ESET - ELECTRONIC SYS ENGTech (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: 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 Thévenin’s and Norton’s Theorems, Superposition Theorem, and Mesh and Nodal analysis; resonant circuits; passive filters; non-sinusoidal 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 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: Grade of C or better 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: PHYS 207; grade of C or better in ENGR 217/PHYS 217 or PHYS 217/ENGR 217; junior or senior classification in industrial distribution or engineering technology.

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: 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 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: 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 ESET 329; grade of C or better in ENGR 217/PHYS 217 or PHYS 217/ENGR 217, or concurrent enrollment; electronic systems engineering technology major.

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, CHEM 107 and CHEM 117; grade of C or better in ENGR 103 or ENGR 104, ENGR 216/PHYS 216 or PHYS 216/ENGR 216 and MATH 151, MATH 152, and PHYS 206; 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 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; grade of C or better in ENGL 103 or ENGL 104, ENGR 216/PHYS 216 or PHYS 216/ENGR 216, and MATH 151, MATH 152, CHEM 107, CHEM 117, and PHYS 206; 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 Lab 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.
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: Grade of C or better in ESET 315 and ESET 349; 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.
Prerequisites: 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; senior classification in electronic systems engineering technology.

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: 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  
revision 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.  
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; 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.