ELECTRICAL AND MECHANICAL TECHNOLOGY (ELM)

ELM 110 - Electrical/Electronic Circuits **Units: 4**
This course covers basic AC/DC circuit principles and practices. Students will explore areas of electrical and electronic circuits including: circuit theory, components, circuit construction and analysis, soldering techniques, proper test equipment usage, troubleshooting methodology, and applications in various technical fields. Completion of this course (total of 4 units), satisfies 30 hours of instruction toward completing the embedded math curriculum requirements, in accordance with Embedded Curriculum Guidelines Option A.
Transferability: May not transfer towards an NSHE bachelor's degree
Term Offered: Summer and Fall

ELM 127 - Introduction to AC Controls **Units: 3**
An introduction to hard-wired industrial control. Emphasis is on the control of electrical motors through relay logic. Topics include circuit design using industrial control diagrams, circuit construction with industrial control panels and devices, troubleshooting methodology and practice.
Transferability: May not transfer towards an NSHE bachelor's degree
Enrollment Requirements: Prerequisite: ENRG 110 or ELM 110 or instructor approval.

ELM 129 - Electric Motors and Drives **Units: 3**
This course covers the construction and operating principles of single and poly phase motors; motor control using relay and timing circuits; and variable speed drives applications. Additional emphasis is placed on maintenance and troubleshooting of electric motors.
Transferability: May not transfer towards an NSHE bachelor's degree
Enrollment Requirements: Prerequisite: ELM 127 or instructor approval.

ELM 134 - Programmable Logic Controllers I **Units: 3**
An introduction to, and hands-on experience with Programmable Logic Controllers (PLC's). Emphasis is on understanding the basic operation and fundamental use of PLC's in industry as a "relay-replacer." The student will build several PLC based control circuits and program the PLC's using PC based software. This course satisfies 20 hours of instruction toward completing the embedded math curriculum requirements, in accordance with Embedded Curriculum Guidelines Option A.
Transferability: May not transfer towards an NSHE bachelor's degree
Enrollment Requirements: Prerequisite: ELM 127 or instructor approval.

ELM 136 - Programmable Logic Controllers II **Units: 3**
This is a continuation of ELM 134 and designed to provide students intermediate level skills in Programmable Logic Control (PLC) programming instruction and control concepts. Emphasis will be placed on programming structure, instructions, and execution for Controllogix platforms. Additional focus will be on network and network protocols throughout the course. Students will utilize advanced simulation software to develop and execute various PLC programs.
Transferability: May not transfer towards an NSHE bachelor's degree
Enrollment Requirements: Prerequisite: ELM 127, ELM 134 and MPT 120 or by Instructor Approval.

ELM 140 - Industrial Robotics I **Units: 3**
An introductory course in Industrial Robotic Systems designed to teach basic robotic system operation and programming using Fanuc Industrial Robots.
Transferability: May not transfer towards an NSHE bachelor's degree
Enrollment Requirements: Prerequisite: ELM 110 and ELM 134, or instructor approval.

ELM 198 - Special Topics in Electrical and Mechanical Technology **Units: 0.5-4**
This course is designed to give students a basic understanding and hands-on experience of current theories in electrical and mechanical technologies. As local manufacturers begin to utilize advanced technologies in their processes, this course will provide a hands on approach to learning the technology in these areas necessary for students to succeed in the new economy.
Transferability: May not transfer towards an NSHE bachelor's degree
Term Offered: AS NEEDED

ELM 233 - Introduction to Instrumentation **Units: 3**
An introduction to the fundamentals of instrumentation and process control. Concepts and measurement of physical variables and brief descriptions of individual processes and combination of processes used in industry. Theory of operation and application of associated process instruments covered.
Transferability: May not transfer towards an NSHE bachelor's degree
Enrollment Requirements: Prerequisite: ELM 134 or instructor approval.

ELM 240 - Advanced Manufacturing and Robotic Systems **Units: 4**
An in-depth look at the integration of robotics into manufacturing systems. Student will gain working knowledge of robot operation, and commissioning of robot "work-cells" utilized in a manufacturing environment.
Transferability: May not transfer towards an NSHE bachelor's degree
Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program and ELM 140.

ELM 340 - Robotic Programming Offline **Units: 3**
This course provides a comprehensive look into robot simulation programming software utilized for offline programming of Fanuc and Kuka robots. Students will gain first hand knowledge of Fanuc and Kuka robotic programming software for the design and setup of a robotic work-cell .
Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.

ELM 440 - Collaborative Robot Design and Operation **Units: 3**
This course provides an in-depth look into the programming, design, and application of collaborative robots. Students will study the history and evolution of collaborative robots within the manufacturing environment, existing limitations, advanced safety system requirements, and the future of collaborative robots.
Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program and ELM 340.