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, Thévenin's and Norton's theorems, mesh and nodal equations; measurement of current, voltage and waveforms with meters and oscilloscopes.
Prerequisite: 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 Thévenin'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: ESET 210; MATH 152.

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 250 Introduction to Electronics Technology
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Hardware and software tools used in the electronics industry; software tools include LabVIEW and PSPICE; designed for anyone who needs knowledge, awareness and working familiarity of the software tools used in industry.

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: ESET 219 with a grade of C or better or concurrent enrollment; electronic systems engineering technology major; multidisciplinary engineering technology major.

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/IP topics including the protocol stack, router operation and addressing issues.
Prerequisites: ESET 219; electronic systems engineering technology major.

ESET 319 Engineering Leadership
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Exploration of Emotional Intelligence (EI), identification of personal EI competencies and areas for improvement, and development of these competencies and skills; determination of techniques to anticipate and manage our emotions, and to anticipate and work with the emotions of others.
Prerequisite: ENGL 104 with a grade of C or better; junior or senior classification.

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; completion of ENGL 104, MATH 151, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.

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.
Prerequisites: ENGR 112 with a grade of C or better; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; electronic systems engineering technology.

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; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; electronic systems engineering technology.

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: ESET 210 with a grade of C or better; CHEM 107 and CHEM 117 with a C or better; ENGL 104, MATH 151, MATH 152, and PHYS 218 with a grade of C or better; 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: ENTC 329 and ESET 350 with a grade of C or better.

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 and PHYS 208; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; 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; 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; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.

ESET 366 Communications Electronics  
Credits 3. 2 Lecture Hours. 2 Lab Hours.  
Fundamental communications concepts, frequency domain, analog and digital modulation, transmitter and receiver architectures, communication circuits including filters/oscillators/PLLs/amplifiers/mixers, fiber optics.  
Prerequisites: Grade of C or better in ESET 350 or concurrent enrollment; junior or senior classification; or approval of instructor.

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: ESET 349 with a grade of C or better; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.  
Corequisite: ENTC 350.

ESET 415 Advanced Network Systems and Security  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Practical network systems and security; topics include network design and protocol such as VLAN, HSRP, IP Routing, MPLS, and SAN; network security such as ACLs, TCP/IP security, IDS, and VPN; network service and management such as DHCP, DNS, NAT, SNMP, and MIB; and network verification and testing.  
Prerequisites: ESET 315 with a grade of C or better; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; junior or senior classification in electronic systems engineering technology.

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.

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.  
Prerequisites: Completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; senior classification in electronic systems engineering technology; final semester of technical coursework and successful completion of ESET 419 or approval of department.

ESET 435 Data Communications  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Data communications concepts and techniques involving error detection and correction, data link control, switching, client-server computing, data compression, data security, internet protocol (IP), transmission control protocol (TCP), includes development of a data link control layer and a client server system utilizing socket by using C Programming Language in Visual C++ environment.  
Prerequisites: ESET 315 and ESET 369 with a grade of C or better; junior or 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: Junior or senior classification or approval of instructor.

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; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; 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.

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: ESET 355 with a grade of C or better; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; 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 359 and ESET 369.
ESET 462 Control Systems
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Fundamentals of real-time closed-loop analog and digital control (the proportional, integral and derivative controller); distributed control systems, sensors, electronics, stepper and servo motors on a 16-bit microcontroller platform; design an autonomous vehicle; open industrial networks, such as Control Area Network (CAN) and DeviceNet technologies, will be discussed.
Prerequisites: Grade of C or better in ESET 359 and ESET 369; completion of ENGL 104, MATH 151, MATH 152, CHEM 107 and CHEM 117, and PHYS 218 with a grade of C or better; 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 349 or approval of instructor.