COLUMBUS STATE

MANUFACTURING SOLUTIONS

# TECHNICAL TRAINING

*Catalog*

**ONE PARTNER.**
Multiple Service Solutions.

COLUMBUS STATE
MANUFACTURING SOLUTIONS

# TECHNICAL TRAINING LAB CERTIFICATIONS

***Classroom of 1 Pricing Guide***

## ON-SITE TRAINING INFO

Along with our Technical Training Lab certificates, we offer on-site training opportunities for companies equipped with suitable facilities. When you see the icon, it means that the training can be completed either in our lab or at your company's site.

### ELECTRICAL SERIES

| | |
|---|---|
| Electrical Certificate 1* | **$2,000** |
| Electrical Certificate 2 | **$2,870** |
| Electrical Certificate 3 | **$2,870** |
| Electrical Certificate 4 | **$2,395** |
| Electrical Certificate 5 | **$2,045** |

### ALLEN-BRADLEY COMPACTLOGIX STUDIO 5000 SERIES

| | |
|---|---|
| PLC Allen-Bradley CompactLogix Certificate 1 | **$2,645** |
| PLC Allen-Bradley CompactLogix Certificate 2 | **$2,645** |
| PLC Allen-Bradley CompactLogix Certificate 3 | **$1,745** |
| PLC Allen-Bradley CompactLogix Certificate 4 | **$2,645** |
| PLC Allen-Bradley CompactLogix Certificate 5 | **$1,745** |

### ALLEN-BRADLEY CONTROLLOGIX 5500 SERIES

| | |
|---|---|
| PLC Allen-Bradley ControlLogix Certificate 1 | **$2,645** |
| PLC Allen-Bradley ControlLogix Certificate 2 | **$2,645** |
| PLC Allen-Bradley ControlLogix Certificate 3 | **$2,645** |

### PROCESS CONTROL SERIES

| | |
|---|---|
| Process Control Certificate 1 | **$2,495** |
| Process Control Certificate 2 | **$2,495** |
| Process Control Certificate 3 | **$1,745** |

***Pricing listed is for bootcamp program***

***Pricing for on-site trainings will vary and is based on client location, number of participants, and level of customization.***

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# TECHNICAL TRAINING LAB CERTIFICATIONS

***Classroom of 1 Pricing Guide***

## SIEMENS SERIES

| | |
|---|---|
| Siemens PLC Certificate 1 | **$2,645** |
| Siemens PLC Certificate 2 | **$2,645** |
| Siemens PLC Certificate 3 | **$2,645** |
| Siemens PLC Certificate 4 | **$2,645** |

## FLUID POWER: HYDRAULICS SERIES

| | |
|---|---|
| Basic Hydraulics Certificate | **$2,245** |
| Intermediate Hydraulics Certificate | **$2,245** |
| Advanced Hydraulics Certificate | **$1,595** |

## FLUID POWER: PNEUMATICS SERIES

| | |
|---|---|
| Basic Pneumatics Certificate | **$1,945** |
| Intermediate Pneumatics Certificate | **$1,595** |
| Advanced Pneumatics Certificate | **$1,595** |
| Pneumatic Troubleshooting Certificate | **$2,870** |

## MECHANICAL DRIVES SERIES

| | |
|---|---|
| Mechanical Drives 1 | **$3,395** |
| Mechanical Drives 2 | **$3,395** |
| Mechanical Drives 3 | **$3,395** |

## SINGLE CERTIFICATE TRAININGS

| | |
|---|---|
| Siemens S7-1200 Applied Process Control | **$6,995** |
| Plastics Technology | **$2,000** |
| Maintainer/Operator | **$3,095** |

## CONTACT INFO:


**mfgsolutions.cscc.edu**

**mfg@cscc.edu**

**614-287-5000**


**Training is a great start, scan the QR code to learn more about our additional services!**

## ON-SITE TRAINING INFO

In addition to the certificates offered in our Technical Training Lab, we also offer on-site training opportunities for companies who wish to do so and have the appropriate training facilities. Check out our On-site Training Options on pages 13 and 14 for more information and keep an eye out for the icon, which indicates a training that can be done in our lab or on-site.

# WELCOME

The Manufacturing Solutions Technical Training Lab at Columbus State Community College is a blended approach to technical development. We mix online curriculum with hands-on lab instruction to accelerate your learning program. The web-based training is a competency-based program available 24 hours per day. You may access coursework within the lab or at your location. After completion of the virtual training, a series of hands-on lab experiences will be conducted in the Technical Training Lab, located at Columbus State's downtown campus, during scheduled lab hours.

# GETTING STARTED

1. After completing a registration form, you will receive an email welcoming you to the Technical Training Lab online/lab learning program. This email will contain an activation code and instructions on how to activate your account.

2. Once the account has been activated, you will have a specific amount of time to complete the online curriculum.

# THE BASICS

- The TTL learning program consists of topics such as AC/DC Electrical Systems and Basic Pneumatics. Each topic comprises a series of learning activity packets (LAPs). For example, AC/DC Electrical System LAP 1 is Basic Electrical Circuits. Each LAP is broken down into segments, and each segment consists of objectives, activities, and skills.
- The TTL team will set up a training plan for you to complete a certain number of LAPs in a specified timeframe. For example, complete AC/DC Electrical System LAPs 1 and 2 during Week One, complete LAPs 3 and 4 during Week Two, etc.
- A pre-assessment must be taken before launching a LAP.
- After completion of the pre-assessment, the launch button will allow access to the educational content.
- Upon completing the LAP, a post-assessment must be completed.
- In some instances, programs include virtual labs. Those labs are to be completed using virtual trainers as part of the online/lab curriculum.
- You will have access to an online scheduling tool to reserve hands-on learning equipment upon completion of at least one web-based LAP. The scheduling tool will notify faculty and staff about what you will complete.

# ELECTRICAL SERIES

*162 Hours Total*

## ELECTRICAL CERTIFICATE 1 | *40 Hours*

This certificate covers fundamentals of AC/DC systems for power and control in industrial, commercial, agricultural, and residential settings using virtual training. Topics include Basic Electrical Circuits, Measurement, Circuit Analysis, Inductance, Capacitance, Combination Circuits, and Transformers. Additional topics also include relay logic control, including AND, OR, NOT, NOR, and NAND functions, ladder diagrams and their applications, electro-pneumatic valves, sequencing control, timers, and advanced systems like time-delay relays and multi-cylinder control.

### AC/DC Electrical Systems

1. Basic Electrical Circuits
2. Electrical Measurements
3. Circuit Analysis
4. Inductance and Capacitance
5. Combination Circuits
6. Transformers

### Electric Relay Control

1. Control Logic
2. Sequencing Control
3. Timers and Advanced Systems

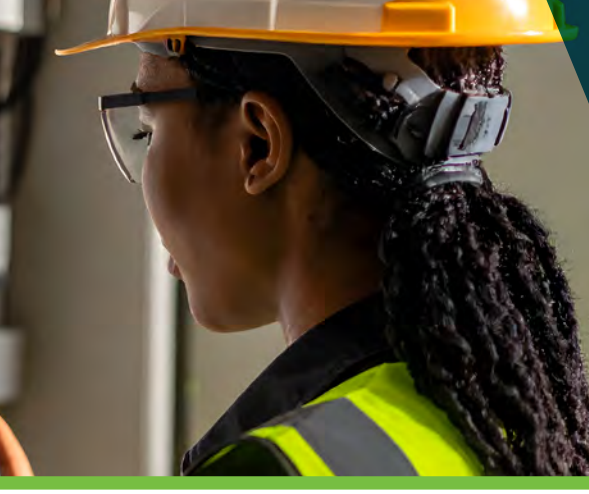
Scan the code to visit our bootcamp page and learn more about upcoming training cohorts!

## ELECTRICAL CERTIFICATE 2 | *35 Hours*

Electric motor control teaches electric relay control of AC electric motors found in industrial, commercial, and residential applications. Learners gain an understanding of the operation, installation, design, and troubleshooting of AC electric motor start/stop circuits, for many common applications. Develops skills in interpreting schematics, system design, motor start/stop circuits, motor sequence control, reversing motor control, and motor jogging. Safety is emphasized; highlighting motor safety, lockout/tagout, and safety interlocks.

### Electric Motor Control

1. Introduction to Electric Motor Control
2. Manual Motor Control and Overload Protection
3. Control Transformers
4. Control Ladder Logic
5. Control Relays and Motor Starters
6. Introduction to Troubleshooting
7. Systems Troubleshooting
8. Reversing Motor Control
9. Automatic Input Devices I
10. Basic Timer Control: On-Delay and Off-Delay



## ELECTRICAL CERTIFICATE 3 | 35 Hours

Electrical certificate 3 introduces learners to motor speed and torque control using variable frequency drives, electronic sensors as input for motor control, programming mini-AB PLC for motor control, and timer and counter instructions.

### Variable Frequency AC Drives

1. Introduction to Variable Frequency AC Drives
2. Speed and Torque Control
3. Acceleration/Deceleration and Braking
4. Fault Diagnostics and Troubleshooting

### Electronic Sensors

1. Electronic Sensors

### Electronic Counter

1. Timers and Counters

### PLC Motor Control

1. Programmable Logic Controller Operation
2. Basic PLC Programming
3. PLC Motor Control
4. PLC Timer and Counter Instructions

## ELECTRICAL CERTIFICATE 4 | 28 Hours

Basic electrical machines introduces electrical circuits and works through many industry tasks in electrical systems including DC Series Motors, DC Shunt and Compound Motors, Motor Speed and Torque, Motor Performance, Split-Phase AC Motors, Capacitor-Start AC Motors, Permanent-Capacitor and Two-Capacitor Motors, and Three-Phase AC Induction Motors.

### Rotating Electric Machines

1. DC Series Motors
2. DC Shunt and Compound Motors
3. Motor Speed and Torque
4. Motor Performance
5. Split-Phase AC Motors
6. Capacitor-Start AC Motors
7. Permanent Capacitor and Two-Capacitor Motors
8. Three-Phase AC Induction Motors

## ELECTRICAL CERTIFICATE 5 | 24 Hours

The electrical wiring system course will introduce learners to wire coding, sizing, and wiring electrical control panels to control reversing a motor using a VFD and an Allen-Bradley CompactLogix PLC controller.

### Electrical Wiring

1. Wiring Tools
2. Wiring Power and Control Circuits and Configuring PLC/VFD

# ALLEN-BRADLEY COMPACT LOGIX STUDIO 5000 SERIES

*136 Hours Total*

## PLC ALLEN-BRADLEY COMPACTLOGIX CERTIFICATE 1 | *32 Hours*

Using Allen Bradley CompactLogix and panel view, this certificate describes the function of a Programmable Logic Controller (PLC), Industrial Network, Operation of EtherNet/IP, how to configure the RSLinx EtherNet/IP Communications Driver, functions of the Studio 5000 programming software, functions of firmware, and how to transfer an application using FactoryTalk View Studio Software.

### Introduction to Studio 5000

1. Introduction to Programmable Controllers
2. PC-PLC Connections
3. Controller Operation
4. PanelView Plus Terminal-PLC Connections and Projects
5. PanelView Plus Terminal Operation
6. PLC Programming
7. PLC Memory Organization
8. Project Creation and Organization
9. Programming Software, Analysis, and Documentation

## PLC ALLEN-BRADLEY COMPACTLOGIX CERTIFICATE 2 | *32 Hours*

PLC instruction and application teaches learners how to design a program to control the Start/Stop of a bidirectional motor. It teaches basic operation of a variable speed drive, describes the function of five pre-defined data types, timer and counter instructions, operation of single and continuous-cycle reciprocating program, and program subroutine and math instructions.

### PLC Instruction and Application

1. PLC Motor and Variable Speed Drive Control Basics
2. Data Types, User-Defined Tags, and Interlock Functions
3. Timer Instructions and Time-Driven Sequencing
4. Counter Instructions
5. Event Sequencing
6. Program Initialization and Master Control Reset
7. Subroutines
8. Math and Data Move Instructions

## PLC ALLEN-BRADLEY COMPACTLOGIX CERTIFICATE 3 | *20 Hours*

This course introduces the FactoryTalk View Station Software. Participants learn to configure communications for a Studio-ME Application and to create and configure an application display, a dynamic object, a Numeric Output Object, and alarms for a PanelView Plus application.

### FactoryTalk View

1. FactoryTalk View Studio – Machine Edition
2. Application Displays and Objects
3. PanelView Plus Application Editing
4. Alarm, Diagnostic, and Information Messages

## PLC ALLEN-BRADLEY COMPACTLOGIX CERTIFICATE 4 | *32 Hours*

This certificate provides a foundational understanding of analog sensors. Topics include calculating process variables using sensor sensitivity, range, and output data; configuring CompactLogix expansion analog input modules; and setting parameters for the 1734-IE2V analog input module. Additionally, participants will learn the operation of CompactLogix comparison instructions and define tag structures for CompactLogix analog output modules.

### Analog Applications

1. Analog Inputs - Sensors
2. Analog Input Default Configuration and Operation
3. Analog Input Tag Structures and Parameterization
4. Comparison Instructions and On/Off Control
5. Analog Output Devices and Modules
6. Analog Output Configuration
7. Variable Speed Drives and PWM Temperature Control
8. Stepper Motor Control

## PLC ALLEN-BRADLEY COMPACTLOGIX CERTIFICATE 5 | *20 Hours*

This PLC troubleshooting certificate will introduce the learner to the basics of PLC power supply, input and output troubleshooting, troubleshooting of Analog Input Loops, troubleshooting of a CompactLogix Analog Output, and applications troubleshooting.

### CompactLogix Troubleshooting

1. Introduction to PLC Troubleshooting
2. PLC Systems Troubleshooting
3. Analog Input/Output Troubleshooting
4. Analog Application Troubleshooting

# ALLEN-BRADLEY CONTROLLOGIX 5500 SERIES

*96 Hours Total*

## PLC ALLEN-BRADLEY CONTROLLOGIX CERTIFICATE 1 | *32 Hours*

This course introduces participants to functions of a programmable logic controller (PLC). It helps learners to identify PLC components and XIC and XIO instruction, as well as, create a PLC project, describe how the I/O module communicates with the PLC processor, and how to create and monitor tags and wire and test a motor starter.

**Introduction to ControlLogix**

1. Introduction to Programmable Controllers
2. Basic PLC Programming
3. PLC Motor Control
4. Discrete I/O Interfacing

## PLC ALLEN-BRADLEY CONTROLLOGIX CERTIFICATE 2 | *32 Hours*

PLC certificate 2 will introduce the learner to retentive and non-retentive timer instructions, counter instructions, power supply troubleshooting, input and output troubleshooting, and application on how to troubleshoot a PLC-controlled electrical motor system.

**PLC Instruction and Troubleshooting**

1. PLC Timer Instructions
2. PLC Counter Instructions
3. Introduction to PLC Troubleshooting
4. PLC Systems Troubleshooting

## PLC ALLEN-BRADLEY CONTROLLOGIX CERTIFICATE 3 | *32 Hours*

This course teaches learners how to design and operate PLC programs for single and continuous cycle actuator reciprocation. Participants will gain skills in creating and managing PLC programs to control motors in both manual and automatic modes. The curriculum covers the use of subroutines, jump, and label instructions while using math instruction.

**PLC Applications**

1. Event Sequencing
2. Application Development
3. Program Control Instructions
4. Math and Data Move Instructions

# PROCESS CONTROL SERIES

*80 Hours*

## PROCESS CONTROL CERTIFICATE 1 | *30 Hours*

This certificate will introduce the learner to common process control applications, the open and close Loops Process Control System, piping and instrumentation diagrams, and the basic functions of an Electronic Loop Controller and of a Current-to-Air Pressure (I/P) Converter. Participants will also learn how to connect and operate a Variable Capacitance Pressure Sensor and how to use a multimeter to test pressure sensor operation.

### Introduction to Process Control

1. Introduction to Process Control
2. Instrument Tags
3. Piping and Instrumentation Diagrams
4. Loop Controllers
5. Final Control Elements
6. Level Measurement

## PROCESS CONTROL CERTIFICATE 2 | *30 Hours*

The process control applications certificate will show learners how to design an On/Off Level Control System, program a Honeywell UDI 1700 Process Meter's Discrete Outputs to Perform On/Off Control, configure and operate a Honeywell UDC 3500 Controller-Based Closed-Loop Liquid Level System, and operate a Proportional Closed-Loop Control System. Additional learning topics include the basic function of flow measurement, how to convert between volumetric and mass flow rate units, defining instrument accuracy and control loop optimization, and how to connect and operate an ultrasonic level sensor.

### Process Control Applications

1. Liquid Level Control
2. Methods of Automatic Control
3. Basic Flow Measurement and Control
4. Control Loop Performance
5. Ultrasonic Level Measurement and Control
6. Differential Pressure Flow Measurement and Control

## PROCESS CONTROL CERTIFICATE 3 | *20 Hours*

This certificate allows learners to study the basics of PLC-based process control and related applications. Major topics include: on/off control, open-loop control, closed-loop control, and PID configuration and tuning.

### PLC Process Control

1. PLC-Based Liquid Level and Flow Control

# SIEMENS S7-1200 SERIES

*128 Hours*


## SIEMENS PLC CERTIFICATE 1 | *32 Hours*

This course introduces learners to the Siemens S7-1200 PLC. Participants learn to connect an S7-1200 PLC to a Profinet network, describe the function of the Totally Integrated Automation (TIA) Portal software, and run a PLC project using the TIA portal software. Additionally, they learn the operation of N.O. and N.C. contact input instructions and the operation of the S7-1200's input and output process image tables.

**Introduction to Siemens**

1. Introduction to Programmable Controllers
2. Basic HMI Panel Operation
3. PLC Program Operations
4. PLC Programming

## SIEMENS PLC CERTIFICATE 2 | *32 Hours*

In this course, participants will learn to design a PLC project to control the start/stop of a bi-directional motor. They will learn the function of two types of timer instructions, three types of PLC counter instructions, and event-driven sequencing. Additionally, participants will learn how to design a PLC project that uses a Function Block (FB) to control a motor application with alarm.

**PLC Instruction and Application**

1. PLC Motor Control
2. PLC Timer and Counter Instructions
3. Event Sequencing
4. Program Control Instructions
5. Math and Data Move Instructions

## SIEMENS PLC CERTIFICATE 3 | *32 Hours*

This course equips participants with the skills to identify WinCC Basic software components, create and configure screen selector objects, and develop two-state symbolic I/O field output objects. Additionally, participants will learn how to configure Siemens S7-1200 integrated analog inputs and develop PLC projects utilizing the NORM_X and SCALE_X instructions.

**Siemens HMI**

1. HMI Application Editing
2. HMI Application Editing 2
3. Analog Inputs
4. Analog Outputs
5. PLC Motion Control

## SIEMENS PLC CERTIFICATE 4 | *32 Hours*

Participants will learn how to interpret the S7-1200's status and diagnostic indicators to assess PLC operation and to perform input and output testing, utilize the diagnostics buffer, and troubleshoot PLC-controlled machines in both manual and automatic modes.

**Troubleshooting**

1. Introduction to PLC Troubleshooting
2. PLC Systems Troubleshooting
3. Analog Input/Output Troubleshooting
4. Analog Application Troubleshooting

# SIEMENS APPLIED PROCESS CONTROL

*30 Hours*

## SIEMENS S7-1200 APPLIED PROCESS CONTROL CERTIFICATE | *30 Hours*

This course introduces the fundamental principles of PLC programming using the Siemens S7-1200 PLC with TIA Portal software. It also covers the development of HMIs. Upon completion, learners will be able to navigate the TIA Portal environment, utilize help documentation effectively, and create PLC routines in Ladder Diagram (LD), Function Block Diagram (FBD), and Structured Control Language (SCL). Additionally, participants will learn how to develop operator interfaces.

### Siemens S7-1200

1. Working Application
2. Clamp and Stamp Application
3. Traffic Light Application
4. Water Level Application
5. Box Filling Application

# PLASTICS TRAINING

*26 Hours Total*

## PLASTICS TECHNOLOGY CERTIFICATE | *26 Hours*

This training introduces injection molding operations that cover the injection molding process, material and machine safety, molding operations, and molding problems and solutions. This course then continues with teaching inserts, threads and multiple part molds, integral hinge, and system purging. It continues into more advanced topics such as the chemistry and properties of plastics, blow molding operations, extrusion process, safety, and operations.

### Plastics Manufacturing

1. Introduction to Injection Molding Operations
2. Injection Molding Operations
3. Plastics: Chemistry and Properties
4. Introduction to Blow Molding Operations
5. Introduction to Extrusion Operations

# FLUID POWER SERIES: HYDRAULICS

*65 Hours*

## BASIC HYDRAULICS CERTIFICATE | *25 Hours*

Basic hydraulics introduces hydraulic power use and application, allowing learners to develop skills and knowledge needed to apply hydraulics in modern industry. It takes learners through key topics and skills in hydraulic power and safety, hydraulic circuits, hydraulic schematics, the principles of hydraulic pressure and flow, and hydraulic speed control circuits. It covers pumps, fluid friction, how to connect hydraulic circuits, hydraulic cylinders and valves (including needle valves), and a wide array of hydraulic applications.

**Basic Hydraulics**

1. Hydraulic Power Systems
2. Basic Hydraulic Circuits
3. Principles of Hydraulic Pressure and Flow
4. Hydraulic Speed Control
5. Pressure Control Circuits

## INTERMEDIATE HYDRAULICS CERTIFICATE | *25 Hours*

Intermediate hydraulics teaches hydraulic components and system applications. Participants will learn industry-relevant skills related to operation, installation, performance analysis, and design. These topics include accumulator sizing, pilot-operated directional control valves (DCVs), cylinder sequencing, flow control valves, relief valves, and remote pressure control.

**Intermediate Hydraulics**

1. Hydraulic DCV Applications
2. Hydraulic Cylinder Applications
3. Hydraulic Relief Valve Operation
4. Hydraulic Check Valve Applications
5. Accumulator Applications

## ADVANCED HYDRAULICS CERTIFICATE | *15 Hours*

This course adds to the basic and intermediate hydraulic skills by teaching advanced applications. Participants will learn industry-relevant skills related to these new topics including operation, installation, performance analysis, maintenance, and design. These topics include heat exchangers, reservoirs, fluid conductors, fluid conditioning, filtration, motor performance, pump performance, system design, and maintenance.

**Advanced Hydraulics**

1. Hydraulic Motor Applications
2. Hydraulic Pump and Motor Performance
3. Fluids and Conditioning

# FLUID POWER SERIES: PNEUMATICS

*85 Hours*

## BASIC PNEUMATICS CERTIFICATE | *20 Hours*

Basic pneumatics introduces pneumatic power through topics including safety, pneumatic circuits and schematics, the principles of pneumatic pressure and flow, and pneumatic speed control circuits. It covers pressure regulation, air filtration, how to connect pneumatic circuits, pneumatic cylinders, valves, and actuators, pressure and cylinder force, pneumatic leverage, pressure and volume, and air flow resistance.

### Basic Pneumatics

1. Pneumatic Power Systems
2. Basic Pneumatic Circuits
3. Principles of Pneumatic Pressure and Flow
4. Pneumatic Speed Control

## INTERMEDIATE PNEUMATICS CERTIFICATE | *15 Hours*

Learners will gain industry-relevant skills related to topics including operation, installation, performance analysis, maintenance, and design. These topics also include cam-operated valves, cylinders, pilot operated DCVs, air filters, and filter selection and maintenance.

### Intermediate Pneumatics

1. Pneumatic DCV Applications
2. Air Logic
3. Pneumatic Maintenance

## ADVANCED PNEUMATICS CERTIFICATE | *15 Hours*

Advanced Pneumatics adds to the basic and intermediate pneumatic skills with topics including pneumatic cylinder loads, quick exhaust valves, motor loads, air bearings, component sizing, and air compressor types and operation.

### Advanced Pneumatics

1. Moving Loads Pneumatically
2. Vacuum Systems
3. Air Compressors

## PNEUMATIC TROUBLESHOOTING CERTIFICATE | *35 Hours*

This course provides a strong understanding of troubleshooting areas such as pneumatic cylinders, motor and rotary actuator, directional control valves, and the construction of a troubleshooting flow chart.

### Pneumatic Troubleshooting

1. Introduction to Pneumatic Troubleshooting
2. Air Reparation Troubleshooting
3. Troubleshooting Pneumatic Cylinders
4. Motor and Rotary Actuator Troubleshooting
5. Troubleshooting DCV and Flow Control Valves
6. Troubleshooting Vacuum Systems
7. Troubleshooting Pneumatic Systems

# MECHANICAL DRIVES SERIES

*126 Hours*

## MECHANICAL DRIVES CERTIFICATE 1 | *42 Hours*

Mechanical drives introduces mechanical systems and develops fundamental knowledge of mechanical systems and practices. Covers basic safety, installation, key fasteners, power transmission systems, v-belt drives, chain drives, spur gear drives, and multiple shaft drives. Topics covered include learning how to select, install, adjust, troubleshoot, and repair a range of mechanical systems which are commonly found in both automated and manual machines used in every industry around the world.

**Mechanical Drives 1**

1. Introduction to Mechanical Drive Systems
2. Key Fasteners
3. Power Transmission Systems
4. Introduction to V-Belt Drives
5. Introduction to Chain Drives
6. Spur Gear Drives
7. Multiple Shaft Drives

## MECHANICAL DRIVES CERTIFICATE 2 | *42 Hours*

Mechanical Drives 2 covers heavy duty V-Belt drives including conventional, multiple, wedge, and variable speed V-Belt drives. This course describes V-Belt selection and maintenance by covering V-Belt size specification, component identification, and troubleshooting. Learners will develop fundamental knowledge of synchronous belt drives, lubrication concepts, precision shaft alignment, and coupling. Also covered is heavy duty chain drives which describes silent chain drives, multiple-strand systems, chain selection, chain lubrication, chain maintenance and troubleshooting.

**Mechanical Drives 2**

1. Heavy-Duty V-Belt Drives
2. V-Belt Selection and Maintenance
3. Synchronous Belt Drives
4. Lubrication Concepts
5. Precision Shaft Alignment
6. Couplings
7. Heavy-Duty Chain Drives

## MECHANICAL DRIVES CERTIFICATE 3 | *42 Hours*

Mechanical Drives 3 includes describing lubrication, selection, maintenance, and troubleshooting of plain ball bearings. It also introduces anti-friction bearings by teaching the fundamental skills of how to identify, mechanically and thermally install, and troubleshooting. Additional topics include gasket and seals (such as O-ring seal, lip seal, and mechanical seal), advanced gear drives (such as helical gear drives and right-angle gear drives), speed reducers, gear drive selections, and maintenance.

**Mechanical Drives 3**

1. Plain Bearings
2. Ball Bearings
3. Roller Bearings
4. Antifriction Bearings Selection and Maintenance
5. Gaskets and Seals
6. Advanced Gear Drives
7. Gear Drive Selection and Maintenance

# MAINTAINER/OPERATOR TRAINING

*38 Hours*

## MAINTAINER/OPERATOR CERTIFICATE | *38 Hours*

The Maintainer/Operator certificate program provides entry level electro-mechanical training. The training builds a comprehensive foundation in basic understanding of electrical, mechanical, and pneumatic systems. Upon completion of the program, participants will have knowledge in topics including basic measurements, Lockout/Tag out, three-phase power, and electric motor installation. The program expedites training time, reduces workplace accidents, and enhances employee productivity.

### Safety

1. Personal Protective Equipment
2. Safety Practices and Regulations
3. Lockout/Tag Out

### Measurement & Gauging

1. Basic Measurement
2. Precision Measurement Tools

### Mechanical Drive Systems 1

1. Introduction to Mechanical Drive Systems
2. Key Fasteners

### Basic Pneumatics

1. Pneumatic Power Systems
2. Basic Pneumatic Circuits

### AC/DC Elecrical Systems

1. Basic Electrical Circuits
2. Electrical Measurements

### Electric Motor Control

1. Introduction to Electric Motor Control
2. Manual Motor Control and Overload Protection

# On-Site Training Opportunities

## EXCEL SERIES

### EXCEL LEVEL I CERTIFICATE | *3 Hours*

One-day, in-person session that utilizes lecture and hands-on activities. The instructor will work with the participants in real time to ensure mastery of the lecture topics of understanding the excel user interface, entering data, using simple functions and simple formulas, using autocalculate, managing worksheet information, formatting a worksheet, and printing a workbook.

### EXCEL LEVEL II CERTIFICATE | *6 Hours*

One-day, in-person session that utilizes lecture and hands-on activities. The instructor will work with the participants in real time to ensure mastery of the lecture topics of absolute reference formulas, link and 3D formulas, range names in formulas, functions, conditional formatting, sort and filter, flash fill, text to columns, duplicate removal, consolidate, validate, insert and format a table, sort and filter data, insert and format a chart, chart tools and format tabs, insert and format a PivotTable, and insert and format a PivotChart.

## PROJECT MANAGEMENT

### PROJECT MANAGEMENT CERTIFICATE | *12 Hours*

Two-day, on-site sessions that follow the Project Management Body of Knowledge (PMI) framework. Topics covered include Creating a High-Performance Team, Starting the Project, Doing the Work, Keeping the Team on Track, and Keeping the Business in Mind. The final training session ends with a company-specific project plan where participants will apply the knowledge learned to an upcoming company project.

## SOLIDWORKS

### SOLIDWORKS ESSENTIALS CERTIFICATE | *32 Hours*

SOLIDWORKS Essentials is a four-day training class available virtually or in-person. Participants learn how to utilize SOLIDWORKS to build 3D parametric models of parts and assemblies and prepare drawings of those parts and assemblies. The program curriculum is divided into modules. SOLIDWORKS Basics, Introduction to Sketching, Basic Part Modeling, Patterning, Revolved Features, Shelling and Ribs, Editing: Repairs, Editing: Design Changes, Using Drawings, Bottom-Up Assembly Modeling, and Using Assemblies (Bill of Materials).

## VIRTUAL WELDING

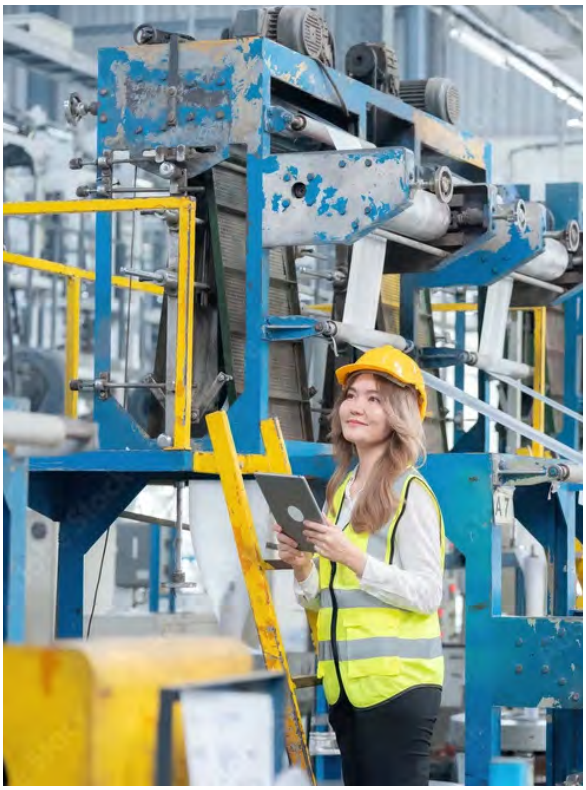
### VIRTUAL WELDING CERTIFICATE | *26 Hours*

This online training provides a broad overview of safety topics for various welding processes, OSHA and ANSI guidelines, and different types of personal protective equipment (PPE) used for welding. The course introduces the learner to common welding processes and workpiece materials, as well as joint and weld types. The course will provide a comprehensive overview and hands-on practice to gas metal arc welding (GMAW), shielded metal arc welding (SMAW) and gas tungsten arc welding (GTAW).

On-site training opportunities are available to companies with the appropriate training facilities and pricing is determined on location, size of cohort, and level of customization.

## On-Site Technical Certifications

- **Electrical Certificate 1**
- **Electrical Certificate 2***
  On-site facility must have 3-phase 208 power
- **Electrical Certificate 4**
- **Siemens PLC Certificate 1**
- **Siemens PLC Certificate 2**
- **Siemens PLC Certificate 3**
- **Siemens PLC Certificate 4**
- **Basic Pneumatics Certificate**
- **Intermediate Pneumatics Certificate**
- **Advanced Pneumatics Certificate**
- **Mechanical Drive Certificate 1**



# ToolingU-SME Online Credentials

## ONLINE SHORT-TERM TRAINING *FOR YOUR EMPLOYEES*

### Learning Plans for Manufacturing Job Roles

Training packages from ToolingU-SME offer quick-start, progressive road maps in various functional areas that allow manufacturers to build career paths for employees. They are intended to enhance your existing OJT and help you create a job progression plan. Unlike many other training programs, these packages require minimal preparation. They are efficient, effective training developed with input from manufacturing experts.

## ONLINE TRAINING OFFERS:

- **Engaging and interactive** content
- Pre- and post-training knowledge assessments
- Access to ToolingU-SME's Learning Management System (LMS)
- Guidance from our Client Success team, including advice, insights, and ideas **built on best practices** and years of experience
- **Self-paced online classes**, typically taking about 60 minutes to complete
- Content developed by industry experts
- Predefined curriculum for each job role
- **Easily accessible** anytime, anywhere on desktops, laptops, tablets, and phones through the ToolingU-SME app

## MOST POPULAR TRAININGS:

- **CERTIFIED MANUFACTURING ASSOCIATE (CMfgA)**
- **SMART MANUFACTURING**
- **WELDING**
- **MACHINING**

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COLUMBUS STATE
MANUFACTURING SOLUTIONS

To begin your training program or to request additional information, please complete our contact form here:

## SEE A TRAINING YOU LIKED? JOT IT HERE AND NOTE ANY QUESTIONS TO ASK OUR TEAM!

# CONTACT INFORMATION

614-287-5000

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**SCAN TO VISIT OUR WEBSITE**

**mfgsolutions.cscc.edu**