Electro-Mechanical Technology

Survey of Automation

ELMEC 1101 - 3 Credits

Automation technology, including robotics, programmable controllers (PLC), process control instrumentation, industrial electricity, plastics, motion controls, vision systems, and automatic guided vehicles. (2 lecture hours, 2 lab hours)

Motor & Generator Fundamentals

ELMEC 1110 - 3 Credits

Basic principles for Alternating Current (AC) and Direct Current (DC) motors and generators. Motor and generator theory, operation, ratings, speeds, and enclosures. Analysis of efficiency, power service factors, and frame sizes. Motor control concepts, including ladder and wiring drawings. Control devices, including sensors, control transformers, and starters. (2 lecture hours, 2 lab hours)

Residential Wiring

ELMEC 1120 - 3 Credits

All facets of correct wiring methods and techniques, based on the National Electrical Code (NEC). Room by room, circuit by circuit, installation and inspection with an emphasis on symbols, branch circuits, service drops, ground-fault circuit-interrupters (GFCI), low voltage circuits, and security system circuitry. (2 lecture hours, 2 lab hours)

Industrial Electricity

ELMEC 1130 - 3 Credits

Industrial electricity, circuits, devices, and power. The use of instruments on circuit analysis and test equipment. (2 lecture hour, 2 lab hours)

Commercial and Industrial Wiring

ELMEC 1140 - 3 Credits

Designed to provide the electrician with tips and techniques for wiring in commercial buildings, offices, stores, manufacturing and other industrial environments. High voltage branch feeders, motors, appliance service, special systems and overcurrent protection are covered. Emphasis is on the National Electrical Code (NEC), minimum requirements pertaining to high and medium voltage motors, wiring, switchgear and power distribution. (2 lecture hours, 2 lab hours)

Hydraulics and Pneumatics

ELMEC 1141 - 3 Credits

Principles of fluids at rest and in motion. Hydraulic and pneumatic pumps, motors, cylinders, boosters, valves, regulators, and circuitry to transmit and control power. (3 lecture hours)

National Electrical Code

ELMEC 1150 - 3 Credits

An overview of the current national electrical code (NEC) with emphasis on reading, interpretation and revisions. Definitions and terminology are covered. (3 lecture hours)

Introduction to Robotic Technology

ELMEC 1171 - 3 Credits

Introduction to the basic theory and operation of robots in industrial automation. Basic robot and work-place design, safety procedures, and robotic applications are studied. (2 lecture hours, 2 lab hours)

Intro to Programmable Logic Controllers

ELMEC 1190 - 3 Credits

A survey of programmable logic controllers (PLC). Terminology, basic memory structure, I/O's (input/outputs), processors, and programming devices. Basics of programming and applications. (2 lecture hours, 2 lab hours)

Introduction to Fiber Optics

ELMEC 1300 - 3 Credits

Modern theories and applications of fiber optics. Course includes history, information transmission, advantages and disadvantages of fiber, optics, and practical applications. (3 lecture hours)

Maintenance Management Systems

ELMEC 1400 - 3 Credits

Overview of various computerized maintenance management systems. Topics include storeroom inventory, preventive maintenance procedures and scheduling, predictive maintenance costs, records and tracking, International Standards Organization (ISO) certification; training and vendor records. (3 lecture hours)

Electro-Mechanical Technology

Preventive and Predictive Maintenance

ELMEC 1410 - 3 Credits

Fundamentals of preventive and predictive maintenance using vibration analysis, equipment history, repair records and tracking systems. Procedures for identifying and implementing maintenance practices. Scheduled maintenance vs. predictive maintenance, charts and predictive maintenance, analysis of dimension signatures for bearings, motors and pumps, and development of anticipatory failure analysis. (2 lecture hours, 2 lab hours)

Drive Components

ELMEC 1420 - 2 Credits

A hands-on approach to gears and gearing systems, chains and sprockets, belts and sheaves, brakes and clutches, couplings and coupling alignment, bearings and lubrication. (1 lecture hour, 3 lab hours)

Selected Topics I

ELMEC 1820 - 1-4 Credits

Introductory exploration and analysis of selected topics with a specific theme indicated by course title listed in college course schedule. This course may be taken four times for credit as long as different topics are selected. May be taken 3 times for credit. (1 to 3 lecture hours, 2 to 4 lab hours)

Independent Study

ELMEC 1840 - 1-4 Credits

Exploration and analysis of topics within the discipline to meet individual student-defined course description, goals, objectives, topical outline, and methods of evaluation in coordination with and approved by the instructor. This course may be taken four times for credit as long as different topics are selected. Prerequisite: Consent of instructor is required (8 lab hours)

Fiber Optic Applications

ELMEC 2310 - 3 Credits

Designed to provide industrial type simulations and emulate the processes found in real life applications. Topics include connector installation and splicing, fusing and troubleshooting. Prerequisite: Electro-Mechanical Technology 1300 or consent of instructor (2 lecture hours, 2 lab hours)

Programmable Controller II (PLC II)

ELMEC 2410 - 3 Credits

Data manipulation within programmable controllers (PLC) including data transfer, arithmetic functions, shift registers and sequencers. Topics such as analog to digital conversion, operator interface input/output (I/O) bus systems, advanced PLC cards, factory information systems, and troubleshooting of applications. Prerequisite: Electro-Mechanical Technology 1190 with a grade of C or better or consent of instructor (2 lecture hours, 2 lab hours)

Programmable Controller III

ELMEC 2420 - 3 Credits

Advanced topics in programmable controllers (PLCs) such as data highways, programming modules, and on-line programming using manufacturer's advanced software, process conversions to programmable controls and critical areas of process controls. Simulated applications of real-time processes comprise the majority of the course work, such as injection molding machines, and transfer pad printing. Prerequisite: Electro-Mechanical Technology 2410 with a grade of C or better or consent of instructor (2 lecture hours, 2 lab hours)

Advanced Industrial Automation

ELMEC 2430 - 3 Credits

A systems approach to industrial automation. Bus structure, memory devices, digital and analog input/output (I/O) devices, data acquisition systems, digital transmission standards and networks. Emphasis is placed on multiple system design, integration and troubleshooting. Prerequisites: Electro-Mechanical Technology 2410 and Electro-Mechanical Technology 2520 with a grade of C or better or consent of instructor (2 lecture hours, 2 lab hours)

Process and Automation Controls

ELMEC 2510 - 3 Credits

Introduction to language, symbols and principles of process control instrumentation with emphasis on temperature, pressure, level and flow measurement, including calibration of transmitters, process feedback and feedforward loops. Discussion of hazardous area classifications. Introduction to controllers, controller modes and tuning processes. Included are deadband adjustments, proportional (gain), integral (reset), and derivative (rate) calibration. (2 lecture hours, 2 lab hours)

Electro-Mechanical Technology

Advanced Process and Automation Controls

ELMEC 2520 - 3 Credits

An in-depth study of force, stress, strain, linear position, weight and mass measurement. Also included are analytical process measurements such as pH, conductivity and resistivity. Major emphasis is given to control elements in process loops and electrical, pneumatic and hydraulic actuators. Introduction to digital process controllers and in-depth study of piping and instrumentation drawings (P&ID). Additionally, a comprehensive study of intrinsic safety and instrument purging is included. Prerequisite: Electro-Mechanical Technology 1190 and Electro-Mechanical Technology 2510 with a grade of C or better or consent of instructor (2 lecture hours, 2 lab hours)

Motion Control: Servo & Stepper Motor

ELMEC 2600 - 2 Credits

An introduction to motion control, including servo motors, DC servo drivers with control circuits, alternating current (AC) motors, steppers, actuators, sensors, fundamentals of basic control principles, and industrial and engineering applications of motion control systems. Prerequisite: Electro-Mechanical Technology 1190 or consent of instructor (1 lecture hour, 3 lab hours)

Machine Vision & Artificial Intelligence

ELMEC 2610 - 2 Credits

Advanced topics in computer vision for robots, and an introduction to artificial intelligence (AI). Course covers the following main areas: sensors, manipulators, and pattern recognition and vision systems, software and control. Object-oriented programming languages and vision system robotics software will be covered in the laboratory. Prerequisite: Electro-Mechanical Technology 1190 or consent of instructor (1 lecture hour, 3 lab hours)

Critical Thinking in Tech Applications

ELMEC 2620 - 2 Credits

Manufacturing processes and parameters that contribute to the system troubleshooting procedures. Through case studies and practical application, a system of thinking is developed to determine fault isolation and failure. (1 lecture hour, 2 lab hours)

Systems Troubleshooting

ELMEC 2630 - 2 Credits

Examines troubleshooting techniques, time-proven tips and aids to troubleshooting, and use of functional block diagrams in the ICO (input-conversion-output) method of fault isolation. Emphasis is on breakdown maintenance. (1 lecture hour, 2 lab hours)

Internship (Career & Technical Ed)

ELMEC 2860 - 1-4 Credits

Course requires participation in Career and Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. Prerequisite: 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the Associate Dean from the academic discipline where the student is planning to earn credit.

Internship (Career & Technical Ed)

ELMEC 2863 - 3 Credits

Course requires participation in Career and Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 225 clock hours for three semester credit hours. Prerequisite: 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the Associate Dean from the academic discipline where the student is planning to earn credit.

Internship (Career & Technical Ed)

ELMEC 2864 - 4 Credits

Course requires participation in Career and Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 300 clock hours for four semester credit hours. Prerequisite: 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the Associate Dean from the academic discipline where the student is planning to earn credit.

Internship Advanced (Career & Tech Ed)

ELMEC 2865 - 1-4 Credits

Electro-Mechanical Technology

Continuation of Internship (Career and Technical Education). Course requires participation in Career & Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. Prerequisite: 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the Associate Dean from the academic discipline where the student is planning to earn credit.