

# Instr and Auto Engr Tech (INST)

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## Courses

### **INST 1105 Computer Hardware: 1 semester hour.**

This course covers the computer hardware component of CompTIA A+. Students who complete this course will be able to explain the internal components of a computer, describe how to assemble a computer system and install an operating system. Students, working through hands-on activities, will gain skills in computer assembly, configuration, and maintenance. PREREQ: ITS Major. F, S

### **INST 1120 Introduction to Linux: 3 semester hours.**

Introduction to LINUX operating system and graphical user interfaces. Includes an overview of the Red Hat Linux distribution. Lecture/laboratory. F, S

### **INST 1125 Introduction to VMWare: 3 semester hours.**

### **INST 1140 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 2220 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 2236 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 2240 Theory: 2 semester hours.**

Basic concepts of process control devices, calibration and test equipment, diagrams and symbols. F, S, Su

### **INST 2242 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 2250 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 2251 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 2253 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 2254 Laboratory: 1 semester hour.**

Calibration of transmitters, simulation of process variables, temperature, pressure, level flow, and humidity control loops. F, S, Su

### **INST 2260 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 2281 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 2282. PREREQ: ESET 1102, ESET 1102L, ESET 1110, ESET 1110L. F, S

### **INST 2282 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 2281. F, S

### **INST 2292 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 2293. PREREQ: INST 2281, INST 2282. F, S

### **INST 2293 Process Measurement and Control Laboratory: 4 semester hours.**

Application of INST 2295 and INST 2296 calibration of transmitters, indicators, and controllers. Interfacing pneumatic, electrical, electronic, and computer devices. PID control loop tuning, installation and troubleshooting of working systems. Connecting and configuring instrumentation for programmable controllers. Process control programming. COREQ: INST 2295 and INST 2296. F, S

### **INST 2294 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 2295 Process Measurement and Control Theory: 6 semester hours.**

Installation and maintenance of process measurement and control devices. Common instrumentation signals. Methods of tuning, programming, and troubleshooting process control loops on DCS and PLC platforms. Final element selection and troubleshooting. COREQ: INST 2296, INST 2293. PREREQ: INST 2281, INST 2282. F,S,D

### **INST 2296 Process Dynamics: 4 semester hours.**

Fundamentals of fluid mechanics and thermodynamics for measurement and control with an emphasis on pressure, temperature, level, and flow. Includes valve and pump sizing. COREQ: INST 2295, INST 2293. PREREQ: INST 2281, INST 2282. F, S

### **INST 2298 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