DIVISION of TECHNOLOGY

MERIDIAN CAMPUS ONLY

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

DTF 4613. Implementation of Technology. (3) (Prerequisite: Consent of instructor prior to internship). Three hours lecture. Theoretical and applied methods, techniques and analysis of field based technology research. Emphasis on the various research designs and preparation of project proposal.

DTF 4923. Technology Career Seminar. (3) (Prerequisite: DTF 4613). Three hours lecture. Critical evaluation of current issues in technology, examination of career opportunities and approved project completion status.

DTF 4936. Technology Field Practicum I. (6) (Co-requisite: DTF 4926). The course provides students opportunities to apply contemporary practices by completing a minimum of 340 supervised hours in an approved industry.

DTF 4946. Technology Field Practicum II. (6) (Prerequisite: DTF 4936 or concurrent enrollment in DTF 4936). The course provides students opportunities to apply contemporary practices by completing a minimum of 340 supervised hours in an approved industry.

DTF 4990. Special Topics in DTF. (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.)

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

DTM 4213. Manufacturing Regulatory Agencies. (3) Three hours lecture. An introduction to the effects that regulatory agencies, both public and private, have on contemporary manufacturing operations.

DTM 4313. Transportation and Packaging. (3) Three hours lecture. A study of internal and external product transportation for a manufacturing facility. Emphasis on the reduction of time and cost to include protective packaging.

DTM 4413. Facilities Operations. (3) Three hours lecture. An introduction to the many facets of manufacturing facility operations. Emphasis on key areas such as maintenance, employee services, and public utility optimization.

DTM 4553. Production Standards & Measurement. (3) Three hours lecture. A study to focus upon the application of theoretical and contemporary methods of manufacturing production standards and appropriate measurement techniques.

DTM 4990. Special Topics in DTM. (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 FINANCE and ECONOMICS

Office: 312 McCool Hall

Professors C. Campbell, Duett, Grimes, and Liano;
Associate Professors Blair, R. Campbell, Kelly, Millea, Rezek, and Rogers;
Assistant Professors Highfield, Nagel, and Thomas;
Instructors He, Luccasen, Metz and Smith

EC 1033. Economics of Social Issues. (3) Three hours lecture. Basic economic principles introduced and developed through the study of important social issues such as unemployment, health care, poverty, crime, pollution, inflation, and government debt. (Not open to students with prior credit in Principles of Economics).

EC 2113. Principles of Macroeconomics. (3) (Prerequisite: Sophomore standing.) Three hours lecture. Introduction to macroeconomics: free enterprise principles, policies, institutions; national income, employment, output, inflation, money, credit, business cycles, and government finances.

EC 2123. Principles of Microeconomics. (3) (Prerequisite: EC 2113 and Sophomore standing.) Three hours lecture. Introduction to microeconomics: emphasizes American industrial structure, demand and supply, pricing and output, income distribution, factor pricing, international trade.

EC 2990. Special Topics in Economics. (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).

EC 3113. Intermediate Macroeconomics. (3) (Prerequisites: EC 2113 and EC 2123). Measurement and determination of national income, employment, and output; economic significance of consumption, saving, investment, foreign trade, money and prices, fiscal and monetary policy.

EC 3123. Intermediate Microeconomics. (3) (Prerequisites: EC 2113 and EC 2123). Theory and application of microeconomics; demand, supply, optimal consumer choice, production, cost, profit-maximizing pricing and output decisions, employment of resources, externalities, efficiency and welfare.

EC 3213. Labor Economics. (3) (Prerequisites: EC 2113 and EC 2123.) Three hours lecture. Labor market behavior of households and firms. Emphasizes wage determination, optimal employment decisions, income distribution, unionization, human capital, and discrimination.

EC 3223. Introduction to Industrial Organization. (3) (Prerequisites: EC 2113 and EC 2123). Three hours lecture. Structure and performance of large corporations, economic effects of antitrust, governmental policy toward competitive practices, regulation of monopoly and natural resources.

EC 3333. Managerial Economics. (3) (Prerequisites: EC 2113 and EC 2123). Three hours lecture. The application and use of economic models in analyzing and solving selected problems of the firm such as product pricing, product mix, demand forecasting, market analysis.

EC 3423. Government and Business. (3) (Prerequisites: EC 2113 and EC 2123). Three hours lecture. Examination of the evolution and composition of the economic relationship between government and business in the U.S.; including the regulation of public utilities and antitrust.

EC 3513. Economic Systems of the World. (3) (Prerequisites: EC 2113 and EC 2123 or consent of instructor). Three hours lecture. Comparative analysis of economic systems ranging from capitalism to market socialism. Includes emerging market systems of Central and Eastern Europe, Asia, and Latin America.

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

EC 4183/6183. U.S. Economic History. (3) (Prerequisite: Completion of any 1000-level history course). Three hours lecture. An intensive study of economic change in the United States and its impact on political and social development. (Same as HI 4183/6183).

EC 4213/6213. Personnel Economics. (3) (Prerequisites: EC 2113 and EC 2123). Three hours lecture. Economic analysis of human resource issues within business organizations. Theoretical examination of hiring standards, productivity, compensation schemes, training, teamwork, incentives, benefits, worker empowerment, and evaluation

EC 4223/6223. Labor Law and Employment Policy. (3) (Prerequisites: Three hours credit of economics or consent of instructor). Three hours lecture. Examination of the legal and regulatory environment of the employment relationship in today's American economy; including, unionization, equal employment opportunity, occupational health and safety.

EC 4303/6303. Theory of Economic Development. (3) (Prerequisites: EC 2113 and EC 2123). Analysis of problems involving developing economies as they relate to the world economy: population, trade, agriculture, industry, and technology. Policies for promoting economic growth.

EC 4313/6313. Introduction to Regional Economic Development. (3) (Prerequisites: EC 2113 and EC 2123 or consent of instructor). Three hours lecture. Regional economic differences; location theory (industrial, agricultural, and residential); Land use patterns; Regional structure, growth, and methods of analysis; National assistance for regional economic development.

EC 4323/6323. International Economic Relations. (3) (Prerequisites: EC 2113 and EC 2123). Three hours lecture. The nature of international trade. International economic theory. Current problems affecting international economic relations.

EC 4333/6333. Applied Regional Economic Development. (3) (Prerequisite: EC 4313/6313). Three hours lecture. Economic analysis and effects of regional resources and development potentials, economic factors affecting industrial location decisions, planning and organization of industrial development.

EC 4423/6423. Introduction to Public Finance. (3) (Prerequisites: EC 2113 and EC 2123). Three hours lecture. Economics of the public sector. Analysis of

government on distribution, allocation, and stabilization functions. Emphasis on public goods, externalities, social insurance, public choice, and taxation.

EC 4433/6433. Problems in State and Local Finance. (3) (Prerequisites: EC 2113 and EC 2123). Three hours lecture. Fiscal importance and economic effects of state and local budgets; trends in taxation, expenditures, fiscal administration, and budgeting fiscal economic development.

EC 4523/6523. History of Economic Thought. (3) (Prerequisites: EC 2113 or consent of instructor). Three hours lecture. Survey of economic ideas from Ancient Greece to present, emphasizing the changing foci and methodologies of economics relative to economic problems perceived at the time.

EC 4643/6643. Economic Forecasting and Analysis. (3) (Prerequisites: EC 2113, EC 2123 and BQA 2113 (or equivalent) or consent of instructor.) Three hours lecture. Forecasting tools and econometric estimation techniques utilizing regression, exponential smoothing, decomposition, frontier analysis, etc. Real-world data, business applications, and model building are emphasized.

EC 4990/6990. Special Topics in Economics. (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).

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

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

EC 8043. Survey of Economics. (3) (Prerequisite: Graduate standing). Three hours lecture. Introduction to macro and microeconomics, national income accounts, monetary system, macroeconomic policy, international trade, supply and demand, distribution of income, markets, pricing, and output.

EC 8103. Economics for Managers. (3) (Prerequisites: EC 2113 and EC 2123, or EC 8043). Three hours lecture. Primarily for masters-level candidates. Exposition of the fundamental theoretical and analytical tools of economics used by business managers engaged in decision making.

EC 8113. Labor Theory and Analysis. (3) (Prerequisites: Graduate Standing). Three hours lecture. Theoretical and empirical examination of labor market processes and policy; Wage determination, resource allocation, labor mobility, human capital investment, discrimination and income distribution.

EC 8133. Econometrics I. (3) (Prerequisites: AEC 8413 or consent of instructor). Econometric theory and methods. Topics include the classical linear regression model, maximum likelihood estimation, generalized least squares, and estimation with panel data.

EC 8143. Econometrics II. (3) (Prerequisite: EC 8133). A continuation of EC 8133. Topics include advanced theories of simultaneous equations estimation methods, time series econometrics, and estimation with qualitative and limited dependent variables.

EC 8163. Microeconomics I. (3) (Prerequisite: EC 3123 or EC 8103 or equivalent). Three hours lecture. Survey of demand analysis, production, cost, and supply relationships, analysis of pricing under competitive and noncompetitive conditions, analysis of income distribution with emphasis on input pricing.

EC 8173. Macroeconomics I. (3) (Prerequisites: EC 3113, EC 3123, and one semester of calculus, or consent of instructor). Three hours lecture. Synthesis of short and long run analysis of the macroeconomy with special emphasis on the role of fiscal and monetary policy.

EC 8263. Microeconomics II. (3) (Prerequisite: EC 8163). Three hours lecture. An exposition of general equilibrium theory, the theory of welfare economics and the economics of information.

EC 8273. Macroeconomics II. (3) (Prerequisites: EC 8173 or equivalent). Three hours lecture. Examination of the modern macroeconomic synthesis. Studies in dynamic economic growth, rational expectations, monetarism, disequilibrium analysis, and open market economies.

EC 8313. Regional Economic Analysis. (3) (Prerequisite: EC 4313/6313 and EC 8133 or equivalent or consent of instructor). Three hours lecture. Theories and tools. Includes economic base, recursive and simultaneous equation econometric models, input-output analysis, and mixed models.

EC 8323. Economic Analysis of Developing Nations. (3) (Prerequisites: 9 hours in economics, including EC 6303 or consent of instructor). Three hours lecture. In-depth analysis of economic issues of developing nations and emerging markets; emphasis on public policies to promote economic growth and transition.

EC 8423. Public Finance. (3) (Prerequisites: EC 2113, EC 2123 and graduate standing). Three hours lecture. Economics of public sector in capitalist system. Emphasizes government budget influences on distribution, resource allocation, stability, growth; stresses taxation, expenditure, budgeting, public choice and debt management.

EC 8522. Seminar in the History of Economic Thought. (2) (Prerequisite: Graduate standing or consent of the instructor). The evolution of economic ideas from Ancient Greece to present. Emphasis is placed on the role of heterodoxy and the rise of new paradigms.

EC 8643. Applied Economic Skills: Advanced Estimation and Diagnostics of Econometric Models. (3) (Prerequisites: EC 8133 and EC 8143 or consent of the instructor). Advanced econometric tools, diagnostics, and estimation techniques with an emphasis on applied economic model building. Application of econometric theory to real-world problems and issues.

EC 8990. Special Topics in Economics. (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).

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

Department of ELECTRICAL and COMPUTER ENGINEERING

Office: 216 Simrall Electrical Engineering Building

Professors Younan (Interim Head), L. Bruce, Donohoe, Fowler,
Grzybowski, King, Mazzola, Molen, Moorhead, Picone, Rajala, Schulz
and Winton; Associate Professors J. Bruce, Du, Koshka, Reese and
Topsakal; Assistant Professors Abdelwahed, Follett, Ginn, Jones and Morris

ECE 1002. Introduction to Electrical & Computer Engineering. (2) (Prerequisite: Credit or registration in MA 1713). One hour lecture. Three hours lecture. Three hours laboratory. What is means to be an engineer, engineering ethics, engineering modeling, the design process, areas of ECE, communication skills, ECE computer account, MATLAB, the Internet.

ECE 2990. Special Topics in Electrical or Computer 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 in two academic years).

ECE 3183. Electrical Engineering Systems. (3) (For non-Electrical Engineering majors). (Prerequisite: MA 2743). Three hours lecture. Definitions and laws relating to electrical quantities; circuit element descriptions; development of techniques in network analysis; semiconductor devices; integration of devices into digital networks.

ECE 3281. Electronics Laboratory. (1) (For non-Electrical Engineering majors). (Prerequisite: Credit or registration in ECE 3283). Laboratory procedures in electronic circuits and measurements.

ECE 3283. Electronics. (3) (For non-Electrical Engineering majors). (Prerequisites: Grade of C or better in either ECE 3413 or ECE 3183). Three hours lecture. Fundamentals of active devices, linear amplifiers, digital logic, digital devices, and microprocessors.

ECE 3313. Electromagnetics I. (3) (Prerequisite: MA 3253 and PH 2223). Three hours lecture. Introduction to engineering electromagnetics with applications. Vector analysis, static and time-varying electromagnetic fields, wave propagation, and transmission lines.

ECE 3323. Electromagnetics II. (3) (Prerequisite: Grade of C or better in ECE 3313). Three hours lecture. Waveguides and cavity resonators, fiber optics, antennas, electromagnetic compatibility, analytical and numerical solution techniques in electromagnetics.

ECE 3413. Introduction to Electronic Circuits. (3) (Prerequisites: Credit or registration in ECE 1002, MA 3113, and PH 2223). Three hours lecture. Fundamentals of electric circuits and network analysis. Transient analysis and frequency response of networks. Introduction to operational amplifiers. AC power.

ECE 3414. Fundamentals of Energy Systems. (4) (Prerequisite: Grade of C or better in both ECE 3413 and 3313). Three hours lecture. Three hours laboratory. Synchronous generators; power transmission lines and cables; power transformers; induction and direct current motors; power electronic and programmable controllers; National Electric Code and electrical safety.

ECE 3424. Intermediate Electronic Circuits. (4) (Prerequisites: Grade of C or better in ECE 3413 and credit or registration in MA 3253). Three hours lecture. Three hours laboratory. Operation circuit models and application of diodes and field-effect and bipolar junction transistors. Electronic instrumentation. Foundations of electrical communications systems.

ECE 3434. Advanced Electronic Circuits. (4) (Prerequisites: Grade of C or better in ECE 3424). Three hours lecture. Three hours laboratory. Feedback and stability. Operational-amplifier and data-converter circuits. Introduction to CMOS logic circuits. Filters and tuned amplifiers. Signal generator circuits. Power amplifiers.

ECE 3443. Signals and Systems. (3) (Prerequisite: Grade of C or better in ECE 3424). Three hours lecture. Modeling of analog and discrete-time signals and systems, time domain analysis. Fourier series, continuous and discrete-time Fourier transforms and applications, sampling, z-transform, state variables.

ECE 3714. Digital Devices and Logic Design. (4) (Prerequisite: Credit or registration in CSE 1213, CSE 1233, or CSE 1284). Three hours lecture. Three hours laboratory. Binary codes, Boolean, algebra, combinational logic design, flip-flops, counters, synchronous sequential logic, programmable logic devices, MSI logic devices, adder circuits.

ECE 3724. Microprocessors. (4) (Prerequisites: Grade of C or better in both CSE 1384 and ECE 3714). Three hours lecture. Three hours laboratory. Architecture of microprocessor-based systems. Study of microprocessor operation, assembly language, arithmetic operations, and interfacing.

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

ECE 4193/6193. Automotive Engineering. (3) Three hours lecture. Fundamentals of automotive engineering, including power units, mechanical systems, electrical systems, and industrial and systems engineering aspects. (Same as CHE 4193/6193, ME 4193/6193 and IE 4193/6193).

ECE 4243/6243. Introduction to Physical Electronics. (3) (Prerequisite: Grade of C or better in ECE 3424). Three hours lecture. Introduction to quantum mechanics and solid state physics. Physical principles of pn junctions, bipolar transistors, field effect transistors. Applications include electro-optics, integrated circuits, gaseous electronics.

ECE 4263/6263. Principles of VLSI Design. (3) (Prerequisites: Grade of C or better in both ECE 3724 and ECE 4243). Two hours lecture. Three hours laboratory. Classic and dynamic CMOS circuit design using state-of-the-art CAD tools, with emphasis on digital system cells and architecture.

ECE 4273/6273. Microelectronics Device Design. (3) (Prerequisite: Grade of C or better in ECE 3424). Three hours lecture. Theory of semiconductors in equilibrium and non-equilibrium, advanced theory of p-n junctions, bipolar junction transistor and advanced theory and operation of field dependent devices.

ECE 4283/6283. Microelectronics Process Design. (3) (Prerequisite: Grade of C or better in ECE 3424). Three hours lecture. Introduction to device fabrication technologies, semiconductor parameter measurement techniques, and the principles of design relative to the LSI technologies.

ECE 4313/6313. Antennas. (3) (Prerequisite: Grade of C or better in ECE 3323 or consent of instructor). Three hours lecture. Introduction to antennas and electromagnetic radiation, antenna design and analysis, antenna performance measures, antenna types, antenna arrays.

ECE 4323/6323. Electromagnetic Compatibility. (3) (Prerequisite: Grade of C or better in ECE 3323 or consent of instructor). Three hours lecture. Introduction to EMC, EMC standards, EMC measurements, emissions and susceptibility, non-ideal behavior of components, signal spectra, crosstalk and shielding.

ECE 4333/6333. RF and Microwave Engineering. (3) (Prerequisite: Grade of C or better in ECE 3323 or consent of instructor). Three hours lecture. Introduction to RF and microwave engineering, unguided and guided wave types, transmission lines, waveguides, microwave networks, impedance matching techniques, and microwave components.

ECE 4411/6411. Remote Sensing Seminar. (1) (Prerequisite: Junior Standing).One hour Lecture. Lectures by remote sensing experts from industry, academia, and governmental agencies on next-generation systems, applications, and economic and societal impact of remote sensing. May be repeated for credit up to four credits. (Same as PSS 4411/6411, FO 4411/6411, GR 4411/6411)

ECE 4413/6413. Digital Signal Processing. (3) (Prerequisite: Grade of C or better in ECE 3443). Three hours lecture. Discrete-time signals, Z-Transform, Discrete Fourier Transform, digital filter design including IIR, FIR and FFT synthesis.

ECE 4423/6423. Introduction to Remote Sensing Technologies. (3) (Prerequisite: Senior or graduate standing, or consent of instructor). Three hours lecture. Electromagnetic interactions, passive sensors, multispectral and hyperspectral optical sensors, active sensors, imaging radar, SAR, Lidar, digital image processing, natural resource applications. (Same as PSS 4483/6483 and ABE 4483/6483).

ECE 4512. EE Design I. (2) (Prerequisite: Grade of C or better in each of ECE 3443, ECE 3243, ECE 3724/CSE 3124, and ECE 3732; and a grade of C or better in one of either ECE 3324, ECE 3254 or ECE 3414; co-registration in GE 3513; and consent of instructor). One hour lecture. Three hours laboratory. Lectures on design, teaming, entrepreneurship, project management, professional development, and ethics. Students must select mentor, perform project design, document and present orally.

ECE 4522. EE Design II. (2) (Prerequisite: Grade of C or better in ECE 4512). One hour lecture. Three hours laboratory. Prototyping, documentation, and oral presentation of an engineering design project. Lectures on legal aspects and industry standards relating to design, professional ethics, career design skills.

ECE 4532. CPE Design I. (2) Prerequisite: CSE 3324, grade of C or better in ECE 4743, co-registration in GE 3513 and consent of instructor). One hour lecture. Three hours laboratory. Lectures on teaming, project management, engineering standards, economics, and ethical and professional issues. Student must select faculty mentor, perform project design, and present orally.

ECE 4542. CPE Design II. (2) Prerequisite: Grade of C or better in ECE 4532). One hour lecture. Three hours laboratory. Development of design, teaming, presentation, and entrepreneurial skills. Teams must complete their project designs, and present written and oral results.

ECE 4613/6613. Power Transmission Systems. (3) (Prerequisite: Grade of C or better in ECE 3414). Three hours lecture. Transmission of power from generator to distribution system; transmission line design; load flow; symmetrical components; balanced/unbalanced faults; stability.

ECE 4633/6633. Power Distribution Systems. (3) (Prerequisite: Grade of C or better in ECE 3414). Three hours lecture. Distribution of power from transmission system to users; primary and secondary feeders; voltage regulation; distribution transformers; protective device coordination; system design; load management.

ECE 4643/6643. Power Systems Relaying and Control. (3) (Prerequisite: Grade of C or better in ECE 4613). Three hours lecture. Protection objectives and fundamentals; inputs; protection of generators, transformers, busses and lines; stability and control.

ECE 4653/6653. Introduction to Power Electronics. (3) (Prerequisite: Grade of C or better in both ECE 3414 and ECE 3424 or equivalent). Three hours lecture. Introduction to power electronic circuits, with emphasis on design and analysis of power semiconductor converters including DC-DC converters. PWM inverters, and DC power supplies.

ECE 4663/6663. Insulation Coordination in Electric Power Systems. (3) (Prerequisite: Credit or registration in ECE 4613). Three hours lecture. Lightning phenomena; switching surges and temporary system overvoltages; laboratory generation and application of high voltages and currents; basic insulation levels; surge arresters; system insulation design.

ECE 4673/6673. Fundamentals of High Voltage Engineering. (3) (Prerequisite: Grade of C or better in ECE 3414). Three hours lecture. Electrical fields, fields in multi-dielectrics, breakdown mechanisms in gases, liquids, and solid dielectrics, laboratory generation of high voltages, high voltage insulators and cables.

ECE 4713/6713. Computer Architecture. (3) (Prerequisites: Grade of C or better in ECE 3724). Three hours lecture. Detailed design and implementation of a stored-program digital computer system. Designs for the CPU, I/O subsystems, and memory organizations. ALU design and computer arithmetic.

ECE 4723/6723. Embedded Systems. (3) (Prerequisites: Grade of C or better in either ECE 3424 or CSE 4153 and grade of C or better in both CSE 3324 and ECE 3724). Two hours lecture. Three hours laboratory. Advanced topics in embedded systems design using contemporary practice. Interrupt-driven, reactive, real-time, object-oriented, and distributed client/server embedded systems.

ECE 4743/6743. Digital System Design. (3) (Prerequisites: Grade of C or better in ECE 3724. Credit or registration in ECE 3424). Two hours lecture. Three hours laboratory. Hierarchical digital design using available design software. Computer aided design workstations will be used to give students access to state-of-the-art design techniques.

ECE 4813/6813. Communications Theory. (3) (Prerequisite: Grade of C or better in ECE 3443). Three hours lecture. The frequency and time domain; modulation; random signal theory; network analysis using nondeterministic signals; basic information theory; noise.

ECE 4823/6823. Digital Communications. (3) (Prerequisite: Grade of C or better in ECE 4813/6813 or equivalent.) Three hours lecture. Digital communications systems design trade-offs and performance analysis in the presence of AWGN. Principle topics: transmission and detection, link analysis, channel coding,

multiple access, spread-spectrum.

ECE 4833/6833. Data Communications and Computer Networks. (3) (Prerequisite: CSE 1384 or ECE 3732 and ECE 3724, both with a grade of C or better). Three hours lecture. The concepts and practices of data communications and networking to provide the student with an understanding or the hardware and software used for data communications. (Same as CSE 4153/6153).

ECE 4843/6843. Error Correcting Digital Codes. (3) (Prerequisite: Senior or Graduate standing). Three hours lecture. A survey, in depth, of current error correcting coding techniques for providing digital data transmission with protection from random and burst noise sources. Many practical and currently used techniques are discussed in detail and some hands on experience is provided.

ECE 4853/6853. Electro-Optics. (3) (Prerequisite: Grade of C or better in ECE 3243 or consent of instructor). Three hours lecture. Linear system theory of optical processes; Electroptic systems; electro-optical information processing.

ECE 4913/6913. Feedback Control Systems I. (3) (Prerequisite: Grade of C or better in ECE 3443). Three hours lecture. Laplace transforms; transient and frequency response of feedback systems; transfer functions; Nyquist criterion, root locus; compensation of feedback systems; logarithmic analysis and design.

ECE 4923/6923. Feedback Control Systems II. (3) (Prerequisite: Grade of C or better in ECE 3443). Three hours lecture. Finite difference and recurrence equations. Z-transform theory. Analysis of sample-data control systems. Design of digital control systems.

ECE 4933/6933. State Space Design and Instrumentation. (3) (Prerequisite: Grade of C or better in ECE 3443). Three hours lecture. State space representation. Dynamic systems. Controllability and observability. Full-state feedback observers. Instrumentation: sensors and interfacing.

ECE 4990/6990. Special Topics in Electrical or Computer 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).

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

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

ECE 8023. Switching Theory II. (3) (Prerequisite: ECE 8013). Three hours lecture. The study of self-timed circuit design techniques; emphasis on elimination of timing considerations from digital circuit design to improve reliability, desirability and speed.

ECE 8223. Analog Integrated Circuit Design. (3) (Prerequisite: ECE 3434). Analysis and design of analog integrated circuits. Selected topics on operational amplifiers, A-to-D converters and communication circuits. Bi-polar and MOSFETS.

ECE 8273. VLSI Systems I. (3) (Prerequisite: ECE 4263/6263). Three hours lecture. VLSI design extended into controller concepts, self-timed logic; system design with CAD tools, parameterized block generators, silicon compilers; projects submitted to commercial silicon foundries.

ECE 8313. Electromagnetic Theory. (3) (Prerequisite: ECE 3254). Three hours lecture. Static boundary value problems, conformal transformation; Schwarz-Christoffel transformation; harmonics; applications of Maxwell's equations to plane waves in dielectrics and conductors; antennas; and radiation. (Same as PH 8313)

ECE 8373. Adaptive Signal Processing. (3) (Prerequisites: ECE 4773/6773 or consent of Instructor). Three hours lecture. Linear combiners, theory of adaptation with stationary signals, algorithms and structures. Applications included.

ECE 8401. Current Topics in Remote Sensing. (1) (Prerequisite: Credit or registration in ECE 4423/6423 or PSS 4483/6483 or ABE 4483/6483). One hour lecture. Review of current literature dealing with the technical issues of remote sensing technologies.

ECE 8413. Digital Spectral Analysis. (3) (Prerequisite: ECE 3443 or consent of instructor). Three hours lecture. Spectral estimation problem, classical methods, parametric modeling, statistical estimation, sinusoidal estimation, and high order spectra. Time series applications.

ECE 8423. Adaptive Signal Processing. (3) (Prerequisite: ECE 3443 or consent of instructor). Three hours lecture. Adaptive filtering, theoretical foundation, algorithms, structures, and implementations. Applications are included.

ECE 8433. Statical Signal Processing. (3) (Prerequisite: MA 4533/6533 or consent of instructor). Three hours lecture. Detection theory and design, statistical decisions, Bayes, and Neymen-Pearson detection, asymptotic performance, signal processing applications.

ECE 8443. Pattern Recognition. (3) (Prerequisite: MA 4533/6533 or consent of instructor). Three hours lecture. Classification, description, and structure of pattern recognition, patterns and feature extractions, engineering approaches including statistical and syntactic, and signal processing applications.

ECE 8453. Introduction to Wavelets. (3) (Prerequisite: ECE 3443 or consent of instructor). Three hours lecture. Wavelet-expansion systems, discrete wavelet transform, multiresolution analysis, time-frequency analysis, filter banks and the discrete wavelet design, wavelet-based applications.

ECE 8463. Fundamentals of Speech Recognition. (3) (Prerequisite: ECE 4413/6413 or consent of instructor). Three hours lecture. Acoustic Phonetics; Linear Prediction; Feature Extraction; Dynamic Programming and Time-Warping; Hidden Markov Models; Statistical Language Modeling; Decision Trees; Introduction to Natural Language Processing; Implementation Issues.

ECE 8473. Digital Image Processing. (3) (Prerequisites: CSE 1233, CSE 1284 or equivalent, ECE 4413/6413). Three hours lecture. A study of digital image processing principles, concepts, and algorithms; mathematical models; image perception; image sampling and quantization, transforms, image coding.

ECE 8483. Image and Video Coding. (3) (Prerequisite: ECE 8473 or consent of instructor). Three hours lecture. Intraframe predictive coding, intraframe transform coding, still-image coding standards, motion compensation, video-coding standards, image transmission and error control.

ECE 8503. Spacecraft Electrical Systems. (3) (Prerequisite: consent of instructor). Three hours lecture. Introduction to electrical and computer subsystems required to develop and operate satellites and space-borne instrumentation. Topics include space sensors, imaging, communications, and data-handling.

ECE 8623. Stability and Control of Power Systems. (3) (Prerequisite: Consent of instructor). Three hours lecture. Transient and dynamic stability; effect of excitation on stability; control of system in steady state (AGC); economic dispatch.

ECE 8663. High Voltage Engineering. (3) (Prerequisite: ECE 3313). Three hours lecture. Emission, mobility, breakdown, corona, arcs impulse generation, measurement, analysis, dielectric materials, design laboratory demonstration.

ECE 8673. Computer Methods in Power Systems Analysis. (3) (Prerequisite: ECE 4613/6613 or equivalent). Three hours lecture. Algorithms for formation and techniques for manipulation of network matrices. Problem formulation and numerical solution techniques for load flow and stability studies.

ECE 8713. Switching Theory I. (3) (Prerequisites: ECE 3434, ECE 4713/6713, or consent of instructor). Three hours lecture. Theory of combinational and sequential (synchronous and fundamental-mode) circuits with emphasis on performance, robustness, cost, and testability objectives.

ECE 8723. Introduction to Computer Arithmetic. (3) (Prerequisite: ECE 4263/6263). Three hours lecture. Fixed point number systems; algorithms and associated logic level implementations for fixed point addition, subtraction, multiplication, and division; floating-point formats and operation.

ECE 8733. Parallel Computing Architectures I. (3) (Prerequisite: ECE 4713/6713, CSE 4113/6113). Three hours lecture. Study of hardware structures relevant to concurrent computing; evaluation and design methods associated with memory, pipelining, and multiple processors.

ECE 8803. Random Signals and Signs. (3) (Prerequisite: IE 4613 or MA 4523 or equivalent). Three hours lecture. Probability and random processes, auto- and cross-correlation, energy and power spectral densities, mean-square calculus, ergodicity. Response of linear systems to random signals, and Markov chains.

ECE 8813. Information Theory. (3) (Prerequisite: ECE 8803 or consent of instructor). Three hours lecture. Entropy, the asymptotic equipartition property, entropy rate, data compression, channel capacity, differential entropy, the Gaussian channels, rate distortion theory.

ECE 8913. Advanced Feedback Control Systems. (3) (Prerequisite: ECE 4913/6913). Three hours lecture. Review of linear feedback systems; root locus; signal flow diagrams; stability citerion; distributed parameter systems; selfadaptive control systems.

ECE 8923. Non-Linear Control Systems. (3) (Prerequisite: ECE 4913/6913 or equivalent). Three hours lecture. A study of techniques available to analyze nonlinear system and a study of associated synthesis procedures.

ECE 8933. Random Processes in Automatic Control. (3) (Prerequisite: ECE 4913/6913 or equivalent). Three hours lecture. Principles and application of statistical design; random processes in automatic control; time invariant systems.

ECE 8943. Optimal Control of Dynamic Systems. (3) (Prerequisite: ASE 4123 or ECE 4913/6913 or equivalent.) Three hours lecture. State variable description of systems; maximum principle of Pontryagin, dynamic programming, optimization of linear systems with quadratic performance measures; time optimal and fuel optimal systems. (Same as ASE 8863)

ECE 8963. Digital Control Systems. (3) (Prerequisites: ECE 4913/6913 and ECE 4923/6923 or consent of instructor). Three hours lecture. Z-Transform theory

and analysis; modified x-transform; design principles; digital state observers; introduction to optimal control, introduction to computer-aided digital control system design and analysis.

ECE 8990. Special Topics in Electrical or Computer 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).

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

Department of CURRICULUM, INSTRUCTION and SPECIAL EDUCATION

310 Allen Hall

Professors Coffey, Devlin, Grace, Minchew, Obringer,
Person, and Verhoek-Miller;
Associate Professors: Brenner, Burroughs, Hamil, and Jayroe;
Assistant Professors: Franz, Hopper, Pope, Scholtes and Thompson

ELEMENTARY EDUCATION

EDE 2990. Special Topics in Elementary 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).

EDE 3123. Early Childhood Education. (3) (Prerequisite: Admission to teacher education. Co-requisite: RDG 3113 and RDG 3123). Three hours lecture. Overview of early childhood education. Understanding young learners and creating learning environments. Assessing young children. Field experience.

EDE 3223. Middle Level Education. (3) (Prerequisite: Admission to teacher education. Co-requisite: RDG 3413 and 3423). Three hours lecture. Understanding the learning needs of young adolescents (grades 4-8); study of appropriate teaching strategies, engaging learning environments, and assessments for young adolescents.

EDE 3233. Teaching Children's Literature at the Elementary and Middle Levels. (3) Three hours lecture. Teaching children's literature at the elementary and middle levels. Introduction, selection, presentation, and utilization of a variety of children's literature.

EDE 3343. Teaching Adolescent Literature. (3) (Prerequisite: Admission to teacher education). Three hours lecture. A study of the types of literature read by older children and adolescents with emphasis upon the criteria for the choice of good books and knowledge of available books and teaching materials. Admission to Teacher Education required.

EDE 3443. Creative Arts for Elementary and Middle Levels. (3) (Prerequisite: Admission to teacher education). Three hours lecture. An exploration of musical and artistic elements utilizing a variety of multicultural music, dance, drama, and aesthetic visuals. (Same as MU 3123).

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

EDE 4113. Teaching Elementary and Middle Level Science. (3) (Co-requisites: EDE 4143, RDG 4133, and EDE 4123; admission to Teacher Education). Two hours lecture. Two hours laboratory. Field-based. Selection, organization and presentation of natural science content for elementary and middle school students; assessment of student learning and general effectiveness of instruction.

EDE 4123. Teaching Elementary and Middle Level Mathematics. (3) (Co-requisites: EDE 4113, RDG 4133, and EDE 4143; admission to Teacher Education). Two hours lecture. Two hours laboratory. Field-based. The content and process of mathematics instruction for elementary and middle grades children; teaching principles, mathematical tools, and assessment of student progress.

EDE 4143. Teaching Elementary and Middle Level Social Studies. (3) (Co-requisite: EDE 4113, EDE 4123, and RDG 4133). Two hours lecture. Two hours laboratory. Field-based. Selection, organization and presentation of social studies content for K-8 students; assessment of student learning and effectiveness of instruction.

EDE 4883. Managing the Elementary and Middle Level Classroom. (3) (Prerequisite: Admission to Teacher Education, completion of all professional development courses, and concurrent enrollment in EDE 4886). Three hours lecture. Developing and managing an appropriate learning environment for elementary and middle level students.

EDE 4886,4896. Elementary and Middle Level Teaching Internship. (6,6) (Prerequisite: Admission to Teacher Education, minimum GPA of 2.5 overall and in major, and completion of all professional education courses with a C or better). Two six hour internships. A supervised observation and teaching experience in an elementary and/or middle level classroom.

EDE 4990/6990. Special Topics in Elementary 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).

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

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

EDE 8313. Theory and Development of Early Childhood Education. (3) Three hours lecture. A study of the historical development and the theoretical bases for early childhood education.

EDE 8423. Elementary School Methods. (3) Three hours lecture. Seminar-type course in synthesis of methods and techniques applicable to elementary teaching; readings; reports; research.

EDE 8433. The Elementary School Curriculum. (3) Three hours lecture. Principles of curriculum construction as they apply to the elementary school program.

EDE 8443. Seminar in Elementary Education. (3) Three hours lecture. A study of current issues in elementary education. Designed for elementary and school administration majors.

EDE 8463. Readings and Research in Children's Literature. (3) Three hours lecture. Research involving the characteristics of quality literature for children, investigation of illustrators, illustrations and role of children's literature in the school.

EDE 8473 The Elementary Social Studies Curriculum. (3) Three hours lecture. Seminar-type course to include research; trends, methods; provision for individual differences; multi-level materials.

EDE 8513. Curriculum and Program Developments in Early Childhood Education. (3) Three hours lecture. The recent and most promising developments in curriculum for preschool through primary aged children.

EDE 8523. Practicum: Language Arts and Literacy Development in Early Childhood Education. (3) (Prerequisites: RDG 4133, RDG 3113, RDG 3123, or the equivalent). Two hours lecture. Two hours laboratory. A study of language development; the language arts curriculum for young children. Observation and participation in a preschool.

EDE 8533. Behavioral Experiences in Early Childhood Education. (3) Three hours lecture. The world of the child from preschool through early primary years with emphasis on child behavior.

EDE 8543. Mathematics Experiences in Early Childhood Education. (3) (Prerequisites: EDE 4123 or the equivalent). Three hours lecture. Materials, methods and the preparation and use of instructional media in providing mathematical experiences for young children.

EDE 8623. Content Area Literacy Instruction. (3) Three hours lecture. Theory, research, and methods for teaching elementary school students to use literacy as a tool for learning.

EDE 8633. The Teaching of Writing. (3) Two hours lecture. Two hours laboratory. Methods and materials for teaching writing grades K-12. Formal and informal writing assessments. Writing across the curriculum.

EDE 8893. Readings in Elementary Education. (3) (Prerequisites: Doctoral or Specialist standing or consent of the instructor). Readings and in-depth discussions to include innovation, controversy, and authoritative studies in the field.

EDE 8990. Special Topics in Elementary 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).

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

EDE 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 EDS 9413)

EDE 9420. Research Practicum in Early Childhood Education. (1-6) (Prerequisites: EDE 8513, EDE 8523, EDE 8533, EDE 8543). Research experiences through participation, observation, and experimental projects related to early childhood settings.

Department of LEADERSHIP and FOUNDATIONS

Office: 245 Allen Hall

Professors Blendinger, Hare, McGrath and Xu; Associate Professors Brocato, Coats, Prince and Stumpf; Assistant Professors Boggan and Davis

EDA 8163. Public School Finance. (3) Three hours lecture. Legal and other factors governing financial policies and practices in public schools; sources of revenue; budgeting; disbursement of funds; school plant; records; insurance.

EDA 8190. Workshop in Educational Administration and Supervision. (1-3) This course is for practicing school administrators who need courses of varying length, format, and focus in areas not covered by the regular curriculum.

EDA 8223. Seminar in Administration. (3) (Prerequisite: Administrative experience or graduate standing). Three hours lecture. Specialized study of selected problems in school administration; research.

EDA 8273. Educational Administration and Supervision. (3) (Prerequisite: Advanced graduate standing). Three hours lecture. Fundamentals of leading and managing at the central office executive level, e.g., assistant superintendent. Emphasis on policy development, curriculum and instruction, planning, operations, and public relations.

EDA 8283. Educational Leadership. (3) (Prerequisite: EDL 8113). Three hours lecture. Nature of educational leadership. The roles of leadership in staff and program development, diffusion of innovations, and the uses of power in making educational decisions.

EDA 8293. Professional Development of Educational Personnel. (3) (Prerequisite: EDL 8143). Three hours lecture. Collaborative approaches to processes of individual and group professional development for instructional and non-instructional personnel; ensuring, supporting, enhancing best practices for teaching, learning, school improvement.

EDA 8323. Educational Facilities Design. (3) Three hours lecture. Studies design issues in learning environments/facilities, examines contemporary design models, their impact on learning and uses this information in the design process.

EDA 8353. Applications of Theory to Educational Administration. (3) Three hours lecture. The nature of theory; types of educational administrative theories; uses of organizational and administrative theory in administrative problem solving; applications of general systems theories in education.

EDA 8383. Ethical Decision Making in Educational Administration. (3) (Prerequisites: EDA 8283 or HED 8123). Three hours lecture. Case studies are used to analyze educational decisions. Multiple decision models and ethical concepts are applied to problems and moral dilemmas.

EDA 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. (Courses limited to two offerings under one title within two academic years).

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

EDUCATIONAL FOUNDATION

EDF 2990. Special Topics in Educational Foundation. (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).

EDF 3333. Social Foundations of Education. (3) Three hours lecture. A study of the sociological, historical, political, legal, and philosophical bases of American education.

EDF 3413. Writing for Thinking. (3) (Prerequisites: Completion of EN 1103 and 1113 or equivalent with grade of C or better in each and junior standing). Designed to enhance participants' writing/thinking skills and to prepare participants to use writing as a learning process with groups they teach or lead.

EDF 3423. Exploring Diversity Through Writing. (3) (Prerequisite: Admission to Teacher Education). Three hours lecture. Using writing to explore issues of diversity in the classroom. Creating a learning community for diverse learners.

EDF 4243/6243. Planning for the Diversity of Learners. (3) Three hours lecture. A study of variables contributing to the creation and management of a positive learning environment for the complexity and diversity of middle and high school students.

EDF 4990/6990. Special Topics in Educational Foundation. (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).

EDF 8323. Comparative Education. (3) Three hours lecture. Contemporary educational movements in Denmark, France, Great Britain, India, Russia, and the United States; technical changes and their effects. Spring, summer semesters.

EDF 8353. Principles of Curriculum Development. (3) Three hours lecture. An examination of principles, problems, and practices influencing curriculum planning; relationships between elementary and secondary school curriculums; research in general curriculum problems.

EDF 8363. Function and Methods of Research in Education. (3) Three hours lecture. The function of research in the development and conduct of the educational program; research methods and techniques in education and the contributions of research to public education; rules and principles governing evidence and conclusions.

EDF 8383. Issues in Education. (3) Three hours lecture. A critical study of current issues in education.

EDF 8393. History of Education in the United States. (3) Three hours lecture. A history of the growth and development of education in the United States from earliest Colonial times to the present, including recent movements and trends.

EDF 8990. Special Topics in Educational Foundation. (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)

EDF 9313. Philosophy of Education. (3) Three hours lecture. An examination of educational beliefs and their justification.

EDF 9373. Educational Research Design. (3) (Prerequisites: EDF 8363 and EPY 8214 or equivalents; consent of instructor). Three hours lecture. A study of various designs of research and preparation of research proposals. Fall, Spring, Summer terms.

EDF 9443. Single-Subject Research Designs for Education. (3) Three hours lecture. A detailed examination of single-subject research designs and their associated research methods including data collection and data evaluation techniques. Spring, Summer terms.

EDF 9453. Introduction to Qualitative Research in Education. (3) (Prerequisites: EPY 8214, EDF 9373). Three hours lecture. Introduction to qualitative research, including theoretical considerations and applied methods, techniques, and analysis of field based educational research.

EDF 9463. Qualitative Data Collection in Education. (3) (Prerequisite: EDF 9453). Three hours lecture. An in-depth examination of interviewing and observation as two primary qualitative data sources in educational settings.

EDF 9473. Qualitative Data Analysis and Presentation in Education. (3) (Prerequisite: EDF 9463). Three hours lecture. Examination, application, and assessment of a range of approaches to analysis and presentation in the design of qualitative research studies in educational settings.

EDUCATIONAL LEADERSHIP

EDL 8113. Contexts of Educational Leadership. (3) Three hours lecture. Exploration of the educational leader's responses to historical, philosophical, sociocultural, democratic and educational contexts affecting leadership; school culture and climate; change processes for school improvement.

EDL 8123. Principles of Educational Leadership. (3) (Prerequisite: EDL 8113). Three hours lecture. Applying democratic processes to school governance and leadership; decision making; consensus building; empowerment; vision; mission; and school improvement.

EDL 8143. Educational Leaders as Instructional Supervisors. (3) Three hours lecture. Applying interpersonal and clinical skills, techniques 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, allo-cation or 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) Interns experience designated observation, authentic application, and mentorship activities at educational sites under joint supervision of university and school-based leaders.

EDL 8223. Internship II: Administrative Applications. (3) 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) Focus on instructional leadership experiences; designated culminating internship activities at school sties; 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: 310 Allen Hall

(For departmental information, see CURRICULUM, INSTRUCTION and SPECIAL EDUCATION.)

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) (Prerequisite: Admission to Teacher Education. Co-requisite: EPY 3143). One hour lecture. Field-based. An introduction to the organization and activities of middle and secondary schools.

EDS 3633. Secondary Mathematics Education. (3) (Prerequisite: Admission to Teacher Education. Co-requisites: EDF 4243 and RDG 3513). Three hours lecture. Examine the concepts and tools used to teach mathematics in the secondary classroom, connections between algebra and geometry concepts, and national and state mathematics standards.

EDS 3643. Secondary Social Studies Education. (3) (Prerequisite: Admission to Teach Education, EDS 3411 and EPY 3143. Co-requisites: EDF 4243 and RDG 3513.) Three hours lecture. An introduction to the history, purposes, and current issues associated with middle and secondary social studies education.

EDS 3653. Secondary Science Education. (3) (Prerequisite: Admission to Teacher Education. Co-requisites: EDF 4243 and RDG 3513). Three hours lecture. Fundamentals of science education including the National Science Education Standards and NSTA recommendations required for teaching science in grades 7-12.

EDS 3673. Secondary Language Arts Education. (3) (Prerequisite: Admission to Teach Education, EDS 3411, EDF 3333 and EPY 3143. Co-requisites: EDF 4243, EDX 3213 and RDG 3513.) Three hours lecture. Essential knowledge, skills, and attitudes necessary for the successful teaching of the language arts.

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

EDS 4633/6633. Methods of Teaching Mathematics. (3) (Prerequisites: Admission to Teacher Education, EDF 4243, RDG 3513 and EDS 3633 Co-requisite: EPY 3253). Three hours lecture. Field based. Aims and purposes of teaching mathematics at the secondary level, curriculum problems, organization and presentation of subject matter, methods of teaching and evaluation.

EDS 4643/6643. Methods of Teaching Social Studies. (3) (Prerequisites: Admission to Teacher Education, EDF 4243, RDG 3513, and EDS 3643 Co-requisite: EPY 3253). Three hours lecture. Field based. An examination of teaching methods and instructional materials and media appropriate for use in middle and secondary social studies classrooms.

EDS 4653/6653. Methods of Teaching Science. (3) (Co-requisite: EPY 3253). Three hours lecture. Field based. Students will gain insight into the methods of teaching science in grades 7-12, including selection, organization, presentation and assessment by National Science Education Standards.

EDS 4673/6673. Methods of Teaching Language Arts. (3) (Prerequisite: EDS 3673, EPY 3253). Three hours lecture. Field based. Objectives of English/language arts; content, organization, methods of teaching language, literature, and composition. Designed primarily for secondary teachers of language arts, foreign language, speech.

EDS 4873. Seminar in Managing the Secondary Classroom. (3) (Prerequisites: Admission to Teacher Education. Co-requisites: EDS 4886 and EDS 4896.) Three hours lecture. A seminar that addresses classroom management issues, theories and practices.

EDS 4886,4896. Teaching Internship in Secondary Education. (6,6) (Prerequisite: Admission to Teacher Education, minimum GPA of 2.5 overall and in major, and completion of all professional education courses with a C or better). Professional full-day public school teaching experience in two consecutive placements or one 16-week placement in diverse settings under direction of supervising teachers and university supervisor.

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 8243. Advance Planning and Managing of Learning. (3) Three hours lecture. An advanced study of variables contributing to efficiency and competency in planning for teacher-learner activities and the creation and maintenance of positive learning environments.

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 8883. Dimensions of Learning I. (3) (Prerequisite: admission to MATS program. EDS 8243, EPY 6313, and EDS 6633 or EDS 6643 or EDS 6653 or EDS 6673). Three hours clinical instruction. Supervised observation and directed teaching in respective field of endorsement.

EDS 8893. Dimensions of Learning II. (3) (Prerequisite: admission to MATS program. EDS 8243, EPY 6313, and EDS 6633 or EDS 6643 or EDS 6653 or EDS 6673). Three hours clinical instruction. Supervised observation and directed teaching in respective field of endorsement.

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: 310 Allen Hall

(For departmental information, see CURRICULUM, INSTRUCTION and SPECIAL EDUCATION.)

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 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 4873. Professional Seminar in Special Education. (3) A seminar dealing with legal, professional, administrative, and curriculum issues as they relate to special education in the schools.

EDX 4886/4896. Teaching Internship in Special Education. (6,6) (Prerequisite: Admission to Teacher Education, minimum GPA of 2.5 overall and in major, and completion of all professional education courses with a C or better). Professional full-day public school teaching experience in two consecutive 8-week placements in diverse settings and grade levels under direction of supervising teachers and university supervisor.

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 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 disabled child who may be in the regular classroom and suggests methods and techniques for teaching the disabled 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 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 8393. Seminar in Education for the Emotionally Disabled. (3) (Prerequisite: EDX 8403.) Three hours lecture. 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 disabled.

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: 260 McCain Engineering Building

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 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 1513). 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 3113. CATIA Solid Modeling. (3) Three hours lecture. Design, assembly, and finite element analysis utilizing CATIA, a state-of-the-art 3-D solid modeling package.

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

Engineering Mechanics is one of the basic engineering sciences. Faculty in Aerospace Engineering, Civil and Environmental Engineering, and Mechanical Engineering teach courses in Engineering Mechanics. The Aerospace Engineering Department manages the Engineering Mechanics offerings.

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 MA 2733 and grade of C or better in EM 2433). 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 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 4133/6133. Mechanics of Composite Materials. (3) (Prerequisites: EM 3213 and MA 3253.) Three hours lecture. Stress, strain, constituative relations for

anisotropic material, lamina properties, laminate properties, composite beams and plates.

EM 4143/6143. Engineering Design Optimization. (3) (Prerequisite: Consent of instructor). Three hours lecture. Introduction to optimality criteria and optimization techniques for solving constrained or unconstrained optimization problems. Sensitivity analysis and approximation. Computer application in optimization. Introduction in MDO. (Same as ASE 4553/6553 and IE 4743/6743).

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 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 Creevy, Lyons, Myers, Patteson, and Raymond (Head);
Associate Professors Bentley, Hagenston, Little, Marsh, and West;
Assistant Professors Anderson, Claggett, Crossley, Dodds, Hanshaw, Johnson, Kardos, O'Donnell, O'Neill, Pierce, Pizer and Shaffer; Instructors Bogard, Chrestman, Leonard, Price, Sanders, Sheperis, Sneed, Spurlock and Whitten

NOTE: Entering freshmen may enter honors or special sections of first-semester composition depending on standard and other tests. Students with ACT scores in English from 15 to 18 take EN 0103, from 19 to 28 take EN 1103, and of 29 and above take EN 1163 or EN 1103H (honors). International students of non-English background will be placed in composition sections appropriate to their needs as determined by TOEFL 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 1111. English Studies. (1) One hour lecture. Introduction to English Studies: a survey of the profession, including disciplinary assumptions, research processes, sub-fields, and career opportunities.

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. (3) (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 3303. Creative Writing. (3) (Prerequisite: Completion of freshman composition). Three hours lecture. Basic techniques in writing fiction and poetry; meter and rhyme, metaphor and image, plot, characterization, dramatic detail.

EN 3313. Writing for the Workplace. (3) (Prerequisite: EN 1113 or equivalent). Three hours lecture. Advanced writing course focused on communication in the workplace, including correspondence, technical descriptions, instruction writing, proposals, and recommendation reports.

EN 3414. Advanced Composition. (4) (Prerequisite: Twelve hours of English). Four 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 EN 1103). Three hours lecture. A study of literary works by or about women. Texts are selected according to theme, genre, and/or historical period. (Same as GS 3513).

EN 3533. Selected Authors. (3) (Prerequisites: EN 1103 and EN 1113 or their equivalent). Three hours lecture. This course offers a focused study of the major works by selected authors. Authors and texts are selected by the instructor. (May be repeated for credit).

EN 3903. Intermediate Fiction Writing. (3) (Prerequisite: EN 3303). Three hours lecture. An intermediate course in the craft and art of fiction writing, focusing on techniques such as setting, dialogue, and characterization.

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 4233/6233. Composition Pedagogy. (3) (Prerequisite: EN 1113 or consent of instructor). Three hours lecture. Introduction to practices and debates in college composition pedagogies. Develops practical strategies for instruction in composition; introduces historical and theoretical scholarship in rhetoric and composition.

EN 4243/6243. Writing Center Tutor Training. (3) (Prerequisite: Grade of B or better in EN 1113 and consent of instructor). Three hours lecture. Introduction to the practices and theories of college writing consultation in Writing Centers.

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 3903 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. (Same as AAS 4343.)

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 4453/6453 Methods in TESOL. (3) (Prerequisite: EN 4403/6403 or permission of instructor). This course covers the various practical pedagogical approaches common in TESOL including methods for teaching reading, listening, speaking, and writing as well as communicative approaches.

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 REGAINED, 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 Civil War-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: 117 Dorman Hall

Professor Massey

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 ENS advisor). A directed field experience of an assigned environmental problem and an associated weekly seminar.

EXERCISE PHYSIOLOGY

(For departmental information, see KINESIOLOGY)

EP 2013. Introduction to Exercise Science. (3) Three hours lecture. The course introduces the history of exercise science and examines the academic disciplines and professions comprising exercise science and kinesiology.

EP 3183. Exercise Psychology. (3) Three hours lecture. Contemporary psychological research and theory as related to human behavior and health in an exercising setting.

EP 3233. Anatomical Kinesiology. (3) Three hours lecture. A functional account of body structure, analysis of human movement and related injury mechanisms.

EP 3304. Exercise Physiology. (4) (Prerequisite: BIO 1004 or BIO 2004 and CH 1043 or CH 1213). Three hours lecture. Two hours laboratory. Examines physiological systems central to exercise performance, interrelationships of those systems during exercise, and adaptations of the human body during both acute and chronic exercise.

EP 3613. Exercise Electrocardiography. (3) (Prerequisite: BIO 1004 or BIO 2014). Three hours lecture. Basic and intermediate electrocardiography including cardiac function, lead systems, rate, rhythm, axis, infarction, ischemia, hypertrophy and effects of cardiovascular drugs and exercise on ECG.

EP 3643. Applied Anatomy and Pathophysiology. (3) (Prerequisites: BIO 1004 or BIO 2004). Three hours lecture. Anatomical foundation of the human body with related pathophysiology of the cardiovascular, peripheral and central nervous system, and musculoskeletal disease states.

EP 3663. Personal Fitness Training. (3) (Prerequisites: EP 3183, EP 3304). Two hours lecture. Two hours laboratory. Fundamentals of personal training including skill development in leading others to become physically active and developing a lifestyle conducive to good health.

EP 4113/6113. Fitness Programs and Testing Procedures. (3) (Prerequisite: EP 3304). Two hours lecture. Two hours laboratory. Provides study of and practice in conducting adult fitness programs and fitness testing procedures.

EP 4123. Aging and Disability. (3) (Prerequisites: EP 4143). Three hours lecture. An examination of the disablement process, chronic diseases, and aging. Issues and implications of disablement are discussed.

EP 4133. Exercise Programs for Clinical Populations. (3) (Prerequisite: EP 3304). Three hours lecture. This course describes the methods of prescribing exercise programs for individuals with special medical conditions.

EP 4143. Aging and Physical Activity. (3) (Prerequisites: EP 3304). Three hours lecture. The effects of normative aging processes on homeostatic mechanisms and how these changes relate to exercise and sport performance in later life.

EP 4153/6153. Training Techniques for Exercise and Sport. (3) (Prerequisite: PE 3304). Three hours lecture. Training techniques used for exercise and sport and their acute and chronic effects.

EP 4183. Exercise and Weight Control. (3) (Prerequisite: PE 3304). Two hours lecture. Two hours laboratory. The course describes the relationship between physical activity and nutrition for the maintenance of ideal body weight and optimal health throughout life.

EP 4210. Health Fitness Studies Internship. (3,6) (Prerequisite: EP 3233, EP 3663, EP 4113, EP 4153, EP 4183, and final semester senior status). Hours and credits to be arranged. A supervised observation and teaching experience in a fitness/health enhancement facility.

EP 4603. Physical Activity Epidemiology. (3) (Prerequisites: EP 3304). Three hours lecture. Biological mechanisms and behavioral determinants for healthy adaptation to physical activity forms.

EP 4703. Neural Control of Human Movement. (3) (BIO 1004 or BIO 2014; EP 3643). Three hours lecture. Overview of the neural processes associated with human movement with the major focus being the mechanistic control of coordinated movement.

EP 4802. Professional Seminar in Exercise Science. (2) (Senior standing and concurrent enrollment in the internship course). Two hours lecture. A seminar dealing with issues as they relate to the professional practice requirements.

EP 4810. Clinical Exercise Physiology Internship. (3,6) (Prerequisite: KI 2603, EP 3613, EP 3304, EP 4113, EP 4133, EP 4603, EP 4643, and final semester senior status). A supervised observation and teaching experience in a clinical exercise physiology setting.

EP 8243. Cardiorespiratory Exercise Physiology. (3) (Prerequisites: EP 3304 or equivalent). Three hours lecture. Advanced principles of cardiovascular and respiratory physiology, with special emphasis on the physiological responses of these systems to acute and chronic exercise.

EP 8253. Doping and Supplement Use in Sports. (3) (Prerequisites: EP 3304 or equivalent, or consent of instructor). Three hours lecture. Examination of the pharmacological and nutritional agents used to enhance muscular development and athletic performance. Examination of commonly abused recreational drugs.

EP 8263. Exercise Biochemistry. (3) (Prerequisite: EP 3304). Three hours lecture. An advanced review of exercise metabolism with special emphasis on aerobic processes during muscular effort.

EP 8273. Laboratory Instrumentation. (3) (Prerequisite: EP 3304). Six hours laboratory. A course in the function, calibration and operation of exercise physiology laboratory instruments.

EP 8283. Environmental Exercise Physiology. (3) (Prerequisite: EP 3304). Three hours lecture. Advanced principles and applications in exercise physiology including responses to acute exercise and chronic training in the heat, cold, and at high and low pressures.

EP 8323. Science and Practice in Cardiopulmonary Rehabilitation. (3) Three hours lecture. An examination of concepts, design, and implementation of cardiopulmonary rehabilitation programs that focuses on disease treatment and management, patient education, and lifestyle modification.

EP 8423. Graded Exercise Testing. (3) (Prerequisite: EP 3304). Two hours lecture. Two hours laboratory. Methods of supervising graded exercise testing, including interpretation of basic electrocardiography.

Department of ENTOMOLOGY and PLANT PATHOLOGY

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

Professors Collison (Head), Baker, Baird, Brown, Caprio, Chambers,
and Schneider; Associate Professors Lawrence, Ma and Sabanadzovic;
Assistant Professors Lu, Musser and Riggins

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 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 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.

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

EPP 4113/6113. Principles of 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 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 4113/6113). 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.

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 4113/6113 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 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 instructors approval). Three hours lecture. Two hours laboratory. Study of basic bio-

logical 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 4523/6523. Turfgrass Diseases. (3) (Prerequisite: EPP 4113/6113 or 3124). Two hours lecture. Three hours laboratory. Study of the life cycle, damage, economic importance and control strategies of disease turfgrass.

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 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 4113/6113). 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 8133. Plant Bacteriology. (3) (Prerequisite: EPP 4113, EPP 6163 or consent of instructor). Two hours lecture. Three hours laboratory. Morphology, biology and taxonomy of plant-associated bacteria and physio-biochemical and molecular mechanisms involved in their interactions with plants; development and management of plant bacterial diseases.

EPP 8143. Advanced Plant Pathology I. (3) (Prerequisite: EPP 4113/6113). 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 Electro Microscopy. (4) (Prerequisite: consent of instructor). One hour lecture. Six hours laboratory. Introduction to TEM including life sciences (tissue) and engineering (Crystalline materials) topics. (Same as ME 8144)

EPP 8173. Clinical Plant Pathology. (3) (Prerequisites: EPP 4113/6113 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. Introduction to scanning electron microscopy and associated techniques.

EPP 8253. Advanced Plant Pathology II. (3) (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. 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. Physiological and biochemical actions of pesticides and therapeutic drugs. Pesticide metabolism and resistance. Insecticide synergism. Natural toxins and venoms. (Same as PHY 8333).

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 8624. Population Ecology of Insects. (4) (Prerequisite: a course in general ecology). Three hours lecture. Two hours laboratory. Effects of abiotic and biotic factors on distribution and population dynamics of insects mediated through taxis, dispersal, migration, diapause, circadian rhythm, phenology, natality/mortality, and developmental rate.

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 and L. Morse; Associate Professors Doggett and Henington; Assistant Professors Elder and Kane, Instructor Gainer

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, exceptionality, 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 Interventions. (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 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 5313. Classroom Communication and Presentation. (3) (Prerequisite: ESL 5120 or TOEFL score above 525). Three hours lecture. An English language course designed to prepare second language speakers for university-level work. This course is designed to improve students' communication in classroom settings. (Does not count toward any degree.)

ESL 5323. Academic Research and Writing. (3) (Prerequisite: ESL 5120 or TOEFL score above 500). An English language course designed to prepare second language speakers for university-level course work. This course is designed to improve students' research and writing skills. (Does not count toward any degree.)

ESL 5333. Critical Reading. (3) (Prerequisite: ESL 5120 or TOEFL score above 500). Three hours lecture. An English language course designed to prepare second language speakers for university-level work. This course is designed to improve students' authentic reading and comprehension skills. (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. This course will not contribute to a student's academic standing or earn credit toward graduation. Coordinated through Academic Affairs.

EXL 1191 Leadership Studies Internship I. (1) (Prerequisites: Permission of Leadership Studies minor advisor in student's major department and prior completion of 12 hours toward Leadership Studies minor.) Brief internship for leadership studies minor. Arranged with departmental leadership studies minor advisor. Registration provides equivalent of full time enrollment status. Coordinated through Academic Affairs.

EXL 1193 Leadership Studies Internship II. (3) (Prerequisites: Permission of Leadership Studies minor advisor in student's major department and prior completion of 12 hours toward Leadership Studies minor.) Brief internship for leadership studies minor. Arranged with departmental leadership studies minor advisor. Registration provides equivalent of full time enrollment status. 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. Registration provides equivalent of full-time enrollment but no academic credit. This course will not contribute to a student's academic standing or earn credit toward graduation. 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. Registration provides equivalent of full-time enrollment but no academic credit. This course will not contribute to a student's academic standing or earn credit toward graduation. Coordinated by the Career Center.