

# AUTOMATION & CONTROLS ENGINEERING TECHNOLOGY (AENT)

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**AENT3110 | Advanced Industrial Controllers with Lab | Lecture/Laboratory (3 Credits)**

Develop foundational skills in PLCs while introducing advanced topics and applications. Advanced applications include control algorithms, structured-text programming and network communications with a focus on system design and integration.

**AENT3120 | CAD for Electrical Controls | Lecture (2 Credits)**

Use E-CAD software to design and layout electrical and electronic circuits for use in both discrete manufacturing and process control systems.

**AENT3130 | Engineering Project Management | Lecture (2 Credits)**

Introduction to the tools and processes used to manage complex engineering and technology projects. Utilize industry standard software to develop budgets, timelines and project goals.

**AENT3210 | AC, DC & Servo Motor Control with Lab | Lecture/Laboratory (3 Credits)**

Examine the theories, calculations and applications of various motors and controls for the purpose of controlling industrial machinery and processes.

**Prerequisite(s):** AENT3110

**AENT3220 | Engineering Statics & Dynamics | Lecture (3 Credits)**

Apply vector algebra and differentiation to forces in equilibrium as well as the effects of forces on the motion of objects.

**Prerequisite(s):** MATH1810

**AENT3230 | Machine Vision & Automated Inspection | Lecture (2 Credits)**

Apply computer-based vision systems for automated inspection, data reporting and deep learning. Program and commission vision-based systems to inspect part features for the purpose of quality control and/or machine guidance.

**AENT3240 | Industrial Networks & IIoT | Lecture (2 Credits)**

Determine how industrial networks enable machines to communicate real-time data between sensors, machines and enterprises. Apply networking technology to the interface of controls and sensors using industry-standard network protocols.

**AENT4110 | HMI & SCADA Systems with Lab | Lecture/Laboratory (3 Credits)**

Analyze Supervisory Control & Data Acquisition (SCADA) systems and how they are used to display and control remote field devices for industrial processes. Topics include PC-based terminals, human machine interfaces (HMI), network communications and IEC 60870 standards.

**Prerequisite(s):** AENT3110

**AENT4120 | Fluid Power Engineering | Lecture (3 Credits)**

Explore the operation, performance characteristics and maintenance of fluid power systems and components. Perform mathematical calculations for application of pumps, motors, valves and cylinders.

**AENT4130 | Machine Safety & Risk Assessment | Lecture (2 Credits)**

Examine OSHA machine guarding requirements as they pertain to hazard prevention.

**AENT4140 | Autonomous Guided Vehicles | Lecture (2 Credits)**

Explore issues concerning the use of AGVs in the manufacturing industry, including material flow optimization, material handling and AGV risk factors.

**AENT4210 | Industrial Automation with Lab | Lecture/Laboratory (3 Credits)**

The fundamentals of industrial automation identifies the overlap of several automation components. Programmable controllers, machine vision systems, CNC machines and industrial robots are interfaced. Focus is on the justification for automation and productivity calculations.

**AENT4220 | Applied Thermodynamics & Heat Transfer | Lecture (3 Credits)**

Apply first and second laws of thermodynamics to closed and open systems. Topics include one-dimensional conduction, convection and radiation.

**Prerequisite(s):** AENT3220

**AENT4295 | Senior Capstone Project | Capstone (4 Credits)**

Demonstrate overall content knowledge of the program outcomes through a capstone automation project. Conduct a final presentation of the project and explain how it applies to the engineering program outcomes, with a focus on justification for automation and productivity calculations.

**Prerequisite(s):** WRIT4020