Advanced Automation/Maintenance Program Overview

Service	Semester	SCN	Credits
PLC 2	1	10-628-152	1
PLC 3	1	10-628-153	1
PLC 4	1	10-628-154	1
PLC 5	1	10-628-155	1
Robotics 1	1	10-628-161	1
Robotics 2	1	10-628-162	1
Operator Interfaces	2	10-628-159	1
Robotics Integration	2	10-628-163	1
Cell Integration	2	10-628-194	4
Texts & Materials Provided		TOTAL	12

Target Audience:

Journey Worker Electricians and Advanced Maintenance personnel with strong electrical backgrounds who desire to upgrade their PLC (Studio 5000), Robotics, Industrial Communication, and Device Integration knowledge.

Education Pathways:

- 12 credits toward Automated Manufacturing Systems Technology Associate Degree (60 credits)
- 12 credits toward Electro-Mechanical Associate Degree (60 credits)
- 12 credits toward Advanced Automation & Maintenance Certificate (19 credits)

Course Descriptions

PLC 2

Introduces Programmable Logic Controllers (PLC)s and Studio 5000 (formerly RSLogix5000) Programming Software. The PLC hardware will consist of Allen Bradley products. Students will configure Ethernet communications to connect to the Allen Bradley PLC hardware. Students will use Studio 5000 programming software to create logical solutions for real world applications. The applications will require students to create, download, and debug their programs. Students will study industrial sensors and their uses. Students will wire and test sensor operations.
Coreq: Programmable Logic Controllers (10609173) OR PLC 1 (10628151)

PLC 3

Continues using the Allen Bradley PLC hardware platform with Studio 5000 programming software. Introduces Analog I/O and scaling for program interfacing. Scaling with math instructions, data handling with FIFO/LIFO instructions, and sequencer SQI/SQO instructions are all introduced.
Coreq: PLC 2 (10628152)

PLC 4

Introduces the IEC 61131-3 compatible languages within Studio 5000. Students are introduced to Structured Text (ST), Sequential Function Charts (SFC), and Function Block Diagrams (FBD). Additionally, students learn remote I/O.
Coreq: PLC 3 (10628153)

PLC 5

Introduces motion programming within Studio 5000. Students will configure, tune, program, and troubleshoot a complete motion control system. The course will cover homing, moving, jogging, and coordinated axis instructions of a motion device. The course introduces advanced PLC to PLC communication, advanced data types, and using Add-On instructions.
Coreq: PLC 4 (10628154)

Robotics 1

Introduces basic robotic programming techniques. Hands on experience will include safety, system setup, jogging, events, tools, coordinate systems, and robot movement types.

Robotics 2

Introduces advanced programming techniques. Hands on experience will include robotic input and output routines, program flow, variables/math instructions, offsets instructions, and operator communication instructions.

Operator Interfaces

Introduces Human Machine Interface (HMI) development. Students create Displays, HMI tags, Basic Objects, Object Animations, Global Objects, Alarms, and Trending.

Robotics Integration

Introduces robotic vision systems and PC based robotic programming software. Students will network robots with Programmable Logic Controllers as an introduction to an automated manufacturing cell.

Cell Integration

Covers automated manufacturing cell design and creation. Applies programmable logic controllers, robotics, sensors, motion controls, drives, vision systems, and industrial safety hardware. Students create electrical schematics, wire, program, and troubleshoot an automated manufacturing cell. Prereq: PLC 3 (10628153) or Controls and PLCs (10628123); Industrial Electronics (10628124) or Semiconductors 1 (10660128)