Instr and Auto Engr Tech (INST)

Courses

**INST 0140 Introduction to Motors and Motor Control Theory:** 2 semester hours.
Introduces basic motors and motor control. Fundamentals of AC and DC motors; includes two-wire and three-wire controls using various controllers, control relays, timing relays, solenoid valves, latching relays, and motor control centers. Computer software used to design and verify motor control circuits. S

**INST 0220 Introduction to Programmable Logic Controllers:** 3 semester hours.
Ladder format, I-O instructions, external devices, operating cycle, relays, timers, counters, sequencers, shift registers, analog applications, math blocks, and troubleshooting. F, S

**INST 0236 Applications of Electronic Electrical and Industrial Process Control Fundamentals:** 6 semester hours.
Application of electronic sensors, thyristor circuits, and networks. Electrical motor control, relays, timers, and PLCs. Computer software used to design and verify motor control circuits, variable frequency drives, and interface methods for controllers. Basic process control, print reading, and device calibration methods. Troubleshooting techniques and safety practices. D

**INST 0240 Theory:** 2 semester hours.
Basic concepts of process control devices, calibration and test equipment, diagrams and symbols. F, S, Su

**INST 0242 Theory:** 2 semester hours.
Electronic instruments-sensors, indicators, transmitters, computing relays, electro-optics, electronic controllers, ratio control, cascade control, recorders, analytical equipment, troubleshooting. F, S, Su

**INST 0250 Laboratory:** 1 semester hour.
Use of test equipment, power supplies, current and volt measurements, use of oscilloscope, capacitor checker, decade box, Wheatstone bridge, transmitter simulator, manometers, pressure calibration devices. F, S, Su

**INST 0251 Laboratory:** 1 semester hour.
Set up, maintenance, and troubleshooting of pneumatic control systems, air supply, air regulators, pressure gauges pneumatic transducer calibration, control valve operation with and without positioner, controller operation set point, measurement error, offset, proportional band, reset, derivative, reverse and direct acting. F, S, Su

**INST 0253 Laboratory:** 1 semester hour.
Computer and programmable controller interfacing with transmitters and final elements, PID loops, auto tuning, set up to complete control loops, computer graphics. F, S, Su

**INST 0254 Laboratory:** 1 semester hour.
Calibration of transmitters, simulation of process variables, temperature, pressure, level flow, and humidity control loops. F, S, Su

**INST 0260 Electrical Systems Documentation and Standards:** 2 semester hours.
Introduction to print reading, technical specifications, print annotation, report writing and Electrical codes. F, S, Su

**INST 0281 Electrical Automation Theory:** 8 semester hours.
Theory of control devices and automated systems, sensors, timers, relays, solenoids, line starters, programmable logic controllers (PLCs), print reading, motor control, programming and interfacing PLCs, Human Machine Interfaces (HMIs), variable frequency drives (VFDs), basic Ethernet communication. COREQ: INST 0282. PREREQ: ESET 0102, ESET 0102L, ESET 0110, ESET 0110L. F, S

**INST 0282 Electrical Automation Laboratory:** 5 semester hours.
Application of INST 0281. Design, install, and troubleshoot automated control systems, relays, sensors, solenoids, indicators, timers, transformers, line starters, motors, programmable logic controllers (PLCs), variable frequency drives (VFDs), human machine interfaces (HMIs), basic Ethernet communication. COREQ: INST 0281. F, S

**INST 0292 Process Measurement and Control Theory:** 10 semester hours.
Theory of measurement and process control with an emphasis on pressure, temperature, level, and flow. Common instrumentation signals. Methods of tuning, programming, and troubleshooting process control loops on DCS and PLC platforms. Final element selection and troubleshooting. COREQ: INST 0293. PREREQ: INST 0281, INST 0282. F, S

**INST 0293 Process Measurement and Control Laboratory:** 4 semester hours.

**INST 0294 Cooperative Training:** 1-16 semester hours.
Student pursues on-the-job training in the instrumentation/industrial controls industry which satisfies competencies in lieu of instrumentation/industrial controls courses. A University Co-op agreement must be signed by all parties involved. Student will pursue a pre-determined unit of activity related to the field of study. May be repeated for a maximum of 16 credits. PREREQ: Permission of instructor. D

**INST 0298 Special Topics:** 1-8 semester hours.
Addresses the specific needs of industry, enabling students to upgrade technical skills that are not included in the current program curriculum. May be repeated. Graded S/U, or may be letter-graded. PREREQ: Permission of instructor. D