

Education: Teaching English to Speakers of Other Languages (EDTE)

EDTE 540 THEORIES AND RESEARCH IN SECOND LANGUAGE ACQUISITION (3)

This course will provide an overview and critical examination of the theories and research in second language acquisition (SLA) and will explore relationships between this work and second language teaching and learning. Major theories examined will include those from cognitive, psycholinguistic, sociolinguistic, and sociocultural perspectives. Prerequisite: Admission to SOE MA Program.

EDTE 541 ADVANCED PEDAGOGICAL GRAMMAR (3)

In this course you will gain an understanding of the grammar of English and how to use this understanding in teaching English as a second or foreign language. We will explore a variety of current perspectives and approaches to describing and teaching grammar. Prerequisite: Admission to SOE MA Program, EDTE 544.

EDTE 542 TEACHING MULTILINGUAL WRITERS (3)

This course will investigate the theory and practice of learning to write in a second language from an applied linguistics perspective. Topics will include the theoretical developments in L1 and L2 composition, current research issues and pedagogical concerns, among others. Prerequisite: Admission to SOE MA Program, EDTE 544.

EDTE 543 PRACTICUM IN TEACHING ESL (3)

The practicum is designed to provide students with an opportunity to observe an ESL teacher (s) and to have a supervised experience in teaching English learners. A seminar accompanies the field experience. Prerequisite: Admission to SOE MA Program, EDTE 544.

EDTE 544 ADVANCED METHODS OF TEACHING ENGLISH AS A SECOND/ FOREIGN LANGUAGE (3)

This course is designed to provide an in-depth study of methods for teaching English to non-native speakers at various levels. Students will link theory to practice through the study of current methods for teaching and developing speaking, listening, reading, and writing, processes in English. Prerequisite: Admission to SOE MA Program.

EDTE 545 SPECIAL TOPICS IN TEACHING ESL/EFL (3)

Special Topics in the fields of applied and sociolinguistics related to teaching English as a second or foreign language will be offered on a rotating basis. Prerequisite: Admission to SOE MA Program.

EDUC 150 PROSPECTIVE TEACHERS (3)

Focuses on realities of the classroom from the teacher's point of view. Includes child development, teachers' roles and responsibilities, and the culture of schools in a changing society. Includes an apprenticeship with a teacher. Grade only. Prerequisite: consent of instructor.

Engineering Science (ES)

ES 101A COMMUNICATION IN THE DIGITAL AGE (3)

Concept of digital age, technology and modern communications, understanding various routinely used technical terms and commonly known computer and communications components and devices; understanding digital voice, video and data communication, mobile communication and communication through internet; ill effects such as radiation, invasion of privacy, unethical usages and protection from them; assessment of learning. (The companion laboratory course ES 101B is strongly recommended; the course does not apply to ES major). Prerequisite: GE Math eligibility. GE Area: This course meets GE Area B3 requirement.

ES 101B COMMUNICATION IN THE DIGITAL AGE LABORATORY (1)

Laboratory to demonstrate the concepts discussed in the course ES 101A and give hands-on experience to the students. (Does not apply to ES major). Corequisite: ES 101A, or permission of the instructor. GE Area: This course meets the GE science laboratory requirement.

ES 110 INTRODUCTION TO ENGINEERING AND LABORATORY EXPERIENCE (2)

Lecture, 1 hour, Laboratory, 3 hours. This course is designed to introduce principles of engineering to the students and expose them to the electronics and computer lab environment. The students are given opportunity to design and build some simple analog and digital circuits and make measurements using various types of lab equipment.

ES 210 DIGITAL CIRCUITS AND LOGIC DESIGN (4)

Lecture, 3 hours, Laboratory, 3 hours. Logic gates, combinatorial logic and analysis and design of combinatorial circuits, electronic circuits for various logic gates. Flip-flops, registers, and counters, sequential circuits and state machines. Various logic families and comparison of their electrical characteristics such as fan-out, rise and fall times, delay, etc. Concepts of machine, assembly and high level languages and relationship between them, basic principles of computer design. Laboratory work will include designing, building and testing of digital circuits, logic and sequential circuits. Prerequisites: MATH 142E, Co-req: ES 230; or consent of instructor.

ES 220 ELECTRIC CIRCUITS (3)

Lecture, 3 hours. Review of Kirchhoff's laws, circuit design, node and mesh analysis, etc.; Thevenin's theorem, Norton's theorem, steady state and transient analysis, transfer function. AC power and three-phase circuits, Y-Delta equivalents. Multi-port networks, two-port networks with energy storage, ideal transformers. Amplifiers and frequency response, filters. Prerequisites: ES 110 and MATH 211; Corequisite: ES 221 and PHYS 214, or consent of instructor.

ES 221 ELECTRIC CIRCUITS LABORATORY (1)

Laboratory, 3 hours. Laboratory work on material treated in ES 220 emphasizing elementary design principles. Prerequisite: ES 110 and corequisite: ES 220.

ES 230 ELECTRONICS I (3)

Lecture 3 hours, Laboratory 0 hours. Theory, characteristics and operation of diodes, bipolar junction transistors and MOSFET transistors; analog and digital electronic circuits; design and analysis of analog electronic circuits such as filters, operational amplifiers, single and multistage amplifiers; modeling and simulation using spice/multisim software. Prerequisite: ES 220 and 221 and corequisite: ES 231 or consent of instructor.

ES 231 ELECTRONICS I LABORATORY (1)

Lecture, 0 hours, Laboratory, 3 hours. Laboratory work to accompany ES 230. Computer assisted design of electronic circuits involving devices such as diodes and transistors. Design, building and testing of electronic circuits such as filters, oscillator, amplifiers, etc. Corequisite: ES 230.

ES 310 MICROPROCESSORS AND SYSTEM DESIGN (4)

Lecture, 3 hours, Laboratory, 3 hours. Hardware architecture of a microprocessor and its programming and instruction design, memory hierarchy and I/O interfaces, comparison of various microprocessor architectures and capabilities, system design using microprocessors. Laboratory work. Prerequisites: ES 210 and ES 230; or consent of instructor.

ES 314 ADVANCED PROGRAMMING, MODELING AND SIMULATION (4)

Lecture: 4 hours; Laboratory: 0 hours. Pointers and dynamic allocation of storage; linked lists; an introduction to the object oriented programming (OOP) paradigm; classes and objects; encapsulation; member variables and member functions. Static arrays, dynamic arrays, stacks and queues, linked lists, trees, binary search trees, balanced trees (AVL, red-black, B-trees), heaps, hashing and graphs. System modeling techniques and applications such as generation of noise (random numbers) and correlated signal with different pdfs, measurement of statistical parameters like moments, queuing systems and system simulation. Prerequisite: CS 115: Programming I. Corequisites: MATH 345: Probability Theory and ES 220: Electric Circuits, or consent of instructor.

ES 330 ELECTRONICS II (3)

Lecture, 2 hours, Laboratory, 3 hours. Analysis and design of high frequency amplifiers; high frequency models of transistors; operational amplifiers and applications; feedback amplifiers; oscillators, modulators, bandpass amplifiers, and demodulators for communications. Laboratory work. Prerequisite: ES 230 or consent of instructor.

ES 400 LINEAR SYSTEMS THEORY (3)

Lecture, 3 hours. Analysis of linear time-invariant systems, correlation, convolution, impulse response, complex variables, Fourier series and transform, sampling, filtering, modulation, stability and causality, feedback and control systems, Laplace and Z-transform, fast Fourier transforms. Prerequisite: MATH 241 or consent of instructor. (Crosslisted with MATH 430 and CES 400.)

ES 430 ELECTROMAGNETIC THEORY AND APPLICATIONS (3)

Lecture, 3 hours. Electrostatics, magnetostatics, electric currents, electromagnetic induction, electric and magnetic fields in matter, Maxwell's equations, retarded potentials radiation reaction, light emission, simple scattering and antenna theory, properties of waveguides, relativistic formulation of electrodynamics, Fourier decomposition of fields. Prerequisites: ES 220, MATH 241 and MATH 261.

ES 432 PHYSICAL ELECTRONICS (3)

Lecture, 3 hours. Semiconductor materials, crystal structure and growth; energy bands and charge carriers, conductivity and mobility; metal-semiconductor and p-n junctions; p-n junction diodes, bipolar junction transistors, field-effect transistors, CCD's, photonic devices and integrated circuits. Projects in photolithography; conductivity and contact resistance measurements; I-V and C-V characteristics of diodes; characterization of transistors may be assigned. Prerequisites: ES 230 or consent of instructor. (Crosslisted with PHYS 475 and CES 432.)

ES 440 ANALOG AND DIGITAL COMMUNICATIONS I (3)

Lecture, 2 hours, Laboratory, 3 hours. Mathematical modeling of signals, time and frequency domain concepts, spectral density, components of a communications system, analog signal transmission. AM, FM and PM modulation and demodulation techniques, noise and bandwidth, link analysis. Laboratory work. Prerequisites: ES 230, and ES 400; or consent of instructor.

ES 441 ANALOG AND DIGITAL COMMUNICATIONS II (3)

Lecture, 2 hours, Laboratory, 3 hours. Digital signals and their transmission, PCM, log-PCM, ADPCM and DM and other low bit rate coders. Digital data transmission, data encoding, clock recovery and BER, data modulation techniques, ASK, FSK, PSK and QAM. Link budgets for satellite, cellular, and cable systems, the effects of noise and bandwidth. Laboratory work. Prerequisite: ES 314 and ES 440 or consent of instructor.

ES 443 INTRO OPTICAL FIBER COMMUNICATIONS (3)

Lecture: 3 hours. Principles of light wave propagation, and propagation in an optical fiber, fiber characteristics, O/E and E/O conversions, coupling, WDM, modulation techniques for efficient information transmission, system design. Prerequisite: ES 430 and Corequisite: ES 441 or consent of the instructor.

ES 445 PHOTONICS (3)

Lecture: 3 hours. Gaussian beams; guided-wave optics; fiber optics; optical resonators; resonant cavities; laser oscillation and amplification; laser excitation; optical pumping; solid state, gas, dye, chemical, excimer and free electron lasers; semiconductor lasers; laser spectroscopy; fiber optic communication; photomultiplier and semiconductor radiation detectors including photoconductors, junction photodiodes; p-i-n diodes, avalanche photodiodes; detector noise. Prerequisite: PHYS 314 or consent of Instructor. (Crosslisted with PHYS 445 and CES 430)

ES 465 INTRODUCTION TO NETWORKING AND NETWORK MANAGEMENT (3)

Lecture, 2 hours, Laboratory, 3 hours. The ISO reference model, theoretical basis for data communications, data transmission theory and practice, telephone systems, protocols, networks, internetworks, with examples. Prerequisites: ES 314 and ES 440 or consent of instructor. (Crosslisted with CES 440.)

ES 480 ARTIFICIAL INTELLIGENCE (3)

A survey of techniques that simulate human intelligence. Topics may include: pattern recognition, general problem solving, adversarial game-tree search, decision making, expert systems, neural networks, fuzzy logic, and genetic algorithms. Prerequisites: ES 314 or consent of instructor.

ES 485 SELECTED TOPICS IN ENGINEERING SCIENCE (1-3)

A course on a single topic or set of related topics not ordinarily covered in the engineering science curriculum. The course may be repeated for credit as topics vary. Prerequisite: consent of instructor.

ES 492 SENIOR DESIGN PROJECT PLANNING (2)

Lecture: 1 hour, Laboratory: 3 hours. This course is the first phase of the capstone course. In the lecture part, the students will learn design techniques, how to plan a project, evaluate and perform tradeoffs, make project presentations and write project reports. In the laboratory parts, the students will choose a project, do planning, acquire parts, components and other resources needed and start the project work.

ES 493 SENIOR DESIGN PROJECT (3)

This is a capstone course. A major project designed to bring the knowledge gained from various courses together to analyze, design and implement an electronic and/or communications system in an efficient and economic manner. Prerequisite: consent of the instructor.

ES 497 ENGINEERING SCIENCE COLLOQUIUM (1)

Lecture: 1 hour; laboratory: 0 hours. Series of lectures on topics of interest in the relevant fields of engineering. A maximum of 1 unit can be applied to the ES major. The students may not miss more than two presentations. A brief summary of each presentation must be submitted after the presentation. The course grade is decided on evaluation of these reports. Cr/NC only.