ELECTRO-MECHANICAL TECHNOLOGY

ELMEC 1101
Survey of Automation
3 Credit Hours
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)

ELMEC 1110
Motor & Generator Fundamentals
3 Credit Hours
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)

ELMEC 1120
Residential Wiring
3 Credit Hours
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)

ELMEC 1130
Industrial Electricity
3 Credit Hours
Industrial electricity, circuits, devices, and power. The use of instruments on circuit analysis and test equipment. (2 lecture hours, 2 lab hours)

ELMEC 1140
Commercial and Industrial Wiring
3 Credit Hours
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)

ELMEC 1141
Hydraulics and Pneumatics
3 Credit Hours
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)

ELMEC 1150
National Electrical Code
3 Credit Hours
An overview of the current national electrical code (NEC) with emphasis on reading, interpretation and revisions. Definitions and terminology are covered. (3 lecture hours)

ELMEC 1171
Introduction to Robotic Technology
3 Credit Hours
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)

ELMEC 1190
Intro to Programmable Logic Controllers
3 Credit Hours
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)

ELMEC 1400
Maintenance Management Systems
3 Credit Hours
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)

ELMEC 1410
Preventive and Predictive Maintenance
3 Credit Hours
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)

ELMEC 1420
Drive Components
2 Credit Hours
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)

ELMEC 1820
Selected Topics I
1 to 4 Credit Hours
Introductory exploration and analysis of selected topics with a specific theme indicated by course title listed in college class 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)

ELMEC 1840
Independent Study
1 to 4 Credit Hours
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)
ELMEC 2410
Programmable Controller II (PLC II)
3 Credit Hours
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)

ELMEC 2420
Programmable Controller III
3 Credit Hours
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)

ELMEC 2510
Process and Automation Controls
3 Credit Hours
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)

ELMEC 2520
Advanced Process and Automation Controls
3 Credit Hours
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 2510 with a grade of C or better or consent of instructor. (2 lecture hours, 2 lab hours)

ELMEC 2560
Motion Control: Servo & Stepper Motor
2 Credit Hours
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: Electronics Technology 1100 with a grade of C or better, or equivalent and Electro-Mechanical Technology 1110 with a grade of C or better, or equivalent or consent of instructor. (1 lecture hour, 3 lab hours)

ELMEC 2620
Critical Thinking in Tech Applications
2 Credit Hours
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)

ELMEC 2860
Internship (Career & Technical Ed)
1 to 4 Credit Hours
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: Consent of instructor and 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 Dean from the academic discipline where the student is planning to earn credit.

ELMEC 2863
Internship (Career & Technical Ed)
3 Credit Hours
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: Consent of instructor and 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 Dean from the academic discipline where the student is planning to earn credit.

ELMEC 2864
Internship (Career & Technical Ed)
4 Credit Hours
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: Consent of instructor and 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 Dean from the academic discipline where the student is planning to earn credit.

ELMEC 2865
Internship Advanced (Career & Tech Ed)
1 to 4 Credit Hours
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: Consent of instructor and 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
Dean from the academic discipline where the student is planning to earn credit.