

# ETS-ENGINEERING TECH: SPECIALT (ETS)

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## ETS 1535C Automation Process Control (3 Credits)

This course introduces Modern Proportional-Integral-Derivative control, PID, control theory with the use of sensors, actuators, and Programmable Logic Controllers, PLC, are introduced. The student will be introduced to state of the art engineering level PLC control systems used in industry and the elements that comprise a closed-loop process.

## ETS 1540C Industrial Applications Using PLCs and Robotics (3 Credits)

This course introduces and elaborates concepts, principles, and relationships of automated assembly devices, computer-aided drafting/design (CADD), computer-aided manufacturing (CAM), industrial robots, numerical control (NC), industrial lasers, programmable logic controllers (PLCs), automated guided vehicles (AGVs), flexible manufacturing systems (FMS), and computer-integrated manufacturing (CIM).

## ETS 1542C Introduction to PLCs (3 Credits)

This course introduces various programmable logic controllers and how each interfaces with hydraulic, pneumatic and electrical controls for automated applications. Laboratory experiences include the design and troubleshooting of ladder logic programs, working with counters, registers, decoders, and digital to analog converters, analog to digital converters, and storage devices. The latest programmable logic controllers from the leaders in the industry will be used as the processors for control applications, rung programming, sequencers, data manipulation instruction, file-to-file moves and graphics. Communications between the processors on the same platforms will be over a Data Network that is selective to each PLC manufacturer. The course concludes with an individual student project involving the programmable logic controller and electro-mechanical control of an industrial application.

## ETS 1603C Fundamentals of Robotics and Simulation (2 Credits)

In the course, students will learn about articulated arm servo robotics and their applications in various industrial tasks like assembly, material handling, and inspection. This course covers fundamental topics such as basic robot operation, programming techniques using teach pendant and PC software, application design, I/O interfacing, operator terminal programming, and more. Students learn to simulate a servo robot, edit and design robot programs, and execute tasks like assembly, material handling, precision and inspection. Combining theoretical knowledge with simulated practice, learners gain a deep understanding of robotic concepts and practical skills, enhancing their competency in real-world applications. With interactive technical learning, students are equipped for success in the dynamic field of robotics.

## ETS 1700C Hydraulics and Pneumatics (3 Credits)

Introduction to the theory and operation of hydraulic and pneumatic systems involving the principles, components, symbols, and applications will be included from both a systems development and troubleshooting context. Special emphasis will be placed on hydraulic and pneumatic components, flow diagrams for particular applications, when used with computer-integrated manufacturing techniques. This course also includes troubleshooting procedures for systems, system components and manufacturing assemblies, taught in a systematic manner.

## ETS 2051 Skilled Trades and Construction (1 Credit)

The Skilled Trades and Construction (STAC) course develops and supports fundamental skills and knowledge required to successfully complete the Construction and Skilled Trades (CAST) assessment. This course has been developed to improve competence in the areas of Graphic Arithmetic, Mechanical Concepts, Reading and Comprehension, and Mathematical Usage. Successful completion of this course better prepares graduates to excel in the service, manufacturing, transportation, utility power, and construction sectors.

## ETS 2511C Electro-Mechanical Systems (3 Credits)

The course encompasses mechanical drive installation, operation, motor drive alignment, and application of diverse motor drive systems. Students will utilize both the mechanical drives training system and interactive curriculum to acquire theoretical understanding and practical skills in shaft, belt, gear, and chain drives, employing authentic motor drive components. It offers hands-on skill development in mechanical drive systems, essential fasteners, power transmission, v-belt drives, chain drives, spur gear drives, and multiple shaft drives.

## ETS 2544C Advanced PLCs (2 Credits)

This course leverages systems that facilitate the development of essential PLC troubleshooting skills. Students learn PLC input and output testing, software testing, and application troubleshooting through interactive exercises and real-world scenarios. Hands-on experience is a cornerstone of this course, with students working directly with industry-standard components, Ethernet Switches, an I/O Simulator, and a variety of application circuits. By studying industry-relevant applications and mastering troubleshooting techniques, learners build a robust foundation for success in diverse industrial settings. Through engaging instruction and practical exercises, students develop the skills and knowledge necessary for a rewarding career in fields such as manufacturing, automation, and beyond.

## ETS 2550C SCADA Systems (3 Credits)

This course introduces the fundamental principles and components of Supervisory Control and Data Acquisition (SCADA) systems. Topics include the architecture, communication protocols, data acquisition methods, human-machine interface and design considerations essential for real-time monitoring and control of industrial processes. The course covers the development of user-friendly Human-Machine Interfaces (HMIs) using industry-standard SCADA software, emphasizing hands-on exercises.