prerequisites: FIN 8112 and FIN 8122 or the equivalent). Three hours lecture. The application of contemporary investment theory for decision-making purposes in portfolio management, and the formulation of portfolio policies for different types of investors.

FIN 8723. Financial Institutions Management. (3) (Prerequisites: FIN 8112 and FIN 8122, or equivalent). Three hours seminar. Cases and readings on the requirements and potential challenges of managing financial institutions in a competitive and rapidly changing environment. Computer simulations.

FIN 8733. Financial Markets, Rates and Flows. (3) (Prerequisites: FIN 8112 and FIN 8122 or equivalent). Three hours lecture. An analysis of money and capital market instruments; a study of interest rates and financial flows; the effect of public policy on credit conditions.

FIN 8990. Special Topics in Finance. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FIN 9000. Dissertation Research/Dissertation. Hours and credits to be arranged.

FIN 9233. Seminar in Corporate Finance. (3) (Prerequisites: FIN 8233 or the equivalent.) Doctoral seminar. Analysis and discussion of the literature dealing with topics in corporate finance. Also, students prepare and present research projects.

FIN 9433. Seminar in Portfolio Theory. (3) (Prerequisites: FIN 8423 or equivalent.) Doctoral seminar. Analysis and discussion of the literature dealing with topics in portfolio theory and management. Also, students prepare and present research projects.

FIN 9733. Seminar in Financial Markets and Institutions. (3) (Prerequisites: FIN 8733 or equivalent.) Doctoral seminar. Analysis and discussion of the literature dealing with topics in financial markets and institutions. Students prepare and present research projects.

Department of FOREIGN LANGUAGES

Office: 300 Lee Hall

Professors Emplainscourt (Head), A. Lopez, Wolverton;
Associate Professors Jordan and Robbins-Herring;
Assistant Professors Krol, Kunz, Harland, Lestrade and Rice;
Instructors Little, and Vozzo

A year's study of the same foreign language in high school will normally be considered the equivalent of one semester's work at MSU for the purpose of determining appropriate placement; no credit hours are earned for MSU courses bypassed in this manner. Students with two or more years of the same foreign language in high school are encouraged to take the Computerized Placement Tests (CPT) in French, German, and Spanish, and the Placement Tests (PT) Japanese, Latin, and Russian administered by the Department, enabling them to earn up to 8 non-transferable MSU credit hours; the tests are free of charge and the credits earned are entered on the student's transcript upon recommendation of the Head of Foreign Languages Department. These tests can be taken during MSU Senior Invitational and MSU Spring Discovery by high school seniors; during summer orientations by entering freshman, and during the add/drop period of fall and spring semesters by beginning freshman. Foreign students may not register for credit in elementary and intermediate courses of their native language. All inquiries should be addressed to the Department Head.

FL 2453. The Icelandic Sagas. (3) (Prerequisite: Completion of freshman composition). Three hours lecture. A survey, in English, of the sagas and their relationship to history, mythology, and other medieval literatures. (Same as EN 2453).

FL 2990. Special Topics in Foreign Language. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FL 4000. Directed Individual Study. Hours and credits to be arranged.

FL 4123/6123. Scandinavian Mythology. (3) (Prerequisite: Junior standing or consent of the instructor). Three hours lecture. A survey of the myths and legends of Scandinavia in English translation. (Same as REL 4123/6123).

FL 4143/6143. Classical Mythology. (3) Three hours lecture. Myths and legends of Greece and Rome and their use in literature and the arts through the ages. (Same as REL 4143/6143)

FL 4623/6623. The Vikings. (3) (Prerequisite: Junior standing or consent of the instructor). Three hours lecture. A survey in English of the Vikings and the Viking Age. (Same as HI 4623/6623).

FL 4990/6990. Special Topics in Foreign Language. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FL 8990. Special Topics in Foreign Language. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FRENCH

FLF 1114. French I. (4) Three hours lecture. One recitation. An introduction to conversational French.

FLF 1124. French II. (4) (Prerequisite: FLF 1114 or equivalent). Three hours lecture. One recitation. Conversational French. Reading of graded text.

FLF 2133. French III. (3) (Prerequisite: FLF 1124 or equivalent). Three hours lecture. Rapid review of French grammar; oral-aural practice; reading of intermediate texts. Honors section available through invitation.

FLF 2143. French IV. (3) (Prerequisite: FLF 2133 or equivalent). Three hours lecture. Oral-aural practice; reading of intermediate texts. Honors section available through invitation.

FLF 2990. Special Topics in French. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLF 3114. Advanced French. (4) (Prerequisite: FLF 2143, FLF 2125 or equivalent or consent of instructor). Three hours lecture and laboratory. Required of all majors. Advanced instruction in all aspects of modern French.

FLF 3124. Advanced French. (4) (Prerequisite: FLF 2143, FLF 2125 or equivalent or consent of instructor). Three hours lecture and laboratory. Required of all majors. A continuation of FLF 3114.

FLF 3143. French Civilization. (3) (Prerequisite: FLF 2143, FLF 2125 or equivalent or consent of instructor). Three hours lecture. Illustrated survey of French cultural heritage.

FLF 3313. Business French I. (3) (Prerequisite: FLF 2143, FLF 2125 or equivalent or consent of instructor). Three hours lecture. The French language as used in business practices and marketing; emphasis on acquisition and application of French commercial terminology in import/export correspondence.

FLF 3323. Business French II. (3) (Prerequisite: FLF 2143, FLF 2125 or equivalent or consent of instructor). Three hours lecture. The French language as used in exchange controls, the Bourse, the banks; acquisition of French business terminology for written and oral expression.

FLF 3523. Survey of French Literature. (3) (Prerequisite: FLF 2143 or FLF 2125 or equivalent or consent of instructor). Three hours lecture. Required of all majors. A survey of French literature from the 18th century to the present.

FLF 4000. Directed Individual Study. Hours and credits to be arranged.

FLF 4073/6073. French Drama of the 20th Century. (3) (Prerequisite: FLF 3523 or consent of instructor). Three hours lecture. Reading of works of outstanding writers and discussion of literary currents of the century.

FLF 4083/6083. Survey of French Lyric Poetry. (3) (Prerequisite: 3513). Three hours lecture. Reading and interpretation of masterpieces. Discussion of literary currents and personalities of the century.

FLF 4093/6093. French Novel and Short Story of the 19th Century. (3) (Prerequisite: FLF 3523 or consent of instructor). Three hours lecture. Reading of selected masterpieces. Discussion of literary currents and personalities of the century.

FLF 4103/6103. French Novel and Short Story of the 20th Century. (3) (Prerequisite: FLF 3523 or consent of instructor). Three hours lecture. Reading and critical evaluation of modern French novels and short stories of various literary schools.

FLF 4143/6143. French Classicism. (3) (Prerequisite: FLF 3513). Three hours lecture. Reading and discussion of selected texts in the novel, drama, and criticism of the 17th century.

FLF 4153/6153. French Classicism. (3) (Prerequisite: FLF 3513 or consent of instructor). Three hours lecture. A continuation of FLF 4143/6143.

FLF 4213/6213. Historical Grammar. (3) (Prerequisites: FLF 3114 and 3124 or consent of instructor). A history of the French language from the *Strasbourg Oaths* to Montaigne.

FLF 4990/6990. Special Topics in French. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLF 7000. Directed Individual Study. Hours and credits to be arranged.

FLF 8000. Thesis Research/Thesis. Hours and credits to be arranged.

FLF 8073. Seminar in French Drama of the 20th Century. (3) (Prerequisite: Graduate standing).

FLF 8093. Seminar in the French Novel of the 19th Century. (3) (Prerequisite: Graduate standing).

FLF 8103. Seminar in the French Novel of the 20th Century. (3) (Prerequisite: Graduate standing).

FLF 8113. Seminar in French Classical and Neo-Classical Comedy. (3) (Prerequisite: Graduate standing).

FLF 8123. Seminar in the French Novel and Short Story of the Renaissance and Classical Period. (3) (Prerequisite: Graduate standing).

FLF 8213. Old French. (3) (Prerequisite: Graduate standing). A philological study of the development of Old Parisian French from Vulgar Latin.

FLF 8223. Seminar in French Classical and Neo-Classical Tragedy. (3) (Prerequisite: Graduate standing).

FLF 8990. Special Topics in French. (1-9) (Prerequisite: Graduate standing). Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GERMAN

FLG 1114. German I. (4) Three hours lecture. One recitation. An introduction to conversational German.

FLG 1124. German II. (4) (Prerequisite: FLG 1114). Three hours lecture. One recitation. Conversational German. Reading of graded texts.

FLG 2133. German III. (3) (Prerequisite: FLG 1124). Three hours lecture. Rapid review of German grammar; oral-aural practice; reading of intermediate texts.

FLG 2143. German IV. (3) (Prerequisite: FLG 2133). Three hours lecture. Oral-aural practice; reading of intermediate texts.

FLG 2990. Special Topics in German. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLG 3114. Advanced German. (4) (Prerequisite: FLG 2143 or consent of instructor). Three hours lecture and laboratory. Required of all majors. Advanced instruction in all aspects of modern German.

FLG 3124. Advanced German. (4) (Prerequisite: FLG 2143 or consent of instructor). Three hours lecture and laboratory. Required of all majors. A continuation of FLG 3114.

FLG 3143. German Civilization. (3) (Prerequisite: FLG 2143 or equivalent.) Three hours lecture. A survey of German cultural heritage.

FLG 3153. Modern German Culture. (3) (Prerequisite: FLG 2143 or equivalent). Three hours lecture. A survey of German culture and life today.

FLG 3313. Business German I. (3) (Prerequisites: FLG 2143). Three hours lecture. The German language as used in business; emphasis on acquisition and application of German commercial terminology on import/export correspondence.

FLG 3323. Business German II. (3) (Prerequisite: FLG 2143). Three hours lecture. The German language as used in the German stock market, trade, and exchange controls; acquisition and application of written and oral German business terminology.

FLG 4000. Directed Individual Study. Hours and credits to be arranged.

FLG 4163/6163. History of the German Language. (3) (Prerequisite: FLG 3124). Three hours lecture. The relationship of High German to the parent Indo-European and to the remaining Germanic dialects; linguistic development from the earliest times to the present.

FLG 4463/6463. German Drama of the 20th Century. (3) (Prerequisite: FLG 3523). Three hours lecture. Reading of works of outstanding writers and discussion of literary currents of the century.

FLG 4990/6990. Special Topics in German. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLG 7000. Directed Individual Study. Hours and credits to be arranged.

FLG 8463. Seminar in German Drama of the 20th Century. (3) (Prerequisite: Graduate standing).

FLG 8990. Special Topics in German. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GREEK

FLH 1113. Greek I. (3) Three hours lecture. An introduction to Biblical and Classical Greek.

FLH 1123. Elementary Ancient Greek II. (3) Three hours lecture. A continuation of FLH 1113.

FLH 2990. Special Topics in Greek. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLH 4990/6990. Special Topics in Greek. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLH 8990. Special Topics in Greek. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

JAPANESE

FLJ 1114. Japanese I. (4) Three hours lecture. One recitation. An introduction to conversational Japanese.

FLJ 1124. Japanese II. (4) (Prerequisite: FLJ 1114 or equivalent). Three hours lecture. One recitation. An introduction to conversational Japanese.

FLJ 2133. Japanese III. (3) (Prerequisite: FLJ 1124 or equivalent). Three hours lecture. Rapid review of Japanese grammar; oral-aural practice; reading of intermediate texts.

FLJ 2143. Japanese IV. (3) (Prerequisite: FLJ 2133 or equivalent). Three hours lecture. Oral-aural practice; reading and discussion of intermediate texts.

FLJ 4000. Directed Individual Study. Hours and credits to be arranged.

FLJ 4990/6990. Special Topics in Japanese. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLJ 8990. Special Topics in Japanese. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

LATIN

FLL 1113. Latin I. (3) Three hours lecture. An introduction to the Latin language.

FLL 1123. Latin II. (3) (Prerequisite: FLL 1113 or equivalent). Three hours lecture. Grammar; elementary reading.

FLL 2133. Latin III. (3) (Prerequisite: FLL 1123 or equivalent). Three hours lecture. Review of Latin grammar; reading of intermediate texts.

FLL 2143. Latin IV. (3) (Prerequisite: 2133 or equivalent). Three hours lecture. Reading of intermediate texts.

FLL 2990. Special Topics in Latin. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLL 4000. Directed Individual Study. (Prerequisite: Junior standing). Hours and credits to be arranged.

FLL 4990/6990. Special Topics in Latin. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLL 7000. Directed Individual Study. Hours and credits to be arranged.

FLL 8990. Special Topics in Latin. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

RUSSIAN

FLR 1114. Russian I. (4) Three hours lecture. One recitation. An introduction to conversational Russian.

FLR 1124. Russian II. (4) (Prerequisite: FLR 1114). Three hours lecture. One recitation. Conversational Russian. Reading of graded texts.

FLR 2133. Russian III. (3) (Prerequisite: FLR 1124). Three hours lecture. Rapid review of Russian grammar; oral-aural practice; reading of intermediate texts.

FLR 2143. Russian IV. (3) (Prerequisite: FLR 2133). Three hours lecture. Oral-aural practice; reading of intermediate texts.

FLR 2990. Special Topics in Russian. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLR 4000. Directed Individual Study. Hours and credits to be arranged.

FLR 4990/6990. Special Topics in Russian. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLR 8990. Special Topics in Russian. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

SPANISH

FLS 1114. Spanish I. (4) Three hours lecture. One recitation. An introduction to conversational Spanish.

FLS 1124. Spanish II. (4) (Prerequisite: FLS 1114 or equivalent). Three hours lecture. One recitation. Conversational Spanish. Reading of graded texts.

FLS 2133. Spanish III. (3) (Prerequisite: FLS 1124 or equivalent). Three hours lecture. Rapid review of Spanish grammar; oral-aural practice; reading of intermediate texts. Honors section available through invitation.

FLS 2143. Spanish IV. (3) (Prerequisite: FLS 2133 or equivalent). Three hours lecture. Oral-aural practice; reading of intermediate texts. Honors section available through invitation.

FLS 2990. Special Topics in Spanish. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLS 3111. Advanced Spanish Laboratory I. (1) (Prerequisite: FLS 2143 or FLS 2125). Three hours laboratory. A laboratory course to accompany FLS 3313 or to be taken separately. Required of all majors.

FLS 3113. Advanced Spanish I. (3) (Prerequisite: FLS 2143 or FLS 2125). Three hours lecture. Required of all majors. Advanced instruction in all aspects of modern Spanish. Required of all majors.

FLS 3121. Advanced Spanish Laboratory II. (1) (Prerequisite: FLS 2143 or consent of department). Three hours laboratory. A laboratory course to accompany FLS 3233 or to be taken separately. Required of all majors.

FLS 3143. Hispanic Civilization. (3) (Prerequisite: FLS 2143 or FLS 2125). Three hours lecture. Illustrated survey of Hispanic cultural heritage.

FLS 3233. Advanced Spanish II. (3) (Prerequisite: FLS 3113 or consent of instructor). Three hours lecture. Required of all majors. A continuation of FLS 3113.

FLS 3313. Business Spanish I. (3) (Prerequisite: FLS 2143 or FLS 2125). Three hours lecture. Emphasis on the acquisition and usage of Spanish business terminology and business practices used in foreign trade.

FLS 3323. Business Spanish II. (3) (Prerequisite: FLS 2143 or FLS 2125). Three hours lecture. Designed to provide a functional command of conversational and written Spanish for business correspondence, travel, investments and international business practices.

FLS 3513. Survey of Spanish Literature. (3) (Prerequisite: FLS 2143 or FLS 2125). Three hours lecture. Required of all B.A. majors. A survey of Spanish literature from its origin to the 18th century.

FLS 3523. Survey of Spanish Literature. (3) (Prerequisite: FLS 2143 or FLS 2125). Three hours lecture. Required of all B.A. majors. A survey of Spanish literature from the 18th century to the present.

FLS 4000. Directed Individual Study. Hours and credits to be arranged.

FLS 4223/6223. Spanish Novel of the Golden Age. (3) (Prerequisite: FLS 3513). Three hours lecture. A study of the picaresque novel and the short novel of the Golden Age.

FLS 4283/6283. The Contemporary Spanish-American Novel and Short Story. (3) (Prerequisite: FLS 3523 or consent of instructor). Three hours lecture. A study of major contemporary Spanish-American novels and short stories.

FLS 4323/6323. Spanish Drama of the Golden Age. (3) (Prerequisite: FLS 3513). Three hours lecture. A study of dramatic works of Lope de Vega, Tirso de Molina, Calderon, and minor dramatic writers of the 17th century.

FLS 4423/6423. Survey of Spanish Lyric Poetry. (3) (Prerequisite: FLS 3513). Three hours lecture. Reading and interpretation of masterpieces of Spanish lyric poetry and poetic theory from the Middle Ages to the present.

FLS 4443/6443. Modernismo. (3) (Prerequisite: FLS 3513 or consent of instructor). Three hours lecture. A survey of Modernismo in Spanish-American literature (1888-1916).

FLS 4523/6523. The Renaissance. (3) (Prerequisite: FLS 3513). Three hours lecture. Spanish literature and thought of the Renaissance.

FLS 4543/6543. Survey of Spanish-American Literature. (3) (Prerequisite: FLS 3513). Three hours lecture. A study of representative authors and literary movements up to Modernism.

FLS 4633/6633. Introduction to Spanish Linguistics. (3) (Prerequisites: FLS 3233 or consent of instructor). Three hours lecture. Intro-

duction to linguistic analyses and their application to the syntactic, morphological, semantic, phonological, historical, and sociolinguistic aspects of the Spanish language.

FLS 4643/6643. Spanish Phonology. (3) (Prerequisite: FLS 3233 or consent of instructor). Three hours lecture. Introduction to the articulatory classification of Spanish sounds. Discussion of the mental organization of these sounds, and the processes which transform them during speech.

FLS 4653/6653. History of the Spanish Language. (3) (Prerequisite: FLS 3513). Three hours lecture. The history of the development of the Spanish language from its origins to the present.

FLS 4990/6990. Special Topics in Spanish. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FLS 7000. Directed Individual Study. Hours and credits to be arranged.

FLS 8000. Thesis Research/Thesis. Hours and credits to be arranged.

FLS 8223. Seminar in the Picaresque Novel. (3) (Prerequisite: Graduate standing).

FLS 8253. Seminar in the Novel of the 19th Century. (3) (Prerequisite: Graduate standing).

FLS 8263. Seminar in the Novel of the 20th Century. (3) (Prerequisite: Graduate standing).

FLS 8283. The Contemporary Spanish-American Novel and Short Story. (3) (Prerequisite: Graduate standing). Three hours lecture. A study of major contemporary Spanish-American novels and short stories.

FLS 8323. Seminar in the Drama of the Golden Age. (3) (Prerequisite: Graduate standing).

FLS 8333. Seminar in the Drama of the 19th Century. (3) (Prerequisite: Graduate standing).

FLS 8343. Seminar in the Drama of the 20th Century. (3) (Prerequisite: Graduate standing).

FLS 8443. Modernismo. (3) (Prerequisite: Graduate standing). Three hours lecture. A study of the most relevant modernists and their works (1888-1916).

FLS 8513. Spanish Literature of the Middle Ages. (3) (Prerequisite: FLS 8663). Three hours lecture. A study of Spanish literary masterpieces and movements from *Poema del Cid* to the 16th Century.

FLS 8663. Old Spanish. (3) (Prerequisite: Graduate standing). Three hours lecture. A philological study of the development of Old Spanish from Vulgar Latin. Reading of texts.

FLS 8990. Special Topics in Spanish. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

Department of FORESTRY

Office: 105 Thompson Hall

Professors Belli, Bullard (Interim Head), Bonner*, Daniels, Dicke, Ezell, Friend*, Hodges*, Hughes, Land, Matney, Munn, Stuart, Schoenholtz and Traugott;

Associate Professors Connor*, Dean*, Duzan*, Evans, Grace, Grado, Grebner, Kubiske*, Parker, Roberts, Schultz and Vozzo*, Assistant Professors Gaddis, Gardiner*, Londo, Maiers, Meadows*, Sun and Yuceer (*- adjunct faculty)

FO 1101. Forest Resources Survey. (1) One hour lecture. Survey of the professional resource manager's role and career opportunities in providing forest-based goods and services. Not open to Forest Resources majors with senior standing.

FO 2111. Dendrology Laboratory. (1) (Corequisite: FO 2112). Four hours laboratory. Field exercises to promote the recognition and identification of trees and other woody plants.

FO 2112. Dendrology. (2) (Prerequisite: BIO 1203; Corequisite: FO 2111). Two hours lecture. Introduction to the identification and systematic classification of trees and other woody plants.

FO 2213. Forest Measurements. (3) (Prerequisite: ST 2113 or equivalent). Three hours lecture. Principles of measurement for standing and felled trees. Inventory and sampling theory for forested lands.

FO 2990. Special Topics in Forestry. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FO 3012. Introduction to Forest Communities. (2) (Prerequisites: PSS 3301, PSS 3303, FO 2112, FO 2111). Field exercises to gain

practical knowledge of soil-geology-ecology interrelationships through trips to various physiographic regions.

FO 3015. Forest Description and Analysis. (5) (Prerequisites: FO 2213). Field and laboratory exercises to gain practical experience with forest and land measurement techniques and equipment. Mapping inventory, and analysis of forested tracts.

FO 3101. Computer Application for Forest Resources Laboratory. (1) (Co-requisite: FO 3102). Two hours laboratory. Practice and demonstration of general and professional software packages used in upper level courses and professional settings in Forest Resources.

FO 3102. Computer Applications for Forest Resources. (2) (Prerequisite: Three hours of courses in the School of Forest Resources or consent of instructor. Co-requisite: FO 3101). Two hours lecture. Application of microcomputer concepts in forest resources with emphasis in Forestry, and general and professional software packages in professional settings.

FO 3113. Forest Recreation Management. (3) Three hours lecture. Studies of the management of forest resources for outdoor recreation.

FO 3123. Forest Ecology and the Global Environment. (3) (Prerequisite: Three hours of courses in the College of Forest Resources or consent of instructor. Co-requisite: FO 3101). Three hours lecture. Introduction to the basic biology, issues, and policy-science interface involving air pollution, deforestation, and other current forest environmental concerns.

FO 3201. Forest Fire Laboratory. (1) (Corequisite: FO 3202). Four hours laboratory on alternate weeks. Field applications and demonstrations of fire control and management techniques that complement theory learned in FO 3202.

FO 3202. Forest Fire. (2) (Corequisite: FO 3201). Two hours lecture. Forest fire control and use. Aspects of fire effects, prevention, detection, suppression and the use of prescribed burning in forest management.

FO 4000. Directed Individual Study. Hours and credits to be arranged.

FO 4113/6113. Forest Resource Economics. (3) (Prerequisites: AEC 2713 or equivalent). Three hours lecture. Basic principles of forest resource valuation; economics applied to production, conversion, marketing and consumption of forest products and benefits.

FO 4121/6121. Principles of Silviculture Laboratory. (1) (Corequisite: FO 4123/6123). Four hours laboratory. Investigative field and laboratory exercises used to complement concepts presented in FO 4123/6123, develop interpretive abilities, and improve reporting skills.

FO 4123/6123. Principles of Silviculture. (3) (Prerequisite: FO 3012; corequisite: FO 4121/6121). Three hours lecture. Natural principles governing establishment, development, and functioning of forest ecosystems. Includes ecology, genetics, physiology, tree growth, reproduction, site, stand dynamics, energetics, hydrology, nutrition, and succession.

FO 4213/6213. Forest Biometrics. (3) (Prerequisite: FO 3102, FO 3101, and FO 3015). Three hours lecture. Applications of mensurational and statistical principles and techniques in determination of forest growth and yield. Advanced topics of forest resource inventory.

FO 4221/6221. Practice of Silviculture Laboratory. (1) (Prerequisite: FO 4123/6123 or WF 4223; corequisite: FO 4223/6223). Four hours laboratory. Application of silviculture practices and operations under given forest land management objectives.

FO 4223/6223. Practice of Silviculture. (3) (Prerequisite: FO 4123/6123, FO 4121/6121 or WF 3133 and WF 4223; corequisite: FO 4221/6221). Three hours lecture. Manipulation to obtain desired reproduction and to attain optimum development under given forest land management objectives.

FO 4231/6231. Forest Operations and Harvesting Laboratory. (1) (Corequisite: FO 3015). Four hours laboratory. Investigative field and laboratory exercises used to complement concepts presented in FO 4233/6233.

FO 4233/6233. Forest Operations and Harvesting. (3) (Prerequisites: FO 3015, FO 4231/6231). Three hours lecture. Study of practical, managerial, and logistic considerations associated with harvesting and other forest operations, as well as their social, environmental and legal influences.

FO 4243/6243. Tree Genetics and Reforestation. (3) (Prerequisites: BIO 1203 and Junior standing). Three hours lecture. Biological, genetic and physiological principles of tree reproduction. Applications to forest management and reforestation, including tree improvement, cloning, seed technology, nursery management and plantation establishment.

FO 4253/6253. Timber Procurement. (3) (Prerequisites: FO 4231/6231, FO 4233/6233). Lectures and field exercises dealing with the problems of timber procurement to include planning for harvest, methods of handling and transport, legal and safety considerations.

FO 4311/6311. Spatial Technologies in Natural Resources Management Laboratory. (1) (Prerequisite: FO 3015 or consent of instructor; corequisite: FO 4313/6313). Three hours laboratory. Fundamentals of scale, area, height and stand volume determinations from aerial imagery; planimetric and topographic mapping; image interpretation; GPS and GIS; applications to natural resources.

FO 4313/6313. Spatial Technologies in Natural Resources Management. (3) (Prerequisite: FO 3015 or consent of instructor; corequisite: FO 4311/6311). Three hours lecture. Fundamentals of scale, area, height, and stand volume determinations from aerial imagery; planimetric and topographic mapping; image interpretation; GPS and GIS; applications to natural resource inventory.

FO 4321/6321. Forest Resource Management Laboratory. (1) (Corequisite: FO 4323/6323). Four hours laboratory. Practical application of forest resource management principles, emphasizing identification and analysis of resource management problems. Specific topics include problem identification, financial analysis, and mathematical programming.

FO 4323/6323. Forest Resource Management. (3) (Prerequisites: FO 4213/6213, FO 4113/6113, FO 4233/6233, FO 4231/6231, FO 4223/6223; Corequisite: FO 4321/6321). Three hours lecture. Application of economic principles and decision-making techniques to forest management problems. Topics include advanced forest valuation, timber taxation, stand-level management, and harvest scheduling.

FO 4343/6343. Forest Administration and Organization. (3) Three hours lecture. Hierarchy and land structuring of forest organizations. Legal aspects of administering forest land holdings.

FO 4353/6353. Forestry Law. (3) (Prerequisite: Junior standing or consent of instructor). Three hours lecture. A comprehensive study of the laws relating to forestry and forest operations with emphasis on real property law, environmental law, forest taxation law and contract law.

FO 4413/6413. Natural Resources Policy. (3) (Prerequisite: Senior standing). Three hours lecture. Current topics relating to natural resources policy which affect management decisions and practices in the public and private sectors of natural resources use.

FO 4421/6421. Professional Practices Laboratory. (1) (Corequisite: FO 4423/6423). Four hours laboratory. Forest resource data collection analysis.

FO 4423/6423. Professional Practice. (3) (Prerequisite: FO 4323/6323, FO 4321/6321; corequisite: FO 4421/6421). Three hours lecture. Development of forest resource alternatives and recommendations for a specific forest property.

FO 4443/6443. International Forest Resources and Trade. (3) (Prerequisite: Consent of Instructor). Three hours lecture. A study of the world's wood consumption, marketing arrangements, community forestry, and forestry in economic development.

FO 4451/6451. Remote Sensing Applications Laboratory. (1) (Co-requisite: FO 4452/6452. Prerequisites: A basic image interpretation or remote sensing course or consent of instructor). Three hours laboratory. Practical approaches to interpretation of remote sensing data. Emphasis is on computer applications for image analysis.

FO 4452/6452. Remote Sensing Applications. (2) (Corequisite FO 4451/6451; Prerequisite: A basic image interpretation or remote sensing course or consent of instructor). Two hours lecture. An introduction to remote sensing with emphasis on analysis and applications of digital image data in inventory, monitoring, and management of renewable natural resources.

FO 4463/6463. Forest Hydrology. (3) (Prerequisite: PSS 3301, PSS 3303, FO 4223/6223, FO 4221/6221, or consent of instructor). Three hours lecture. Synthesis of current information on the fundamental properties and processes of forest soils, hydrology, and water quality with emphasis on watershed and ecosystem management factors.

FO 4471/6471. GIS for Natural Resource Management. (1) (Corequisite: FO 4472/6472. Prerequisite: Junior standing). Three hours laboratory. Computer laboratory exercises that stress development, management and use of digital geographic data for management of natural resources.

FO 4472/6472. GIS for Natural Resource Management. (2) (Corequisite: FO 4471/6471. Prerequisite: Junior standing). Two hours lecture. Introduction to geographic information systems (GIS) with emphasis on collection, encoding, storage, retrieval, and analysis of spatial data for use in management of natural resources.

FO 4483/6483. Forest Soils. (3) (Prerequisite: PSS 3301, PSS 3303, FO 4123/6123, FO 4121/6121, or consent of instructor). Three hours lecture. Synthesize current information on fundamental properties and processes of forest soils with emphasis on applications to silviculture, soil conservation, and sustainable management of forested ecosystems.

FO 4631/6631. Tree Form and Function Laboratory. (1) (Prerequisites: Introductory statistics such as ST 2113 or FO 4213, graduate standing or consent of instructor). (Co-requisite: FO 4633/6633). Three hours laboratory. Introduction to tree physiology measurement techniques and instrumentation, data analysis and interpretation.

FO 4633/6633. Tree Form and Function. (3) (Prerequisite: BIO 1203). (Co-requisite for 6633: FO 6631). Three hours lecture. Physiology growth, and development of forest trees. Topics include carbohydrate source-sink relations, tree hydraulic architecture, forest canopy-atmosphere gas exchange.

FO 4990/6990. Special Topics in Forestry. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FO 7000. Directed Individual Study. Hours and credits to be arranged.

FO 8000. Thesis Research/Thesis. Hours and credits to be arranged.

FO 8111-8211. Graduate Seminar. (1-1) Credit in 2 semesters allowed. Review of and discussion of current forestry issues. Presentation of student reports.

FO 8123. Tree Seed. (3) (Prerequisite: BIO 4203/6203 or consent of instructor). Two hours lecture. Three hours laboratory. Principles and practices of tree seed production, methods, and factors involved in harvesting, processing, storing, and testing of tree seed.

FO 8133. Forest Ecophysiology. (3) (Prerequisite: FO 4432/6432, BIO 4214/6214, or Consent of Instructor). Three hours lecture. Fall semester. An exploration of environment-plant interactions, and physiological mechanisms for injury from, and resistance to, environmental stress, with emphasis on forest communities.

FO 8143. Advanced Forest Economics. (3) Three hours lecture. Application of current theory and techniques of economics to forestry. Emphasis is on the use of quantitative tools to improve decision-making in forest resource management.

FO 8153. Quantitative Forest Ecology. (3) (Prerequisites: MA 1723 and ST 8114 or consent of instructor). Three hours lecture. Analytical models, fitting model coefficients to data, life tables, spatial patterns, interspecific competition, and species diversity.

FO 8163. Nonmarket Forest Values. (3) Three hours lecture. (Prerequisite: FO 4133 or equivalent or consent of Instructor). The course will deal with the valuation of nonmarket, non-timber outputs or amenities derived from the forest.

FO 8173. Advanced Spatial Management. (3) (Prerequisite: an introductory course in remote sensing and/or geographical information systems or consent of instructor). Three hours lecture. Group discussion and application of integrated remote sensing, image analysis and GIS software tools for assessment of natural resources.

FO 8211. Graduate Seminar. (1-1) Credit in 2 semesters allowed. Review of and discussion of current forestry issues. Presentation of student reports.

FO 8213. Advanced Silviculture. (3) (Prerequisite: FO 4223 or consent of instructor). Three hours of lecture and/or field trips once per week. Spring semester. Silvicultural practices in context of the total ecological principles in decision making process. Emphasis on silviculture of bottomland hardwoods.

FO 8223. Seminar in Forest and Wildland Resources and Use. (3) Three hours. Biological and social bases for forest and wildland use; conservation and management through applications of science and public policy.

FO 8233. Advanced Forest Inventory. (3) Three hours lecture. Design and analysis of forest resource inventories. Growth functions, yield tables, measures of site quality and stocking, and advanced sampling topics.

FO 8243. Advanced Forest Resource Management and Planning. (3) (Prerequisite: FO 8143). Three hours lecture. Emphasis is on the assessment of multiple-use alternatives. Data needs, resource trade-offs, and economic and policy implications are discussed.

FO 8293. Master of Forestry Professional Paper. (3) For Master of Forestry students only. Demonstration of ability to compile, synthesize, and evaluate information, and to effectively communicate analyses and conclusions.

FO 8990. Special Topics in Forestry. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FO 9000. Dissertation Research/Dissertation. Hours and credits to be arranged.

Department of FOREST PRODUCTS

Office: Forest Products Laboratory

Professors Leightley (Department Head), Amburgey, Barnes, Borazjani, Ingram, Kim, Nicholas, Schultz, Seale, Sellers and Steele; Associate Professors Diehl and Zhang

FP 1103. Wood Technology and Products. (3) Three hours lecture. A survey of wood structures, properties and products, including reconstituted wood products, chemicals from wood and wood preservation.

FP 2990. Special Topics in Forest Products. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FP 3012. Introduction to Forest Industries. (2) 40 hours per weeks for two weeks of laboratory (industry tours). Guided introduction to forest products industries and processes.

FP 4000. Directed Individual Study. Hours and credits to be arranged.

FP 4013/6013. Wood Anatomy. (3) (Prerequisite: FP 1103 or consent of instructor). Two hours lecture. Three hours laboratory. Anatomy of commercial timber species; elements of botanical microtechnique, fundamentals of microscopy, and fundamental properties: gross and minute structural characteristics of wood leading to identification.

FP 4023/6023. Wood Chemistry. (3) (Prerequisite: CH 1053 and CH 1051 or CH 1223 and CH 1221). Three hours lecture. Introduction to the distribution, chemical structure, reactions and uses of the chemical components of wood including cellulose, hemicellulose, lignin, and extractives.

FP 4113/6113. Adhesives and Finishes for Wood. (3) (Prerequisite: CH 1053, FP 1103, or consent of instructor). Two hours lecture. Three hours laboratory. Theory and technology of adhesion; adhesive types, application equipment; fundamentals of coating technology; wood finishes; finishing systems; evaluation of glued, finished products; market volumes.

FP 4123/6123. Lumber Manufacturing. (3) (Prerequisite: Consent of instructor). Two hours lecture. Three hours laboratory. Raw materials, production methods and product specifications for sawn wood products. Machinery and plant layout. Operation, control, and analysis of lumber manufacturing systems; markets.

FP 4143/6143. Composite Wood Products. (3) (Prerequisite: FP 4113 or consent of instructor). Two hours lecture. Three hours laboratory. Study of physical and chemical parameters affecting reconstituted wood products; laboratory investigation of processing methods; industrial standards and quality control; markets.

FP 4213/6213. Wood Deterioration and Preservation. (3) (Prerequisite: Consent of instructor). Two hours lecture. Three hours laboratory. Thermal, biological, and mechanical agents of wood products deterioration; biological control; design considerations; wood preservatives, preservation systems; treatability; preservative effectiveness; standards, pollution control.

FP 4223/6223. Furniture Production I. (3) (Prerequisite: FP 1130 or consent of instructor). Two hours lecture. Three hours laboratory. The theory of furniture production; materials for furniture; manufacturing machines and their functions; wood machining and sanding; finishing; industrial processes; marketing.

FP 4233/6233. Furniture Production II. (3) (Prerequisite: FP 1103 or consent of instructor). Two hours lecture. Three hours laboratory. General principles of upholstered furniture design; frame construction and analysis; material selection; fasteners; joint construction; and testing standards.

FP 4253/6253. Quantitative Methods in Forest Products and Furniture. (3) (Prerequisite: MA 1613 or MA 1713, BIS 1013 or concurrent). Three hours lecture. Application of economic principles to the production and marketing of forest products; production theory of single and multiproduct firms; computer applications.

FP 4313/6313. Environmental Principles. (3) (Prerequisites: FP 3012 or consent of instructor). Three hours lecture. Environmental regulations pertaining to Forest Products industries. Handling and transport of hazardous compounds. Sources of environmental problems, fate in the environmental, and common control technologies.

FP 4323/6323. Physical Properties of Wood. (3) (Prerequisite: FP 1103, MA 1613, PH 1113, or consent of instructor). Two hours lecture. Three hours laboratory. Equation derivation; dimensional behavior; psychometry; thermal properties; electricity; moisture movement; case studies/problems.

FP 4353/6353. Forest Products Marketing. (3) (Prerequisites: FP 3012 and junior standing). Marketing and practices used by forest products and furniture producing companies as related to differentiated vs non-differentiated products by consumers.

FP 4413. Professional Practice. (3) (Prerequisite: Senior standing). Three hours independent study. Seniors will be exposed to all FP faculty members and required to prepare both written and oral reports on a variety of FP topics.

FP 4423/6423. Mechanical Properties of Wood. (3) (Prerequisite: FP 1103, MA 1613, PH 1113, or consent of instructor). Two hours lecture. Three hours laboratory. Strength and elasticity of wood and wood composites; variation in properties as function of structure, moisture, temperature and time; derivation of working stresses; structural design.

FP 4990/6990. Special Topics in Forest Products. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FP 7000. Directed Individual Study. Hours and credits to be arranged.

FP 8000. Thesis Research/Thesis. Hours and credits to be arranged.

FP 8111. Research Seminar. (1) Review of current research work in wood science and technology; the scientific method; philosophy of research.

FP 8113. Advanced Wood Physics. (3) (Prerequisite: Consent of instructor). Two hours lecture. Three hours laboratory. Wood-fluid relationships; interfacial properties of wood; thermal and electrical properties of wood; current topics in wood physics.

FP 8123. Advanced Lignocellulosic Chemistry. (3) (Prerequisite: Consent of instructor). Three hours lecture. Carbohydrate chemistry; chemistry of cellulose and cellulose, hemicellulose, lignins, extractives, and bark; pulping and bleaching chemistry; analysis of lignocellulosic materials; biodegradation of lignocellulosics; biomass products.

FP 8133. Environmental Issues in Forest Products. (3) (Prerequisite: Consent of instructor). Three hours lecture. Environmental impact, regulations, management of wood treatment by-products and

chemical wastes; biodegradation microorganisms; bioremediation; bio-mass residues; soil, sediment, water, air contaminations; current clean-up technologies.

FP 8143. Ultrastructure of Wood. (3) (Prerequisites: Course in basic wood anatomy and identification, comparable to FP 4014/6014). Two hours lecture. Three hours laboratory. The study of the formation, anatomy, structure and chemical properties of wood and wood fibers with an introduction to microscopic and spectroscopic methods of investigation.

FP 8213. Advanced Wood Mechanics. (3) (Prerequisite: Consent of instructor). Two hours lecture. Three hours laboratory. Study of elastic and viscoelastic behavior of wood composites; fracture in wood; stress analysis; current topics in wood mechanics.

FP 8990. Special Topics in Forest Products. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FP 9000. Dissertation Research/Dissertation. Hours and credits to be arranged.

Department of FOOD SCIENCE and TECHNOLOGY

Office: 107 Herzer Building

Professors White (Head), Chen, Haque, Marshall, Rogers, Althen and Silva;
Assistant Professor Chen and Schilling

FST 1103. Introduction to Food Science. (3) Three hours lecture. An introductory course that relates how the disciplines of chemistry, microbiology and nutrition are involved in preservation, handling, distribution, and metabolism of foods. (May be taught as a correspondence course).

FST 2112. Food Products Evaluation. (2) One hour lecture. Two hours laboratory. Sensory examination of food products; common defects, causes, and remedies. Basic methods of evaluation of different types of foods.

FST 2990. Special Topics in Food Science and Technology. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FST 3111. Food Science Seminar. (1) One hour lecture. Preparation and presentation on specially assigned current topics in Food Science.

FST 3142. Meats Judging I. (2) Spring semester. Four hours laboratory. Grading and judging meat carcasses and cuts, study of packing house operation. (Same as ADS 3142).

FST 4000. Directed Individual Study. Hours and credits to be arranged.

FST 4114/6114. Analysis of Food Products. (4) (Prerequisites: CH 2503). Three hours lecture. Three hours laboratory. Chemistry and technology of food products processing and physical and chemical methods of analyzing foods and biological products.

FST 4123/6123. Fermented Foods Processing. (3) (Prerequisites: BIO 3304). Two hours lecture. Three hours laboratory. Fundamental concepts of microbial cultures used in various fermented foods, with emphasis on the manufacture of cheese, cultured dairy products and other foods.

FST 4143/6143. Dairy Foods Processing. (3) Two hours lecture. Two hours laboratory. Basic concepts of processing, freezing, and concentrating milk and milk products. Emphasis on fluid milk products, frozen dairy desserts, and dried products.

FST 4153/6153. Food Plant Management. (3) (Prerequisite: Senior standing or consent of instructor). Two hours lecture. One hour laboratory. A study of problems associated with the general management of food processing plants.

FST 4164/6164. Quality Assurance of Food Products. (4) (Prerequisites: BIO 3304). Two hours lecture. Four hours laboratory. Principles, methods, and techniques involved in evaluating essential parameters for commercial, state and federal control of food products.

FST 4173/6173. Food Packaging. (3) (Prerequisite: Consent of instructor). Three hours lecture. Objectives and requirements of packaging; composition, characteristics, chemical and physical properties, selection and adaptation of packaging materials and packages.

FST 4241/6241. Applied Food Chemistry. (1) (Prerequisite: BCH 3613 and prior credit for/or current enrollment in FST 4243/6243). Two hour lab. Basic laboratory experiments to provide understanding of the function and interactions of chemical components in food.

FST 4243/6243. Composition and Chemical Reactions of Foods. (3) Spring semester. (Prerequisites: CH 1053 and CH 2503 or

equivalent). Three hours lecture. Nature and chemical behavior of food constituents including proteins, lipids, carbohydrates, minerals, water, enzymes and pigments; properties of food systems as related to commercial preparation. (Same as ADS 4243/6243).

FST 4314/6314. Meats Processing. (4) Spring semester. Three hours lecture. Two hours laboratory. Survey of the meat industry with emphasis on slaughtering, cutting, curing, cooling, care, storage and manufacturing meats and meat products. (Same as ADS 4314/6314).

FST 4414/6414. Microbiology of Foods. (4) (Prerequisite: BIO 3404). Two hours lecture. Four hours laboratory. Isolation and classification of the microorganisms associated with spoilage of commercial and domestic preserved foods. (Same as BIO 4414/6414).

FST 4513/6513. Poultry Processing. (3) Two hours lecture. Two hours laboratory. Operation and study of modern processing equipment; grading poultry and eggs; killing, dressing, eviscerating, and packaging poultry; studying methods of retail and wholesale marketing. (Same as PO 4513/6513).

FST 4563. Food Products Evaluation. (3) Basic principles and applications in food product measurements, including physical (viscosity, texture), chemical (pH, acidity), microbiological (bacteria, yeast), and sensory methods will be discussed. (This course is designed for certification programs and not for students enrolled in degree programs at MSU).

FST 4573/6573. Food Engineering Fundamentals. (3) (Prerequisites: MA 1713, PH 1123, or consent of instructor.) Three hours lecture. Fundamentals of engineering as applied to food and agricultural products. Emphasis on units and dimensions, thermodynamics, mass and energy balances, fluid flow and heat transfer.

FST 4583/6583. Food Preservation Technology. (3) Two hours lecture. Two hours laboratory. Basics and unit operations on thermal processing, refrigeration/freezing, concentration/dehydration, fermentation, preservatives, baking, low thermal processes, modified atmospheres, wastewater, and shelf-life will be discussed. (Same as PSS 4583/6583).

FST 4593/6593. New Food Product Development. (3) (Prerequisite: Senior Level Standing). Two hours lecture. Two hours laboratory. New product development, original idea through preliminary appraisal, economic and technological feasibility studies, laboratory developments, organoleptical and consumer testing, and revisions to final decision making.

FST 4990/6990. Special Topics in Food Science and Technology. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FST 4613/6613. Seafood Processing. (3) Two hours lecture. Two hours laboratory. A study of basic food science and technology principles directed toward seafood and aquaculture food harvesting, processing, marketing, and regulation.

FST 7000. Directed Individual Study. Hours and credits to be arranged.

FST 8000. Thesis Research/Thesis.

FST 8111-8141. Food Science Seminar. (1) One hour lecture. Preparation and presentation of reports on specially assigned current topics in Food Science.

FST 8113. Advanced Food Microbiology. (3) (Prerequisite: FST/BIO 4414/6614). Three hours lecture. Advanced concepts in food microbiology emphasizing food quality and safety.

FST 8143. Advanced Food Chemistry. (3) (Prerequisites: FST 4243/6243). Three hours lecture. Designed for students to recognize and appreciate the various colloidal phenomena encountered in foods, and to develop a knowledge of techniques employed in their investigation.

FST 8163. Flavor and Food Acceptance. (3) (Prerequisite: CH 2503). Three hours lecture. Sensory responses with emphasis on smell, taste, tact and appearance as related to foods. Techniques of panel and physicochemical methods of testing.

FST 8253. Nutrition and Food Science Research Techniques. (3) Spring semester. One hour lecture. Six hours laboratory. Application of various instruments and techniques for assay of food and biological material. (Same as NTR 8253).

FST 8333. Food Law. (3) (Prerequisite: Consent of Instructor). Two hours lecture. Two hours laboratory. Role of Law, Mandatory and Optional food regulations exercised by State, Federal and International Agencies on Food Quality, Safety, Wholesomeness and Nutrition.

FST 8423. Meat Science. (3) Summer semester. (Prerequisites: CH 4513/6513 or equivalent and BIO 3304 or equivalent). Three hours lec-

ture. Basic study of the value of meat and how this information is applied to the evaluation, processing and preservation of meat, meat products and meat by-products. (Same as ADS 8423)

FST 8572. Advanced Food Technology. (2) (Prerequisites: FST 6583 and/or consent of instructor). Two hours lecture. Introduction and discussion of recent developments in Food Science and Technology including aseptic processing, microwave technology, food irradiation, separation techniques, and modified atmosphere packaging.

FST 8983. Ingredient Technology. (3) Three hours lecture. A specialized study of the major food ingredients including functionality, applications, formulations, and legal considerations for formulated products.

FST 8990. Special Topics in Food Science and Technology. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

FST 9000. Dissertation Research/Dissertation. Hours and credits to be arranged.

GENERAL AGRICULTURE

GA 1111. Survey of Agriculture. (1) One hour lecture. A study of the over-all function, historical beginnings, organization and operation of the agricultural industry in the United States and the world.

GA 2990. Special Topics in General Agriculture. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GENERAL BUSINESS

GB 2990. Special Topics in General Business. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GB 3011. Academic Peer Advising I. (1) (Prerequisites: Junior standing and consent of instructor, for Business majors only). One hour lecture. Study of the role, benefits, objectives, and practice of academic peer advising.

GB 3021. Academic Peer Advising II. (1) (Prerequisites: GB 3011 and consent of Instructor, for Business majors only). One hour lab. Laboratory application of academic peer advising.

GB 3031. Academic Peer Advising III. (1) (Prerequisites: GB 3011, GB 3021, and consent of Instructor, for Business majors only). One hour lab. Laboratory application of academic peer advising.

GB 4853. Business Policy. (3) (Prerequisite: Graduating senior). Three hours lecture. Administrative process under conditions of uncertainty. Emphasis in integrating knowledge acquired in the functional areas of business administration in formulating administrative policies.

GB 4990/6990. Special Topics in General Business. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GB 8990. Special Topics in General Business. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GENERAL ENGINEERING

Office: 250 McCain Engineering Building

Professors Bennett and Taylor

Instructors Barton, Brocato, Curtis and Nelson

GE 2990. Special Topics in General Engineering. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GE 3011. Engineering Entrepreneurship Seminar. (1) Two hours seminar. Current topics in engineering entrepreneurship to enable students to better understand the role of the entrepreneur in creating start-up companies and leading young existing companies.

GE 3513. Technical Writing. (3) (Prerequisites: Completion of English composition requirements; junior standing). Three hours lecture. Instruction and practice in technical writing for scientific and engineering fields, emphasizing analysis and development of correspondence, progress and research reports, instruction, and proposals.

GE 4990/6990. Special Topics in General Engineering. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GE 8990. Special Topics in General Engineering. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GE 9000. Dissertation Research/Dissertation. Hours and credits to be arranged.

Department of GEOSCIENCES

(Courses are listed under GG (Geology) and are found below and GR (Geography) which follows Genetics listing.)

Office: 109 Hilbun Hall

Professors Binkley, Mylroie, Schmitz and Wax; Professors Emeritus Kaye, Laswell, Myers, and Russell;

Associate Professors Dewey and Panuska; Assistant Professors Brown, Cooke, Lynch, Mack and Rodgers;

Instructors Cartwright, Craven, Gilbert, Gillham, Gustin, Haby, Harris, Meloche, Miller, J. Mylroie, Sherman-Morris, Ruffin and Verno

GG 1111. Earth Sciences I Laboratory. (1) Two hours laboratory. Laboratory for GG 1113, but may be scheduled without GG 1113. Includes study of earth materials, maps, and aerial photographs. Planned primarily as a science elective for the non-geology major.

GG 1113. Survey of Earth Sciences I. (3) Three hours lecture. Study of the Earth in space, the materials of which the Earth is composed,

and the processes affecting change on the Earth. Planned primarily as a science elective for the non-geology major.

GG 1121. Earth Sciences II Laboratory. (1) Two hours laboratory. Laboratory for GG 1123, but may be scheduled without GG 1123. Includes the study of fossils, geologic maps, and geologic cross sections. Planned primarily as a science elective for the non-geology major.

GG 1123. Survey of Earth Sciences II. (3) (Prerequisite: GG 1113, or equivalent). Three hours lecture. Origin and development of the Earth through geologic time. Planned primarily as a science elective for the non-geology major.

GG 1133. Planetary Geology. (3) Three hours lecture. Process oriented examination of the planets and their satellites with emphasis on the "Earth-like" planets and moons.

GG 2990. Special Topics in Geology. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GG 3133. Introduction to Environmental Geology. (3) (Prerequisite: GG 1113, 1153, or 1183). Three hours lecture. Consideration of those aspects of earth science concerned with problems arising from intensive use of earth by modern society.

GG 3603. Introduction to Oceanography. (3) (Prerequisite: GG 1113). Three hours lecture. A survey of the basic principles and applications of science to the study of the marine environment.

GG 3613. Water Resources. (3) (Prerequisite: GG 1113 or equivalent or consent of instructor.) Three hours lecture. Introduction to the location, use, recovery and environmental problems of surface and subsurface waters.

GG 4000. Directed Individual Study. (Prerequisite: Junior standing). Hours and credits to be arranged.

GG 4033/6033. Resources and the Environment. (3) (Prerequisite: Consent of instructor). Three hours lecture. Formation and development of natural resources involving the basic evolution, planning, and design of a typical lignite coal mine, including environmental monitoring and reclamation.

GG 4063/6063. Development of Fossil Fuel Resources. (3) (Prerequisite: Consent of instructor). Three hours lecture. Formation, deposition, and extraction of fossil fuel resources. Petroleum and coal will be the main fossil fuels examined.

GG 4113/6113. Micropaleontology. (3) (Prerequisite: GG 4203 or equivalent). Three hours lecture. A study of microscopic fossils. May be taken with GG 4201.

GG 4114/6114. Mineralogy. (4) (Prerequisites: GG 1111 and CH 1223, or equivalents). Three hours lecture. Three hours laboratory. The physical and chemical properties of minerals; crystallography, origin, distribution, association, uses, and identification of minerals.

GG 4123/6123. Petrology. (3) (Prerequisite: GG 4114 or equivalent). Two hours lecture. Three hours laboratory. The origin, occurrence, and classification of the major rock types.

GG 4133/6133. Principles of Paleocology. (3) (Prerequisite: GG 4203 or equivalent or consent of instructor). Three hours lecture. A study of paleocology with special emphasis on marine paleocology. May be taken with GG 4201.

GG 4153/6153. Engineering Geology. (3) (Prerequisite: GG 1113 or equivalent). Two hours lecture. Two hours laboratory. Application of geologic principles to location and construction of engineering structures; engineering properties of geologic materials; engineering application of equipment used by geologists.

GG 4201/6201. Practicum in Paleontology. (1) (Prerequisites: GG 1163 and BIO 1504 or equivalent). One hour lecture. Two hours laboratory. Laboratory for GG 4203, but may instead be taken with GG 4113 or GG 4133. A practicum in morphology of fossils, biostratigraphy, and paleocology.

GG 4203/6203. Principles of Paleobiology. (3) (Prerequisites: GG 1163 and BIO 1504, or equivalents). Three hours lecture. Three hours laboratory. An introductory study of topics in paleobiology. May be taken with GG 4201.

GG 4233/6233. Applied Geophysics. (3) (Prerequisite: Consent of instructor). Three hours lecture. A survey of the basic principles and applications of geophysics with major emphasis on petroleum exploration.

GG 4304/6304. Principles of Sedimentary Deposits I. (4) (Prerequisite: GG 1123 or equivalent). Three hours lecture. Three hours laboratory. Treatment of sediment and sedimentary rock. Emphasis on texture, fluid processes, deposition, structure, and diagenesis; stratigraphic analysis; and application to subsurface flow systems.

GG 4333/6333. Geowriting. (3) Three hours lecture. Weekly library research on controversial topics in geology presented in class as written professional papers.

GG 4403/6403. Gulf Coast Stratigraphy. (3) (Prerequisite: GG 4304 or equivalent). Three hours lecture or field trips. Systematic study of the stratigraphy of the Gulf Coast; actual field experience substituted for class work, when conditions permit.

GG 4413/6413. Structural Geology. (3) (Prerequisites: GG 4123 or consent of instructor). Two hours lecture. Two hours laboratory. Appli-

cation of the principles of mechanics to the forces deforming the rocks of the Earth's crust; emphasis on structures in sedimentary rocks.

GG 4433/6433. Subsurface Methods. (3) (Prerequisite: GG 4443 and GG 4413, or equivalent). One hour lecture. Four hours laboratory. The study of subsurface geologic methods including contouring, sampling study, various types of logging, and the interpretation of subsurface data.

GG 4443/6443. Principles of Sedimentary Deposits II. (3) (Prerequisite: GG 4304). Three hours lecture. Application of principles from GG 4304. Introduces facies associations produced in depositional environments, systems, and systems tracts, tectonics and sedimentation, basin classification, and sequence analysis.

GG 4503/6503. Geomorphology. (3) (Prerequisite: Consent of instructor). Three hours lecture. The origin and characteristics of land forms based on a consideration of geologic processes, stages of development, and geological structure.

GG 4523/6523. Coastal Environments. (3) (Prerequisite: GG 1113 or consent of instructor). Three hours lecture. An introduction to world coastal environments, with emphasis upon major shoreline-shaping processes, geographical variation in coastal landforms, human impacts, and environmental concerns.

GG 4613/6613. Physical Hydrogeology. (3) (Prerequisite: GG 3613 or consent of instructor). Three hours lecture. Advanced study of the interrelationship of ground water and its geologic environment with emphasis on occurrence, distribution, and movement.

GG 4623/6623. Chemical Hydrogeology. (3) (Prerequisite: CE 3523, CE 8563, or GG 4613/6613 or consent of instructor). Three hours lecture. Advanced study of groundwater and its environment with emphasis on the chemical interaction of water with porous solids and the transport of chemical constituents.

GG 4990/6990. Special Topics in Geology. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GG 7000. Directed Individual Study. Hours and credits to be arranged.

GG 8000. Thesis Research/Thesis. Hours and credits to be arranged.

GG 8113. Geology I: Processes and Products. (3) (Prerequisite: Consent of instructor). Three hours video and online. Principles of physical geology with emphasis on earth materials and processes, rock and mineral identification, and landscape development. Primarily for K-12 science teachers.

GG 8123. Geology II: Earth, Time and Life. (3) (Prerequisite: GG 8113 or consent of instructor.) Three hours video and online. Principles of historical geology with emphasis on geological time, earth history, fossils, evolution, and extinction. Primarily for K-12 science teachers.

GG 8164. Earth Sciences I. (4) (Prerequisite: Consent of the Head of Department). Three hours lecture. Two hours laboratory and field work. Comprehensive study of physical aspects of earth sciences, including geology, geophysics, oceanography, and atmospheric and space sciences. Planned primarily for teachers of science.

GG 8203. Ocean Science. (3) (Prerequisite: GG 8113 or consent of instructor). Three hours video and online. Comprehensive examination of the ocean world, focusing on the topography, physics, chemistry, and circulation of the oceans. Primarily for K-12 science teachers.

GG 8223. Advanced Paleontology. (3) (Prerequisite: GG 4203 or equivalent). Two hours lecture. Two hours laboratory and field trips. Deals with topics in advanced paleontology.

GG 8233. Environmental Geoscience. (3) (Prerequisite: GG 8113 or consent of instructor). Three hours video and online. Study of current environmental problems associated with the earth science realms: atmosphere, biosphere, hydrosphere, and lithosphere. Primarily for K-12 science teachers.

GG 8333. Planetary Science. (3) (Prerequisite: GG 8113 or consent of instructor). Three hours video and online. Examination of mineral matter and geological processes of the moon, the planets, asteroids, comets and meteorites. Primarily for K-12 science teachers.

GG 8413. Paleomagnetism. (3) (Prerequisite: Consent of instructor). Three hours lecture. In depth examination of the geomagnetic field and magnetization of rocks and minerals with emphasis on practical application to geologic problems.

GG 8443. Advanced Structural Geology. (3) (Prerequisite: Major in geology including GG 4413 or equivalent). Three hours lecture. A study of major tectonic units and the forces involved in their formation.

GG 8561. Geoscience Seminar. (1) (Prerequisite: Graduate standing). Review of current geoscience literature; preparation and presentation of formal papers.

GG 8572. Geologic Literature. (2) (Prerequisite: Major in geology). A reading course with emphasis on library research.

GG 8613. Hydrology. (3) (Prerequisite: GG 8113 or consent of instructor). Three hours video and online. Investigation of the occurrence, distribution, movement, and chemistry of earth's waters. Emphasis on geological controls of surface and groundwater. Primarily for K-12 science teachers.

GG 8713. Regional Geology of Eastern North America. (3) (Prerequisite: Major in geology). Three hours lecture. A study of physiography, structure, and stratigraphy of eastern North America.

GG 8723. Regional Geology of Western North America. (3) (Prerequisite: Major in geology). Three hours lecture. A study of physiography, structure, and stratigraphy of western North America.

GG 8990. Special Topics in Geology. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GENETICS

(For the interdisciplinary graduate programs in Genetics, consult College of Agriculture and Life Sciences section of this catalog and the *Graduate Bulletin*.)

GNS 2990. Special Topics in Genetics. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GNS 3103. Genetics I. (3) (Prerequisites: MA 1313 and BIO 1504 or BIO 1203). (Same as PO 3103 and BIO 3103).

GNS 4133/6133. Human Genetics. (3) (Prerequisite: BIO 1504 or consent of instructor). Three hours lecture. Principles of Mendelian and molecular genetics as applied to humans. Description and causes of human genetic diseases and other anomalies. (Same as BIO 4133/6166).

GNS 4804/6804. Molecular Biology Methods. (4) (Prerequisite: Coregistration in BCH 4613/6613). Two hours lecture. Four hours laboratory. A comprehensive course to teach the student the modern methods of biochemistry including molecular biology. (Same as BCH 4804/6804).

GNS 4990/6990. Special Topics in Genetics. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GNS 6123. Animal Breeding. (3) Fall semester. (Prerequisite: PO 3103). Three hours lecture. The basis for genetic improvement of livestock, including the study of variation, heritable characteristics, mating systems and methods of estimating breeding values. (Same as ADS 4123/6123.)

GNS 6713. Molecular Biology. (3) (Prerequisite: Coregistration in BCH 4613/6613). Three hours lecture. A study of basic molecular process such as synthesis of DNA, RNA, and protein in both prokaryotic and eukaryotic cells. Offered fall semester. (Same as BCH 4713/6713).

GNS 7000. Directed Individual Study. Hours and credits to be arranged.

GNS 8000. Thesis Research/Thesis. Hours and credits to be arranged.

GNS 8143. Biometrical Genetics in Plant Breeding. (3) (Same as PSS 8543).

GNS 8453. Statistical Genetics. (3) (Same as ADS 8453).

GNS 8643. Molecular Genetics. (3) (Prerequisites: PO 3103 or BIO 3103 and Coregistration in BCH 4613/6613). Three hours lecture. Study of the gene and its expression with emphasis on structure and function in higher organisms. (Same as BCH 8643 and PHY 8643).

GNS 8990. Special Topics in Genetics. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GEOGRAPHY

(For departmental information, see GEOSCIENCES, GG.)

GR 1114. Elements of Physical Geography. (4) Three hours lecture. Two hours laboratory. Systematic study of the elements of the environmental process that form and characterize the earth's natural landscapes. May be taken as a science elective.

GR 1123. Introduction to World Geography. (3) Three hours lecture. A survey of the world's regions, with emphasis upon locational aspects, physical and cultural diversity, and environmental issues.

GR 1603. Introduction to Meteorology. (3) (Prerequisite: GR 1114, GR 1123, or equivalent). Three hours lecture. Descriptive study of weather with the objective of gaining appreciation of the variety of atmospheric phenomena. Explanation of daily weather events, their causes and impacts.

GR 2013. Cultural Geography. (3) Three hours lecture. Study of human occupation of the Earth, treating geographic aspects of population, settlement, origin and diffusion of cultural traits, resource utilizing systems, and political factors.

GR 2313. Maps and Remote Sensing. (3) Two hours lecture. Two hours laboratory. Fundamental principles of cartography and remote sensing, including types and applications. Attention is given to interpretation of surface features, environmental problem solving, and environmental planning.

GR 2990. Special Topics in Geosciences. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GR 3113. Conservation of Natural Resources. (3) Three hours lecture. Consideration of the current problems associated with the conservation of soils, forests, waters, minerals, and wild life in the United States and the world.

GR 4000. Directed Individual Study. Hours and credits to be arranged.

GR 4103/6103. Geography of Tourism. (3) (Prerequisites: GR 1123 or equivalent). Three hours lecture. Study of the spatial aspects of recreation and tourism, with emphasis upon social, economic, and environmental impacts.

GR 4123/6123. Urban Geography. (3) Three hours lecture. Historic trends in distribution and growth of urban settlements, urban loca-

tion theory; economic bases, functions, and structure of cities and metropolitan areas; urban problems; planning.

GR 4203/6203. Geography of North America. (3) Three hours lecture. A regional survey of the United States and Canada with emphasis upon place names, physical landscapes, historical settlement patterns, cultural regions, and environmental issues.

GR 4213/6213. Geography of Latin America. (3) Three hours lecture. A regional survey of Latin America with emphasis upon place names, physical environments, cultural landscapes and their evolution, and environmental issues.

GR 4223/6223. Geography of Europe. (3) Three hours lecture. A regional survey of Europe with emphasis upon placements, physical environments, cultural landscapes, geopolitical evolution, end environmental issues.

GR 4233/6233. Geography of Asia. (3) Three hours lecture. A regional survey of Asia with emphasis upon placenames, physical geography, cultural diversity and cultural landscapes, geopolitical conflicts, and environmental issues.

GR 4243/6243. Geography of Russia and the Former Soviet Republics. (3) Three hours lecture. A regional survey of the former Soviet Union republics with emphasis upon placenames, physical environments, ethnic diversity, geopolitical evolution, and environmental issues.

GR 4253/6253. Geography of Africa. (3) Three hours lecture. A regional survey of the African continent with emphasis upon placenames, physical geography, cultural diversity and cultural landscapes, geopolitical changes, and environmental issues.

GR 4263/6263. Geography of the South. (3) Three hours lecture. A regional survey of the South with emphasis upon physical and cultural landscapes, settlement patterns, ethnic diversity, tourism development, and environmental issues.

GR 4401/6401. Weather Analysis I. (1) (Prerequisite: GR 1603 or equivalent). One hour lecture. Two hours laboratory. Introduction to real-time weather information such as Difax charts, satellite and radar imagery, and text data. Emphasis placed on Newscasting.

GR 4411/6411. Weather Analysis II. (1) (Prerequisite: GR 4401/6401). One hour lecture. Two hours laboratory. Continuation of

Weather Forecasting I. Advanced analysis of current weather data in Nowcasting.

GR 4421/6421. Weather Forecasting I. (1) (Prerequisite: GR 4411/6411). Two hours laboratory. Introduction to the process of creating and disseminating weather forecasts. Use of current weather data in creating daily forecasts for the local area.

GR 4431/6431. Weather Forecasting II. (1) (Prerequisite: GR 4421/6421). One hour lecture. One hour laboratory. Continuation of Weather Forecasting I. Emphasis placed on disseminating both oral and written forecasts for the local area.

GR 4443. Weather Prediction I. (3) (Prerequisite: GR 1603 or consent of instructor). Three hours video and online. Examination of the complexity of weather forecasting. Emphasis on numerical weather prediction, computer models, and mesoscale analysis.

GR 4453. Weather Prediction II. (3) (Prerequisite: GR 4443 or consent of instructor). Three hours video and online. Continuation of GR 4443. Case studies of weather events are used to develop independent weather forecasts. Emphasis on special weather events.

GR 4503/6503. Practicum in Broadcast Meteorology I. (3) (Prerequisite: GR 1603 or equivalent). Two hours lecture. Two hours laboratory. Introduction to television weather broadcasts with emphasis on creating accurate forecasts and on the techniques or communicating weather information to the public.

GR 4513/6513. Practicum in Broadcast Meteorology II. (3) (Prerequisite: GR 4503/6503). Two hours lecture. Two hours laboratory. Continuation of Practicum in Broadcast Meteorology I. Emphasis is placed on understanding the television studio as related to weathercasting.

GR 4523/6523. Practicum in Broadcast Meteorology III. (3) (Prerequisite: GR 4513/6513). Two hours lecture. Two hours laboratory. Continuation of Practicum in Broadcast Meteorology II. Emphasis placed on producing weather graphics for weather broadcasts.

GR 4533/6533. Practicum in Broadcast Meteorology IV. (3) (Prerequisite: GR 4523/6523). Two hours lecture. Two hours laboratory. Continuation of Practicum in Broadcast Meteorology III. Emphasis placed on studio performance of weathercasts.

GR 4603/6603. Climatology. (3) (Prerequisite: GR 1114 or GR 1123, or equivalent). Three hours lecture. Study of the elements and controls of weather and climate, distribution and characteristics of climatic regions.

GR 4613/6613. Applied Climatology. (3) (Prerequisites: GR 4633 or equivalent.) Two hours lecture. Two hours laboratory. Problem solving in today's world in topics such as bioclimatology, agricultural climatology and land use climatology.

GR 4633/6633. Statistical Climatology. (3) (Prerequisites: GR 4603/6603 or equivalent.) Two hours lecture. Two hours laboratory. A survey of the types of statistical weather data available. Manipulation of the data on various temporal and spatial scales.

GR 4640/6640. Meteorological Internship. (1-6) (Prerequisite: Consent of instructor). Hours and credits to be arranged. Internship with television station, private company or government agency under supervision of instructor.

GR 4653/6653. Satellite and Radar Meteorology. (3) (Prerequisite: GR 4603/6603). Three hours lecture. Study of the history, the operations, and the applications of satellites and radar in weather analysis. Theory of meteorological measurements in determinations of atmospheric structure.

GR 4663. Satellite Meteorology. (3) (Prerequisite: GR 4603 or consent of instructor). Three hours video and online. Study of the history, operations, and applications of satellites in weather analysis. Theory of meteorological measurements in determinations of atmosphere structure.

GR 4673. Radar Meteorology. (3) (Prerequisite: GR 4603 or consent of instructor). Three hours video and online. Detailed analysis of the use of Doppler radar in weather operations. Emphasis on Doppler velocity measurements, clear-air return, and severe storm identification and warning.

GR 4703/6703. Severe Weather. (3) (Prerequisites: GR 1603 or equivalent.) Three hours lecture. Descriptive study of severe and unusual weather across the earth. Explanation of variations in severe weather in both spatial and temporal scales.

GR 4713/6713. Synoptic Meteorology I. (3) (Prerequisites: GR 4603/6603 or equivalent.) Two hours lecture. Two hours laboratory. Fundamental principles behind weather forecasting. Physical processes in the atmosphere, atmospheric circulation systems, air mass analysis, frontogenesis and frontolysis.

GR 4743/6743. Synoptic Meteorology II. (3) (Prerequisite: GR 4713/6713). Two hours lecture. Two hours laboratory. Advanced analysis and detailed case studies of meteorological phenomena related to weather forecasting problems. Short and long-range forecasting techniques are presented.

GR 4813/6813. Natural Hazards and Processes. (3) (Prerequisites: GR 1114 or equivalent.) Three hours lecture. A survey of natural phenomena in geology, oceanography and astronomy as applied to meteorology. Detailed study of earthquakes, volcanoes, ocean movements, and solar activity.

GR 4913/6913. Thermodynamic Meteorology. (3) (Prerequisite: GR 1603 or equivalent). Three hours lecture. Examination of the meteorological stability within the earth's atmosphere. Focus on analysis of the various stability indices related to predicting severe weather.

GR 4990/6990. Special Topics in Geosciences. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

GR 7000. Directed Individual Study. Hours and credits to be arranged.

GR 8000. Thesis Research/Thesis. Hours and credits to be arranged.

GR 8113. Meteorology I: Observations. (3) (Prerequisite: Consent of instructor). Three hours video and online. Principles of meteorology with emphasis on elements, controls, and forecasting of atmospheric phenomena. Concentration on daily weather observations and the movement of weather systems. Primarily for K-12 science teachers.

GR 8123. Meteorology II: Forecasting and Storms. (3) (Prerequisite: GR 8113 or consent of instructor). Three hours video and online. Continuation of Meteorology I. Emphasis on the forecasting of daily weather events and on severe weather. Primarily for K-12 science teachers.

GR 8313. Advanced Cultural Geography. (3) (Prerequisite: Consent of instructor). Three hours lecture. Study and analysis of population distribution, densities, and movements; rural and urban settlement patterns and features; principles of cultural geography.

GR 8323. Geography for Teachers. (3) (Prerequisite: GR 1123 or equivalent). Three hours lecture. Systematic overview of geography designed for in-service teachers. Organized around the National Geography Standards, class lectures are augmented by lessons presented by K-12 teachers.

GR 8400. Field Methods in Geosciences. (1-3) (Prerequisite: Consent of Instructor). Hours and credits to be arranged. May be taken twice. Provides field experience in the geosciences through planned and supervised outdoor projects and field trips.

GR 8542. Geographic Literature. (2) (Prerequisite: Major or minor in geography). A reading course with emphasis on library research.

GR 8553. Research Methods in Geoscience. (3) (Prerequisite: Consent of instructor). Three hours seminar and forum. Defining research problems, formulating hypotheses, collecting data, using analytical techniques, substantiating conclusions for geoscience topics; written and oral presentations of research projects required.

GR 8990. Special Topics in Geosciences. (1-9) Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

HIGHER EDUCATION

Advisor: Assistant Professor Callais
(For departmental information, see COUNSELOR EDUCATION.)

HED 7000. Directed Individual Study. Hours and credits to be arranged.

HED 8113. Administration of Student Personnel Services in Higher Education. (3) Three hours lecture. One hour laboratory. A study of the organization and administration of student personnel services with emphasis on health services, placement, financial aid and student housing.

HED 8123. University and Community College Governance. (3) Three hours lecture. A comprehensive survey of the field of administration of the community college and the university.

HED 8133. University and Community College Instruction. (3) Three hours lecture. A study of teaching methods and techniques, development of course content and instructional aids, and evaluation of student performance in the university and community college.