Electronic Technology (ELEC)

ELEC 1120 DC Circuits with Lab   **3 Credits**
Prerequisite: MATH 1400 or MATH 1650 or higher (can be taken concurrently).
This course introduces Direct Current (DC) circuit concepts, including series, parallel, and series-parallel resistive circuits. Problem solving methodologies focus on application of Ohm's law, Kirchhoff's laws, Mesh, Nodal and Superposition analysis, and Thevenin's and Norton's theorems. The course also addresses transient analysis of switched resistor and capacitor (RC) and switched resistor and inductor (L/R) circuits. Course includes hands-on lab.
(4 contact hours: 2 lecture, 2 lab)

ELEC 1220 AC Circuits with Lab   **3 Credits**
Prerequisite: ELEC 1120 and MATH 1400 or MATH 1700 or higher.
This course introduces Alternating Current (AC) circuit analysis techniques as applied to series, parallel, and series-parallel circuits consisting of resistors, capacitors, and inductors. Students will perform sinusoidal analysis of circuit impedance, voltage, and current, in both polar and rectangular form, using problem solving methodologies learned in ELEC 1120 Direct Current Circuit Analysis. The course also covers concepts of filtering, energy/power, and magnetism. Course includes hands-on lab.
(4 contact hours: 2 lecture, 2 lab)

ELEC 1260 Direct Current and Alternating Current Laboratory   **1 Credit**
Prerequisite: ELEC 1220 (can be taken concurrently).
This course applies the theoretical concepts studied in ELEC 1120 Direct Current Circuit Analysis and ELEC 1220 Alternating Current Circuit Analysis to passive analog circuits. Laboratory exercises consist of utilizing simulation software, circuit components, power supplies, function generators, oscilloscopes, and volt-ohm meters.
(3 contact hours: 3 lab)

ELEC 1330 Digital Electronics with Lab   **3 Credits**
Prerequisite: Placement in MATH 1400 or higher.
This course introduces the analysis, design, and application of logic gates and higher-level digital devices. Students will apply Boolean algebra, DeMorgan's theorem, and Karnaugh Map reduction techniques to logic gates and to various flip-flop and state machine devices. Digital logic applications include arithmetic, counters, registers, memory, state machines, multiplexers, and de-multiplexers. Course includes hands-on lab.
(4 contact hours: 2 lecture, 2 lab)

ELEC 1400 Stand-Alone Photovoltaic Systems   **2 Credits**
Prerequisite: ELEC 1120.
This course provides an overview of basic stand-alone Photovoltaic (PV) systems. Concepts and applications covered include system components, site analysis, PV module criteria, mounting solutions, safety, and basic installation practices. The course will also cover fundamental concepts of sizing a residential stand-alone system, over current protection, and grounding.
(4 contact hours: 1 lecture, 3 lab)

ELEC 2000 Electronic Technology Field Experience   **2 Credits**
Prerequisite: Permission of the Electronic Engineering Technology department chair, ELEC 1120, ELEC 1220, ELEC 1330, and be matriculated into the ELEC program with a minimum cumulative GPA OF 2.0.
This field experience is a planned paid work activity designed to expose the student to the various technical work areas that exist within the various fields of Electronic Engineering Technology. This course is a technical elective in the Electronic Engineering Technology program.
(24 contact hours: 24 lab)

ELEC 2120 Electronics with Lab   **3 Credits**
Prerequisite: ELEC 1120.
This course is an introduction to the theory, operation, and practical applications of solid-state devices. Topics include diodes, bipolar junction transistors, amplifiers, frequency response, operational amplifiers, oscillators, power supplies, and voltage regulators. Course includes hands-on lab.
(5 contact hours: 2 lecture, 3 lab)

ELEC 2150 Operational Amplifiers and Linear Integrated Circuits   **2 Credits**
Prerequisite: ELEC 1220, ELEC 2120.
This course introduces op-amp and integrated circuit concepts applied to linear amplifiers, non-linear signal converters, sinusoidal and square-wave oscillators, and active filters.
(2 contact hours)

ELEC 2170 Power Supply and Integrated Circuits Laboratory **1 Credit**
Prerequisite: ELEC 2150 (can be taken concurrently).
This course applies the theoretic concepts studied in ELEC 2120 Linear and Switch-Mode Power Supplies and ELEC 2150 Operational Amplifiers and Linear Integrated Circuits to active, linear, and switched, circuits. Laboratory exercises consist of utilizing simulation software, circuit components, power apparatus, function generators, oscilloscopes, and volt-ohm meters.
(3 contact hours: 3 lab)

ELEC 2300 Sensors, Actuators, and Control **3 Credits**
Prerequisite: ELEC 1220.
This course introduces applications of discreet device sensors, actuators, and signal conditioning concepts as found in various process control system types. Students will work with analyzing and signal conditioning sensors found in the measured variable feedback loop and actuators found in the controlled variable loop. Students will also analyze Single-Input-Single-Output (SISO) continuous control system characteristics.
(5 contact hours: 2 lecture, 3 lab)

ELEC 2420 Microcontrollers with Lab **3 Credits**
Prerequisite: ELEC 1330.
This course includes microprocessor/microcontroller architecture, instruction sets, software development, interrupt handling, memory, interfacing techniques, and hardware used in control applications designed with microprocessor/ microcontrollers. Course includes hands-on lab.
(5 contact hours: 2 lecture, 3 lab)

ELEC 2460 Digital Systems and Microcontroller Laboratory **1 Credit**
Prerequisite: ELEC 2420 (can be taken concurrently).
This course applies the theoretic concepts studied in ELEC 1330 Digital Systems Fundamentals and ELEC 2420 Microcontroller Applications to digital circuits and embedded system programming. Laboratory exercises consist of writing assembly language programs, utilizing computer software, circuit components, power supplies, function generators, oscilloscopes, and volt-ohm meters.
(3 contact hours: 3 lab)

ELEC 2610 Embedded Systems Project Lab **3 Credits**
Prerequisite: ELEC 2460, ELEC 2170 (can be taken concurrently); or permission of instructor.
This course utilizes a microcontroller as the basic building block for an embedded system that incorporates data acquisition and control concepts. Measurement of a physical system, selection of an appropriate sensor with applied signal conditioning, firmware/software application development, simulation and testing, and control element hardware selection and interfacing are part of the problem solving steps that are required for this course.
(5 contact hours: 2 lecture, 3 lab)

ELEC 2700 Motor Control and Servo Systems **3 Credits**
Prerequisite: ELEC 1120.
This course introduces AC and DC motor theory and operation concepts to open and closed loop control systems. Students will apply feedback error correction techniques to typical servomechanisms and analyze closed loop control.
(5 contact hours: 2 lecture, 3 lab)

ELEC 2821 Programmable Logic Controllers **3 Credits**
Prerequisite: ELEC 1120 or permission of instructor.
This course covers similarities between programmable controllers and relay logic. It includes programmable logic controller (PLC) instructions with application, programming, installation, and troubleshooting techniques. Comprehensive labs use the Rockwell Automation Allen-Bradley family of controllers and programming software to design and implement real world industrial automation applications starting with basic relay logic and progressing to advanced timer/counter applications, sequencer instructions, and Ethernet communications between controllers.
(5 contact hours: 2 lecture, 3 lab)

ELEC 2850 Advanced Programmable Logic Controller Applications **2 Credits**
Prerequisite: ELEC 2821.
This course builds on the knowledge obtained from ELEC 2821 Programmable Logic Controllers covering more advanced functions such as data acquisition, SCADA applications, High Speed Counting, Process instructions, ASCII instructions and Message instructions. It includes fundamental operator interface controls utilizing Rockwell Automation MicroLogix controllers and PanelView operator interfaces. The course also discusses several industrial networks such as EtherNet/IP, Modbus.
(4 contact hours: 1 lecture, 3 lab)