PORTLAND COMMUNITY COLLEGE

Mechatronics

Mechatronics Certificates

at PCC's OMIC Training Center this Winter

PCC offer two Mechatronics certificates, focusing on thinking critically and creatively to troubleshoot and solve electrical problems. Both are based on real industry situations that apply to any manufacturing environment.

Electrical Technician: You'll take five courses for a total of **102 hours** and **10.2 Continuing Education Units (CEU)**. The areas covered are: print reading, control system servicing, and power wiring, including DC, 1-ph, control and power systems taught according to NEC and NFPA regulations.

Electrical Technician Schedule *Tuesday/Thursday 5 – 9 PM & 5 – 9:30 PM*		
Course	**CEU**	**Class Dates**
DC Voltage Systems	2.70	Jan 10 - Jan 31
1-Phase Voltage Systems	2.70	Feb 2 – Feb 21
Circuit Protection Devices	1.60	Feb 23 – Mar 2
3-Phase Voltage Systems	1.60	Mar 7 - Mar 16
Solid State Devices	1.60	Mar 21 - Mar 30

PLC Control Specialist: You'll take three courses for a total of **90 hours** and **9 Continuing Education Units (CEU)**. The areas covered include PLC hardware, wiring, and programming for advanced applications, HMI programming, and networking, troubleshooting network errors for technicians and control engineers.

PLC Control Specialist Certificate Schedule *Monday/Wednesday 5 – 9 PM & 5 – 9:30 PM*		
Course	**CEU**	**Class Dates**
Fundamentals of PLCS	3.00	Jan 9 – Feb 1
Advanced PLCs and HMIs	3.00	Feb 6 – Mar 1
System Automation & Networks	3.00	Mar 8 - Mar 29

LOCATION
PCC Columbia Country Center
OMIC Training Center
34001 NE Wagner Ct,
Scappoose, OR 97056

HOURS
M / T / W / Th
5:00 pm – 9:00 pm

LEARN MORE

Find out more about PCC's Mechatronics classes. Contact OMIC today!

CALL: 971-722-1818
EMAIL: **david.poole15@pcc.edu**
VISIT: pcc.edu/omic

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Programmable Logic Controls (PLC) Specialist Certificate

This certificate path is designed to guide technicians and engineers into an understanding of programmable logic control (PLC) hardware and programming techniques, as well as advanced troubleshooting and integration with peripheral equipment, including Variable Frequency Drives (VFDs), Human-Machine Interfaces (HMIs), remote field I/O terminals, motion control axes, and industrial robots.

The main emphasis of this program is troubleshooting and problem-solving with real-world equipment and downtime scenarios using our custom-designed, hands-on training equipment.

Each class can be taken independently and all are held in the evenings to accommodate work schedules

Course 1 - PLC Hardware and Basic Programming

- Introduction to PLC Hardware
- PLC Power Supply and Field Device Wiring
- Ladder Logic Programming, Including:
  - Input / Output Instructions
  - Timers and Counters
  - Math commands

Course 2 - Advanced PLC / HMI Programming

- Analog Inputs and Outputs
- PLC Program Management
  - Documentation and Tag Descriptions
  - Ladder Routines and Tag Scope
- Advanced Tag Types
  - Array Tags
  - Structure Tags
  - User-Defined Structures
- Interfacing with External Equipment
  - VFDs
  - HMIs

Course 3 - Networking Automated Systems

- Industrial Computer Networking
  - Ethernet
  - Modbus
  - RS-232/485
- Remote and Field I/O Devices
- Interfacing with Industrial Robots
- Interfacing with Motion Controllers / PID Controllers

Three courses, 90 hours total

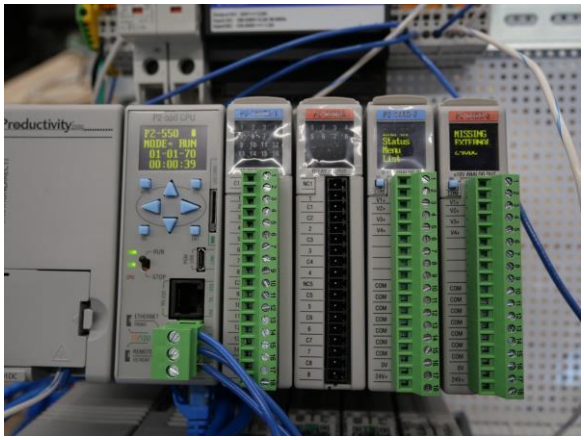
- **Start date: 1/9/2023**
- **End date: 3/29/2023**
- **Classes held weekly**
  Mon/Wed 5pm-9pm & 5-9:30pm

Quotes from students who attended the course:

"I troubleshoot systems with various devices installed on them, and understanding how they work will help with the troubleshooting process. Mixing it up between lecture and hands-on really helps with my attention. Enjoyed the class not being just a textbook."

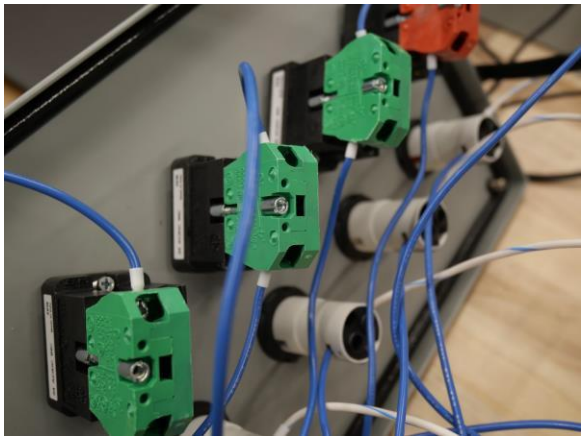
"The PLC class was excellent. I gained so much knowledge and really enjoyed the hands-on portion."

- Interfacing with CNC Controllers

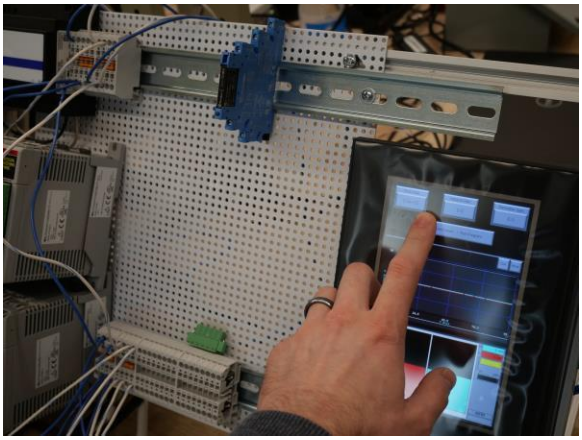


PLC Hardware and Programming

Motor and VFD Interface

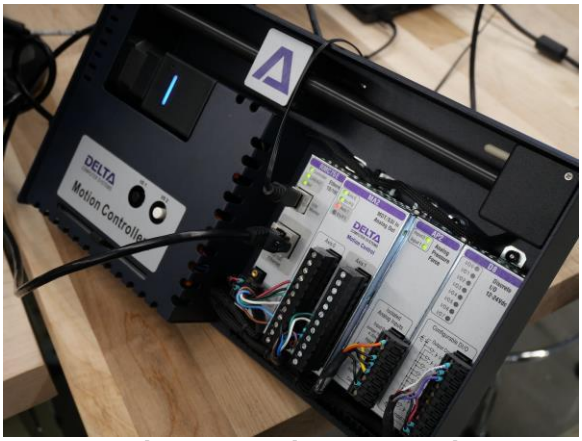


Discrete and Analog I/O Wiring



HMI Programming

Network Troubleshooting



Motion Control Programming

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Electrical Technician Certificate

This certificate path is designed to guide technicians and engineers into an understanding of electrical systems used for control and power of industrial devices. Hands-on activities will be conducted in a safe working environment with no exposure to unguarded, dangerous sources.

The main emphasis of this program is troubleshooting and problem-solving with real-world equipment and downtime scenarios using our custom-designed, hands-on training equipment.

Each class can be taken independently and all are held in the evenings to accommodate work schedules

Course 1 - DC Voltage Systems

- Relationship of V, I, R, and P
- Multimeter Operation
- Series and Parallel Loads and Controls
- Wiring Tools and Installation
- Schematics and Diagrams

Course 2 - AC Voltage Systems

- Principles of Frequency, RMS, and Peak Values
- Reactance of Inductive and Capacitive Devices
- Voltage Conversion with Transformers
- Single-phase Control and Motor Load Devices
- Interference and Measurement of AC Circuits

Course 3 - Circuit Protection Devices

- Electrical Disconnects
- Circuit Breakers and Fuses
- Motor Overload Relays
- Safety Relays and Controllers
- Overcurrent Protection Devices (MOVs, Diodes)

Course 4 - 3-Phase Voltage Systems

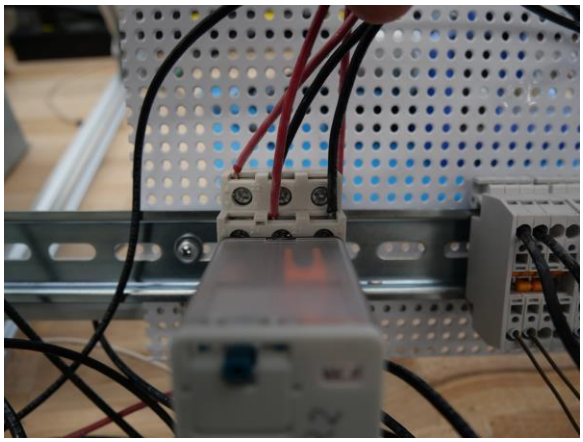
- Principles of Phase Angles and Balancing Loads
- Delta and Wye Wiring Configurations
- 3- 6- and 9-Wire Motor Troubleshooting
- Reversing Contactors, Soft Starts, and VFDs
- Filters, Reactors, and Power Quality

Course 5 - Solid-State Devices

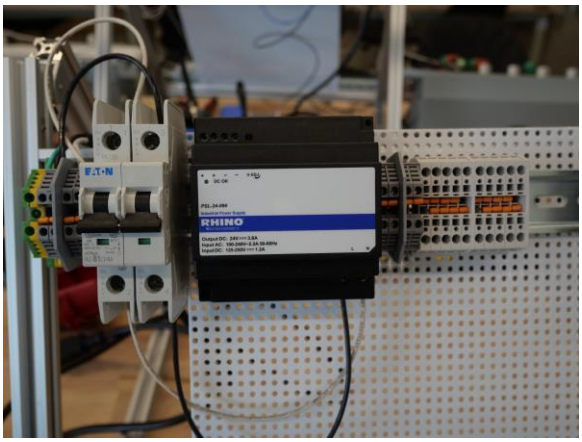
- Solid State Relays
- Heat Dissipation Principles
- PNP and NPN Sensors
- Multimeter Testing of Solid-State Devices
- Analog to Digital Conversion

Five courses, 102 hours

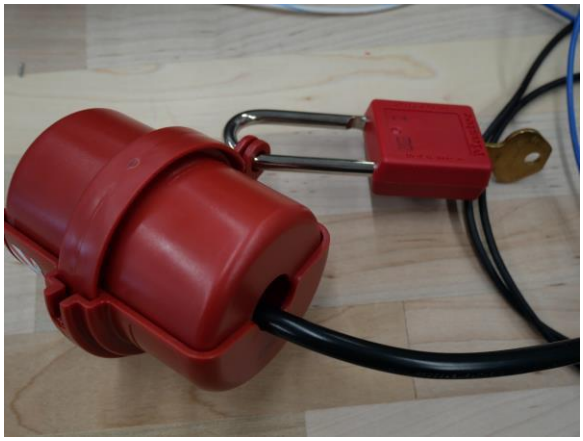
- ***Start date: 1/10/2023***
- ***End date: 3/30/2023***
- ***Classes held weekly***
  - ***Tue & Thu, 5pm-9pm & 5-9:30pm***



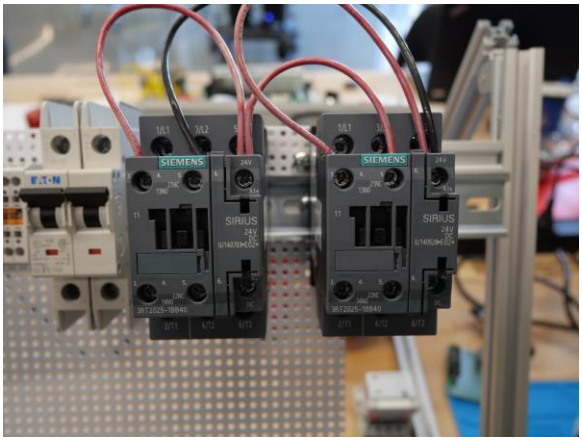
Relay Controls and Troubleshooting



Circuit Breaker and Power Supply

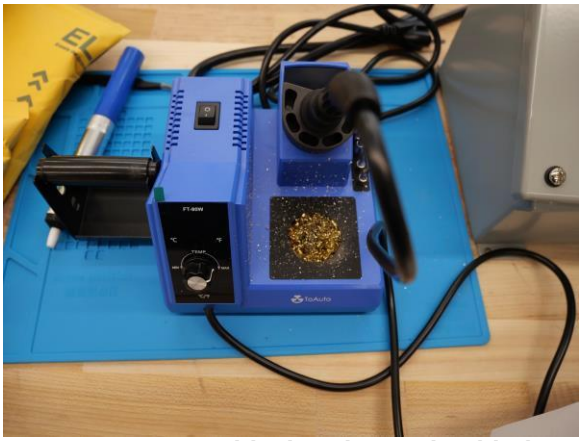


Lock-Out-Tag-Out Principles



Direct Online Motor Controls

DC/1-/3-Motor Wiring and Troubleshooting



Component Troubleshooting and Soldering