EDSP 515 Adv Legal Issues in Special Educ (3)

EDUC 515 is part of the Professional Level II Education Specialist Credential program. Advanced legal issues faced by teachers, administrators, and parents in special education are addressed. Topics include entitlement to services, procedural due process, complaint resolution, least-restrictive environment, provision of related services, parent participation, shared decision-making, and other related legal issues. Candidates review federal legislation, case law, and statutory requirements within the context of understanding the legal framework underlying special education and providing services, which are legally, as well as programmatically, sound. Prerequisite: Admission into the Professional Level II Education Specialist credential program.

EDSP 516 Prof Induction Plan:Culminating Assesmemt (1)

EDUC 516 is the final course in Professional Level II Education Specialist Credential program. This course creates a context for the culminating assessment of the individualized Professional Induction Plan. Candidates will collaboratively assess the elements presented in their induction plans developed in EDUC 511. Working with University faculty, school district support staff, and other teachers, the candidates will evaluate the attainment of their professional goals by reviewing the evidence contained in their Professional Portfolio and applied to their school settings. Areas for continued professional growth will also be identified. Cr/NC only. Prerequisite: Admission into the Professional Level II Education Specialist Credential program.

EDSP 578 Project Continuation (1-3)

EDSP 595 Special Studies (1-4)

Engineering Science (ES)

ES 110 Introduction to Engineering & 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, and 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. Designing, 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. Co-requisites: 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, and 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, and Fourier decomposition of fields. Prerequisites: ES 220, MATH 241 and MATH 261. (Crosslisted with PHYS 430)

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; and 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, and 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, and 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; and detector noise. Prerequisite: PHYS 314 or consent of Instructor. (Crosslisted with PHYS 445 and CES 430)

ES 465 Introduction to Networking (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, and Internetworks, with examples. Prerequisites: ES 314 and ES 440 or consent of Instructor. (Crosslisted with CS 465 and 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. (Crosslisted with CS 480)

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.