ESET - ELECTRONIC SYS ENG TECH (ESET)

ESET 210 Circuit Analysis

Credits 4. 3 Lecture Hours. 3 Lab Hours. Electric and magnetic principles of components used in DC and AC circuits; transient analysis; phasor analysis; Ohm's and Kirchhoff's laws, Thevenin's and Norton's theorems, mesh and nodal equations; measurement of current, voltage and waveforms with meters and oscilloscopes. **Prerequisite:** Grade of C or better in MATH 151.

ESET 211 Power Systems and Circuit Applications

Credits 3. 2 Lecture Hours. 3 Lab Hours. Fundamentals of energy systems; power generation/distribution; motors/generators; AC power analysis; power factor correction; application of Thevenin's and Norton's Theorems, Superposition Theorem, and Mesh and Nodal analysis; resonant circuits; passive filters; nonsinusoidal circuits; pulse waveforms; measurements of AC circuits; circuit analysis using Multisim. **Prerequisites:** Grade of C or better in ESET 210 and MATH 152; electronic systems engineering technology major.

ESET 219 Digital Electronics

Credits 4. 3 Lecture Hours. 3 Lab Hours. Survey of digital applications, number systems, digital logic devices and circuits, sequential logic.

ESET 269 Embedded Systems Development in C

Credits 3. 2 Lecture Hours. 3 Lab Hours. Introduction to programming using the C programming language and embedded microcontroller systems; fundamental language syntax and symantics, concentration of the application to embedded systems. **Prerequisites:** Grade of C or bettter in ESET 219 or concurrent enrollment; electronic systems engineering technology or multidisciplinary engineering technology majors.

ESET 300 Industrial Electricity

Credits 4. 3 Lecture Hours. 2 Lab Hours. Industrial applications of electrical theory, codes, circuitry, wiring devices, motors and controllers, switch gear and solid state controls. **Prerequisite:** Grade of C or better in PHYS 207; grade of C or better in ENGR 217/PHYS 217 or PHYS 217/ENGR 217; junior or senior classification in Industrial Distribution (IDIS) or Manufacturing and Mechanical Engineering Technology (MMET).

ESET 315 Local-and-Metropolitan-Area Networks

Credits 4. 3 Lecture Hours. 3 Lab Hours. Design, operation, application and management of LANs and MANs; topologies, cabling systems, protocols, bridges, routers, hubs, switches, security; media and transport systems; Internet and TCP/CP topics including the protocol stack, router operation and addressing issues. **Prerequisites:** Grade of C or better in ESET 219; electronic systems engineering technology major.

ESET 319 Engineering Leadership

Credits 3. 2 Lecture Hours. 3 Lab Hours. Exploration of and development of competency in multiple areas related to the practice of leadership in engineering, including emotional intelligence, communication, time management, personal mastery and effectiveness, team dynamics, team membership, motivation, servant leadership, application of systems thinking in an organization, understanding organizational function and culture and career management. **Prerequisite:** Grade of C or better in ENGL 103 or ENGL 104; electronic systems engineering technology major.

ESET 329 Six Sigma and Applied Statistics

Credits 3. 2 Lecture Hours. 3 Lab Hours. Concepts of probability and statistics, mean, variance, Gaussian/uniform/Student/Weibull distributions, and their applications in electronics design, analysis, and troubleshooting; Six Sigma process and tools including Gauge R&R, test of hypotheses, analysis of variance, linear regression, response surface method, control chart, and design of experiments. **Prerequisites:** Grade of C or better in ESET 210 and MATH 152; electronic systems engineering technology major.

ESET 333 Product Development

Credits 3. 2 Lecture Hours. 3 Lab Hours. Process of product development to create an idea; development of a business plan; market research; voice of customer; managing resources; project management; identifying product partners; creating a unique product and/or company. **Prerequisite:** Grade of C or better in ENGR 112, ENGR 217/PHYS 217, or PHYS 217/ENGR 217, or concurrent enrollment; electronic systems engineering technology major or embedded systems integration minor.

ESET 349 Microcontroller Architecture

Credits 4. 3 Lecture Hours. 3 Lab Hours. Microcontrollers including type of circuits and how they function; architecture of microcontrollers; instruction sets and how they are programmed. **Prerequisites:** Grade of C or better in ESET 219 and ESET 269; electronic systems engineering technology major.

ESET 350 Analog Electronics

Credits 4. 3 Lecture Hours. 3 Lab Hours. Study of semiconductor devices including diodes, field effect transistors, bipolar junction transistors, and operational amplifiers; applications include signal conditioning, power supplies, active filters, discrete transistor amplifiers, and transistor switching/driver circuits. **Prerequisites:** Grade of C or better in ESET 210; grade of C or better in CHEM 107 and CHEM 117, or CHEM 120; grade of C or better in ENGL 103 or ENGL 104, PHYS 218 or ENGR 216/PHYS 216 or PHYS 216/ENGR 216, and MATH 152, and PHYS 206 or PHYS 218; junior or senior classification in electronic systems engineering technology.

ESET 352 Electronics Testing I

Credits 4. 3 Lecture Hours. 3 Lab Hours. Testing of electronic devices and systems; including test planning, test reporting, test specifications, parametric testing, measurement accuracy, test hardware, sampling theory, digital signal processing based testing, and calibrations; both circuit analysis (2/3) and circuit design (1/3) with several analog and mixed-signal systems. **Prerequisites:** Grade of C or better in ENTC 329 and ESET 350; junior or senior classification in electronic systems engineering technology.

ESET 355 Electromagnetics and High Frequency Systems

Credits 4. 3 Lecture Hours. 3 Lab Hours. High frequency concepts including topics in basic electromagnetics, transmission lines, antennas, and RF circuit design; applications including wireless communication systems, fiber optic systems, and high frequency PCB layout. **Prerequisites:** Grade of C or better in ESET 211, PHYS 207, and ENGR 217/PHYS 217 or PHYS 217/ENGR 217; junior or senior classification in electronic systems engineering technology.

ESET 359 Electronic Instrumentation

Credits 4. 3 Lecture Hours. 3 Lab Hours. Fundamentals of controls, measurement systems, sensors, sampling theorem, analog to digital and digital to analog conversions; signal conditioning; bio-potentials and biomedical transducer characteristics; digital signal processing; computer-based data acquisition using graphical development environment; and digital communication protocols. **Prerequisites:** Grade of C or better in ESET 349 and ESET 350; grade of C or better in ENGL 103 or ENGL 104; junior or senior classification in electronic systems engineering technology.

ESET 369 Embedded Systems Software

Credits 4. 3 Lecture Hours. 3 Lab Hours. A study of the technical aspects of embedded computer software systems, with emphasis on embedded real-time systems, programming techniques and development methodologies. **Prerequisites:** Grade of C or better in ESET 349; junior or senior classification in electronic systems engineering technology.

ESET 400 Industrial Automation

Credits 4. 3 Lecture Hours. 2 Lab Hours. Industrial applications of electronic devices; instrumentation; AC and DC drives; local area networks; cell and area controllers and advanced applications of programmable controllers. **Prerequisites:** Grade of C or better in ESET 300; junior or senior classification in industrial distribution.

ESET 415 Advanced Network Systems and Security

Credits 3. 2 Lecture Hours. 3 Lab Hours. Advanced topics of the network systems and security including network design and protocol (BGP, IP Routing, IPv6, NAT, DNS); network security (ACLs, TCP/IP security, and VPN); socket programming and cryptographic protocols. **Prerequisites:** Grade of C or better in ESET 315; junior or senior classification in electronic systems engineering technology or approval of instructor.

ESET 419 Engineering Technology Capstone I

Credits 3. 2 Lecture Hours. 3 Lab Hours. Project management tools for a formal technical proposal; addresses scope, schedule, risk, cost, milestones and deliverables; planning and initial design of prototype implemented in ESET 420; teams must have sponsor and technical advisor. **Prerequisites:** Grade of C or better in ESET 319 or MXET 300, ESET 333 or MMET 361, and ESET 369; must be taken the fall or spring semester immediately prior to ESET 420; senior classification.

ESET 420 Engineering Technology Capstone II

Credits 2. 6 Lab Hours. Second semester course in capstone design sequence; focus on design implementation, testing, documentation, demonstration, and presentation of a fully functional prototype; professional design tools for schematic capture, printed circuit board layout and software development, integration and validation. **Prerequisite:** Grade of C or better in ESET 419; grade of C or better in ESET 352, ESET 415, ESET 455 and ESET 462, or concurrent enrollment; ENTC 399 or concurrent enrollment; senior classification in electronic systems engineering technology.

ESET 444 Building Energy Management Systems

Credits 3. 2 Lecture Hours. 3 Lab Hours. Essential elements of energy management from understanding energy production to consumption; identification of the major components of energy management of buildings, energy audit to business (strategy), Heating Ventilating Air Conditioning (HVAC), control systems, economics (ROI) and engineering system integration. **Prerequisites:** Senior classification.

ESET 452 Electronics Testing II

Credits 3. 2 Lecture Hours. 3 Lab Hours. Advanced testing techniques of electronic devices and systems; study of advanced electronics test methodologies; emphasis on circuits containing analog to digital converters (ADCs) and digital to analog converters (DACs); device interface board design and data analysis; both circuit analysis (2/3) and circuit design (1/3) using industry grade state-of-the-art equipment. **Prerequisites:** Grade of C or better in ESET 349 and ESET 352; junior or senior classification in electronic systems engineering technology.

ESET 453 Validation and Verification

Credits 3. 2 Lecture Hours. 3 Lab Hours. Validation of semiconductor devices; differences between validation and production testing; extensive use of Altium for simulation and layout of circuits; use of Spotfire to analyze data acquired as part of validation process; focus on acquisition of valid data and clear and concise presentation of data to stakeholders. **Prerequisites:** Grade of C or better in ESET 352; junior or senior classification in electronic systems engineering technology.

ESET 455 Wireless Transmission Systems

Credits 4. 3 Lecture Hours. 3 Lab Hours. System engineering aspects of microwave, satellite and cellular communication systems; power budget calculations, propagation analysis, systems descriptions; CNR, CIR; review of modulations practical engineering considerations. **Prerequisites:** Grade of C or better in ESET 315 and ESET 355; junior or senior classification in electronic systems engineering technology.

ESET 456 Embedded Sensors and Internet of Things (IoT) Systems

Credits 3. 2 Lecture Hours. 3 Lab Hours. Integration of off-the-shelf sensors and embedded intelligence components to form data acquisition, monitoring and control of remote equipment and systems through wired and wireless networks; algorithm development and implementation in interrupt-driven and RTOS-based firmware environments; collection, reduction, analysis and information extraction of data from multiple edge devices using industry-standard cloud-based software environments. **Prerequisites:** Grade of C or better in ESET 355, ESET 359, and ESET 369; junior or senior classification in electronic systems engineering technology.

ESET 462 Control Systems

Credits 4. 3 Lecture Hours. 3 Lab Hours. Components, principles and techniques fundamental to automated control systems; study of transfer functions, network analysis using Laplace transforms, Z transforms, feedback control systems theory, digital computer simulation and computer-based controls systems. **Prerequisites:** Grade of C or better in ESET 359 and ESET 369; junior or senior classification in electronic systems engineering technology.

ESET 469 Embedded Real Time Software Development

Credits 3. 3 Lecture Hours. Survey of the operation and use of Real Time Kernels as the basis for embedded system firmware development; includes task operation, inter-task communications, synchronization, dynamic memory, multitask system design and defensive programming techniques; embedded RTOS applications. **Prerequisites:** Grade of C or better in ESET 369; junior or senior classification in electronic systems engineering technology.

ESET 485 Directed Studies

Credits 1 to 6. 1 to 6 Other Hours. Directed study of special problems in an in an area of electrical systems engineering technology not covered in other courses. Maye be repeated for credit. **Prerequisites:** Senior classification and approval of instructor.

ESET 491 Research

Credits 0 to 4. 0 Lecture Hours. 0 Lab Hours. 0 to 4 Other Hours. Research conducted under the direction of faculty member in the college of engineering. May be repeated three times for credit. **Prerequisites:** Junior or senior classification and approval of instructor.