



AUTOMATED MANUFACTURING CERTIFICATE ASSESSMENT 2021

PROGRAM DESCRIPTION

The Automated Manufacturing Certificate is currently being offered at the USUE Price campus and will be completed within a 3-semester timeline. The program is offered as open enrollment, allowing students to enroll anytime during the calendar year and receive a certificate of completion within the following year. The Automated Manufacturing Certificate of Completion prepares both experienced and inexperienced students with the necessary skills to become maintenance technicians in a multitude of industrial and mechanical environments. This program provides a combination of text work, computer simulation, and one-on-one teacher to student training to prepare students for careers in the field of automation. This certificate introduces students to relevant topics, such as electrical controls, fluid power systems, industrial mechanics, motor alignment and wiring, PLC programming, robotics, and other technologies relevant to the ever-changing demands of industry.

The automated manufacturing certificate consists of the following classes offered throughout the 3 semesters (Fall, Spring, Summer)

- [ELET 1120 - Computer Tools for Technology](#) **3**
- [ELET 1130 - Circuit Analysis](#) **3**
- [ELET 1140 - Circuit Analysis Lab](#) **2**
- [ELET 1200 - Motors, Controls and PLCs](#) **4**
- [ELET 1210 - Motors, Controls and PLCs Lab](#) **2**
- [ELET 2110 - Micro Systems](#) **3**
- [ELET 2120 - Micro Systems Lab](#) **2**
- [ELET 2150 - Industrial Instrumentation Systems](#) **3**
- [ELET 2160 - Industrial Instrumentation Systems Lab](#) **1**
- [ELET 2270 - Principles of Robotics](#) **3**
- [ELET 2280 - Principles of Robotics Lab](#) **2**
- [ELET 2988 - Special Problems](#) **3** (Industrial Mechanics)
- [DSME 1310 - Fluid Power Theory](#) **4**
- [DSME 1330 - Fluid Power Lab](#) **4**



Individual course descriptions

Course	Objective	Outcome
ELET 1120 - Computer Tools for Technology	Covers various software packages and systems used by electronic/electrical technicians and technologists in system analysis and design.	Students will gain knowledge of computer programs required to build and implement control systems.
ELET 1130 - Circuit Analysis	This course covers basic and advanced DC and AC electric circuit topics. These topics include but are not limited to Ohm's Law, Kirchhoff's Voltage and Current Laws, resistance, capacitance, inductance, conductance, reactance, susceptance, impedance, admittance, and RC and RL time constants. Analysis of series, parallel, series-parallel and bridge networks using Superposition, Thevenin's and Maximum Power Transfer Theorems, Resonance, Mesh and Nodal Analysis; and Source and - Y Conversions are also covered.	Students will study electrical fundamentals and theory.
ELET 1140 - Circuit Analysis Lab	This course provides practical electronics experience. Emphasis is placed on validation of concepts, laws, theorems and methods of analysis. Students design circuits and develop familiarity with electrical components and test equipment. Laboratory reporting techniques are developed.	Students will safely practice the skills explained in 1130 theory and will calculate and build different electrical circuits. Students will be introduced to the electrical test equipment and electrical components.
ELET 1200 - Motors, Controls and PLCs	This course covers the theories, operations, and applications of motors, motor controls, and programmable logic controllers.	Students will gain additional knowledge of motor control circuits and theory.
ELET 1210 - Motors, Controls and PLCs Lab	This course provides practical experience related to topics in ELET 1200. Topics include motor wiring, programming. Students design wiring to industry specifications. Laboratory reporting techniques are developed through report writing.	Students will complete labs safely and efficiently using additional motor control components, building upon skills learned in the Circuit Analysis class.



Course	Objective	Outcome
ELET 2110 - Micro Systems	This course examines microprocessors and microcontrollers and how they are used in a variety of industrial applications. This course also covers assembly language and C programming, as well as hardware interfacing as it applies to microprocessors and microcontrollers.	
ELET 2120 - Micro Systems Lab	This course reinforces the concepts, techniques, and systems studied in ELET 2110. Particular emphasis is placed on safety, operation of test equipment, programming of devices, interfacing systems, and laboratory reporting.	
ELET 2150 - Industrial Instrumentation Systems	Course topics include temperature and pressure measurements, flow, and level measurements used in process control.	Students will study different types of sensors and their characteristics.
ELET 2160 - Industrial Instrumentation Systems Lab	Students set up, calibrate, test, and troubleshoot devices used to measure process parameters. Students interpret manufacturer's specifications to perform safe and accurate calibration of various transmitters, sensors, and systems.	Labs will be performed using the different sensors studied in 2150.
ELET 2270 - Principles of Robotics	Students are introduced to the concepts associated with robots. Topics include robot types, kinematics, industrial uses, actuators, and programming. Emphasis is placed on the use of robots for industrial automation.	
ELET 2280 - Principles of Robotics Lab	This lab consists of exercises associated with the concepts learned in the ELET 2270 lecture. Emphasis is placed on safety, programming, and proper lab reporting techniques.	



ELET 2988 - Special Problems(Industrial Mechanics)	Students will learn the fundamentals of mechanical transmission systems and allows for the practice of industry-relevant skills including how to operate, install, maintain, troubleshoot, and design basic mechanical transmission systems using chains, v-belts, spur gears, bearings, and couplings.	Through both web-based learning and student-teacher interactions students will learn then apply knowledge into labs on a mechanical trainer.
DSME 1310 - Fluid Power Theory	Classroom instruction is given in the basic fundamental principles of fluid power. Covers the theory and operation of hydraulic fluid, reservoir design, filters, pumps, actuators, pressure controls, directional controls, and flow controls. Students will have the opportunity to learn schematic symbols through representations of various types of circuit design representing both closed loop and open center systems in industrial as well as mobile applications. As the course progresses, students will be introduced to methods of troubleshooting hydraulic systems using a flow meter and pressure gauges.	Students will discuss and mathematically calculate the relationships between hydraulic pressure, force, area, and resistance as well as rpm, torque, hydraulic horsepower, energy and heat loss. Students will also identify and review hydraulic fittings, hose types, and safety.
DSME 1330 - Fluid Power Lab	Hands-on experience identifying, testing, troubleshooting various brands of hydraulic components.	Students will use a flow meter and pressure gauges to troubleshoot hydraulic components as well as test different components on a hydraulic test bench. Particular emphasis is placed on component identification, failure analysis and hydraulic fitting identification.