

APPLIED ENGINEERING AND ENERGY SYSTEMS (AEES)

AEES 1020 - Introduction to Electromechanical Systems I (3 Credits)

This course covers maximum power transfer, the Wheatstone bridge, Thevenin's network analysis, RC and RL transient analysis, RC, RL and RLC AC analysis, passive filters, frequency response, single and 3 phase power, single and 3 phase transformers, fuses, circuit breakers, relays and contactors.

Lecture: 2 hours, Lab: 2 hours

Prerequisite(s): ETEE 1050 (may be taken concurrently)

AEES 1030 - Introduction to Digital Systems (3 Credits)

This course provides the student with a basic understanding of digital systems through the use of programmable logic controllers. The student will explore fundamental properties of digital logic controllers, digital control components and systems. Students also will analyze and develop basic control systems solutions, using logic controller simulation software to configure and test systems.

Lecture: 2 hours, Lab: 2 hours

Prerequisite(s): (MATH 0500 or MATH 0100 or Math Placement)

AEES 1040 - Electronic Devices & Circuits (3 Credits)

This course is a study of the basic laws of electronic circuit theory applied to electronic devices with emphasis on solid state devices, including the theory and operation of semi-conductor diodes and transistors. Operational amplifiers, oscillators, active filters and switching circuits are emphasized and analyzed in laboratory experiments. Analysis techniques include the use of Bode plots and computerized experiments using circuit simulation software in addition to bench work wiring up circuits that are analyzed and then tested.

Lecture: 2 hours, Lab: 2 hours

AEES 1050 - Introduction to Energy Generation & Management (4 Credits)

This course will introduce energy generation and management to the student. Topics covered will include the physics and energy generation and use, the collection and analysis of energy use data, identification and analysis of energy efficiency measures, and the production of an energy assessment report.

Lecture: 3 hours, Lab: 2 hours

Prerequisite(s): (MATH 0600 or MATH 0101 or Math Placement) and (PHYS 1000) or (Bachelor Degree or higher)

AEES 1060 - Robotics and Control (3 Credits)

This course provides an introduction to the field of robotics and automation. Topics include the different robot classification systems and robot arm configurations; robot end effectors, robot operating systems and kinematics. This course also introduces basic concepts of automation and artificial intelligence. Various concepts of control are introduced such as programmable logic controllers. Equipment justification is also introduced. Students will program and operate two types of robots using the robots' programming languages.

Lecture: 2 hours, Lab: 2 hours

AEES 1070 - Mechanical Systems (3 Credits)

This course is designed to familiarize the student with components used in mechanical systems. The student will learn how to select components based on system requirements and how to implement the component into the system. Attention is given to currently manufactured components and the use of the manufacturer's sizing and mounting procedures. More specifically, the sizing and fitting of these elements based on function, power requirements, life and cost.

Lecture: 2 hours, Lab: 2 hours

Prerequisite(s): ENGR 1020 and ENGR 1030

AEES 1080 - OSHA General Industry Safety (1 Credit)

This course provides essential training for individuals working in general industry roles, focusing on foundational safety and health principles as required by the Occupational Safety and Health Administration (OSHA). Students will gain knowledge of OSHA standards and regulations, as well as practical safety practices in various workplace scenarios.

Lecture: 1 hour

AEES 2000 - Introduction to Electromechanical Systems II (3 Credits)

Power generation, transmission and distribution is presented. DC series, shunt, and compound motors are covered. AC single-phase and three-phase generators, synchronous and induction motors, motor protection and electronic controls are analyzed. Students complete extensive labs involving single and three-phase power and motors.

Lecture: 2 hours, Lab: 2 hours

AEES 2010 - Applied Engineering Mechanics

(3 Credits)

Students are introduced to basic concepts in engineering mechanics: statics, dynamics, and the strength of materials, with a focus on technical application of the fundamentals to mechanical design. Newton's Laws are studied with emphasis on equilibrium and motion. Realistic problems are analyzed through the use of vector mechanics. Kinematic and kinetics are investigated to a level sufficient enough for students to follow and develop basic analysis of mechanisms and machines. Stress levels and strain are covered allowing for determination of acceptable analysis and design of mechanical systems.

Lecture: 2 hours, Lab: 2 hours

Prerequisite(s): MATH 1179 and MATH 1181 and PHYS 1000

AEES 2020 - Automation Systems

(3 Credits)

This course addresses fundamental issues of automation. Topics covered include the types of automation, designing for automation, automatic assembly transfer systems, automatic feeding and orienting, and automated material handling systems. Quality and cost analysis as they relate to automation, the design and analysis of lean systems, as well as advanced topics in robotics such as vision systems technology are also discussed.

Lecture: 2 hours, Lab: 2 hours

Prerequisite(s): ETME 1010 and ETEE 1800

AEES 2030 - HVAC Systems

(3 Credits)

This course introduces the physical principles involved in the refrigeration cycle. Students will learn the functions of each component involved in the refrigeration cycle, including compressors, condensers, metering devices, and evaporators. Heating, air-conditioning, and ventilation technologies are also presented.

Lecture: 3 hours

Prerequisite(s): PHYS 1000 and MATH 1181

AEES 2500 - Capstone Energy Audit

(3 Credits)

This capstone course allows students to apply the knowledge and skills acquired while earning their Associate of Science in Applied Engineering and Energy Systems (AEES). As part of the final capstone project, students perform a comprehensive building energy audit. This project requires students to take measurements using survey instrumentation, develop energy conservation measures, and create a final comprehensive, written report highlighting the results of the energy audit.

Lecture: 3 hours

Prerequisite(s): AEES 1050