



OCM BOCES

Allen-Bradley SLC 500

Electrical Controls

Mechanical Power Systems

Troubleshooting Hydraulics

Onondaga Community College

MET 151 Machine Tools

MET 152 Machine Tools

MET 254 Numerical Control Programming

*For an updated schedule of our classes,
please visit our Event Calendar at
www.macny.org/calendar.aspx*

*Any of the courses in this catalog
can be customized for your facility and
conducted at your location...
contact the MACNY Training Department at
315 - 474 - 4201 opt. 5*

MACNY's Regional Partnership with Onondaga-Cortland-Madison BOCES

Below is a partial listing of courses offered through the Onondaga-Cortland-Madison BOCES

Electrical/Electronic Courses

- Electrical Controls
- Industrial Electronics Maintenance Level One
- Industrial Electronics Maintenance Level Two
- National Electric Code
- Hydraulics for electricians & Electronic Technicians

Industrial Motor Drives Courses

- Maintaining & Troubleshooting AC Motor Drives
- Maintaining & Troubleshooting DC Motor Drives

Mechanical Courses

- Industrial Rigging
- Mechanical Print Reading
- Geometric Dimensioning & Tolerancing
- Mechanical Power Systems & Hydraulics for the Operator

PLC Courses

- Maintenance & Troubleshooting of the Allen-Bradley SLC-500 Level One
- Maintenance & Troubleshooting of the Allen-Bradley SLC-500 Level Two
- RSLogix 500 Software for the Allen-Bradley SLC-500
- Allen-Bradley ControlLogix 7 RSLogix 5

Customized Workforce Training

- Technical Skills
- Computer Skills
- Certification Program
- On and Off-Site Offerings
- Supervisory Skills & Leadership Training
- Assessment and Evaluation Services
- Competitive Pricing
- Company Focused
- Flexible Scheduling
- Office & Professional Skills

***For additional information or to register for any of the courses listed, contact
Debbie Sindone at 315-474-4201 ext 24 or dsindone@macny.org***

Allen-Bradley SLC 500

Who Should Attend:

Plant engineering, maintenance personnel, or anyone with administrative oversight of the SLC 500 platform production.

Prerequisites:

Those attending this course should have a working knowledge of electrical principles, electromechanical control devices, and basic computer skills. Familiarity with the plant process aids in the understanding of the application of the SLC-500 to the production cycle.

Format:

Hands-on Lecture and Lab format allows for both conceptual and practical application of new ideas and principles of the SLC-500 family of controllers. The training employs RSLogix 500 software.

Class Size and Length:

Up to 10 students can attend the 32-hour session. Those completing the course receive 2.8 CEU credits.

Course Objectives:

1. Identification of Typical Hardware Components in a SLC-500 system
2. Configuration, Installation, and Troubleshooting the SLC-500 system
3. Development and Interpretation of Simple Programs in the SLC-500 system
4. Utilization of the Instruction Set of the SLC-500
5. Setup Communication Protocol for the controller and the computer

Course Outline:

- Introduction to PLCs and the SLC500 Hardware
- SLC500 Addressing
- Using RSLogix 500 in Projects
- Uploading, Downloading, and Saving Projects
- Monitoring, Online Editing, and Analyzing Ladder Logic
- Analyzing Instructional Families
- Analyzing Data Manipulation and Program Control
- Using Documentation, Search, Forcing, Histograms
- Using SLC 500 with Remote I/O
- Using Analog with SLC500
- Handling Faults in SLC500
- Converting from SLC-504 processors to Ethernet SLC-505 processors

Electrical Controls

Who Should Attend:

Beginning electricians, equipment operators and people in skilled trades who are cross-training from other disciplines.

Prerequisites:

None.

Format:

Hands-on workshop. One lab station for every two students

Class Size and Length:

Up to 12 students can attend the 32-hour session. Those completing the course receive 2.8 CEU credits.

You'll Learn How To:

1. Work safely with electricity
2. Use a clamp-on meter to make AC current reading
3. Read a resistor value from the color code
4. Use simple math to calculate voltage drops, current and resistance
5. Read single-line drawings
6. Read control-circuit ladder diagrams
7. Test relays, solenoids, contractors, switches, and motor starters
8. Understand basic principles of AC and DC motors
9. Use a multimeter to make voltage and current readings
10. Identify component parts in schematics and ladder diagrams

Course Outline:

I. Fundamental Concepts

- Electricity
- Voltage
- Ground or Common
- AC Voltage & Frequency
- Load

II. Practical Applications

- Meters
- Signed Numbers
- Safety
- Current
- Resistance
- Color Code
- Conductors & Inductors
- Wire Size & Type (AWG)

III. Units of Measurement

- Prefixes
- Technician's Triangle
- Head Calculations
- Ohm's Law
- Power
- Voltage Drops
- Safety
- Ground Faults

IV. Circuits

- Series Circuits
- Parallel Circuits
- Voltage Dividers
- Potentiometer
- Rheostat

V. Components

- Magnetic Fields
- Coils
- Transformers
- Clamp-on Meters
- Diodes
- Bridge Rectifier
- Capacitors
- Filters

VI. Fundamental Circuit Parts

- Power Connections
- AC Wiring
- Three-Phase (Delta & WYE)
- Fuses & Breakers
- Single-Line Diagrams
- Switches & Relays
- Solenoids & Contactors
- NEMA & IEC Ratings

VII. Ladder Diagramming

- Ladder Symbols
- Low-Voltage Control
- Motor Control Centers
- Motor Starters
- Thermal Breakers
- Proximity Switches
- Indicator Lights

VIII. Motors

- Fundamental Concepts
- Rotors & Armature
- Stators & Fields
- Generator Action
- DC Motors
- Three-Phase Motors
- Single-Line Motors
- Meter Checks on Motors

Mechanical Power Systems

Who Should Attend:

Those involved in troubleshooting mechanical devices. This could include operators, millwrights, mechanics, machinery maintenance mechanics, production control supervisors and electromechanical technicians.

Prerequisites:

None.

Format:

Hands-on workshop. One lab station for every two students

Class Size and Length:

Up to 12 students can attend the 32-hour session. Those completing the course receive 2.8 CEU credits.

You'll Learn How To:

1. Better Understand Mechanical Systems
2. Understand Simple & Complex Machines
3. Troubleshooting Mechanical Systems
4. Understand Gear Drives
5. Understand Belt Drives
6. Service Different Types of Belts, Chain, or Gear Driven Systems
7. Make Power Measurements
8. Provide Proper Lubrication
9. Use Various Measuring Devices
10. Understand Applications of Various Industrial Fasteners

Course Outline:

I. Introduction to Mechanical Systems

- Prime Movers
- Types of Loads

II. Simple & Complex Machines

- Energy
- Work
- Power
- Mechanical Advantages
- Lever
- Pulley
- Wedge
- Wheel & Axle

III. Power Measurements

- Horse Power
- Torque
- Speeds
- Input
- Output
- Drive/Driven

IV. Rotating Mechanisms

- Types of Gears
- Work & Friction

V. Measuring Devices

- Inch Micrometers
- Metric Micrometers
- Dial Indicators
- Torque Wrenches

VI. Scales Gear Enclosures

- Parallel Shafts
- Right Angle Shafts
- Gear Ratios
- Maintenance

VII. Belt Drives

- Types of Belts
- Belt Tension
- Pulley Problems

VIII. Variable Speed Drives

- Friction Wheel
- Fixed-Center, Variable Pitch

IX. Chain Drives

- Maintenance
- Kinds of Chains
- Chain Sprockets
- Tooth Belt Drives

X. Servicing Chain Drives

- Lubrication
- Alignment
- Replacement
- Selection of Type

XI. Industrial Clutches

- Principles of Operations
- Torque
- Mechanical
- Selection of Type

XII. Industrial Brakes

- Disk Brakes
- Drum Brakes
- Band Brakes
- Short Shoe Brakes

XIII. Couplings

- Rigid
- Flexible
- Shaft Couplings

XIV. Lubrication

- Principles
- Properties
- Additives
- Types

XV. Bearings

- Principles of Operations
- Types of Bearings
- Removal, Mounting
- Preloading

XVI. Seals

- Dynamic
- Static
- Removal & Installation

XVII. Fasteners

- Screws & Bolts
- Snap Rings & Keys
- Adhesives & Pins

Troubleshooting Hydraulics

Who Should Attend:

Those involved in troubleshooting industrial hydraulic equipment. This could include millwrights, plumbers, pipefitters, mechanics, machinery maintenance mechanics, and electromechanical repair technicians.

Prerequisites:

None.

Format:

Hands-on workshop. One lab station for every two students

Class Size and Length:

Up to 12 students can attend the 32-hour session. Those completing the course receive 3.5 CEU credits.

You'll Learn How To:

1. Read hydraulic schematics
2. Identify and understand common hydraulic components
3. Demonstrate an understanding of common circuit applications
4. Troubleshoot hydraulic power circuits
5. Perform preventive maintenance
6. Remove, clean, and replace hydraulic power components

This course can be tailored to address specific plant needs. Look at your Prints in class.

Course Outline:

I. Introduction to Fluid Power

- Hydraulic Safety
- Color Code for Hydraulic Piping and Tubing
- Troubleshooting Techniques
- Definitions and Pascal's Law

II. Symbols

- Hydraulic Agencies and Symbols

III. Intro to the Hydraulic Trainer

- Graphic Symbol Schematic of Trainer

IV. Directional Control Valves

- Solenoid - Polor - Detented
- Check Valves and Pilot Operated Check
- Remote Pilot Control

V. Pressure Controls

- Spool Type Pressure Control Valves
- Pilot Operated Relief Valve
- Sequence Valve for Machine Operations
- Counter-Balance Valve
- Unloading Valve
- Two Pump Power Supply
- Pressure Reducing Valve
- Relief Valve
- Multi-Pressure Circuits

VI. Flow Controls

- Pressure Compensated Flow Control Valve
- Meter-In and Meter-Out Flow Control

VII. Cartridge Valves

VIII. Actuators

- Linear Actuators / Cylinders
- Regenerative Circuits
- Cylinders in Series and in Parallel

IX. Pumps

- Fixed and Variable Displacement Pumps
- Intensifier (Pressure Booster)

X. Troubleshooting Hydraulic Equipment

XI. Air / Oil Circuits (Air Over Oil)

XII. Accumulators

XIII. Hydraulic Fluids, Seals, and Filters

- Fluid Storage and Oil Analysis
- Oil Analysis Seal Types
- Filtering Methods

XIV. Miscellaneous Circuitry

- Component Quiz

MACNY's Regional Partnership with Onondaga Community College

Below is a partial listing of courses offered through Onondaga Community College

MACNY's Regional Partnership with Onondaga Community College

MACNY has partnered with Onondaga Community College (OCC) to assist in serving the education and training needs of our members in Central New York.

Customized Programs

OCC has many programs to choose from. If you don't see what you need, let us know and we'll create it. We're constantly evolving to respond to the changing needs of employers in our community.

Professional Training at Your Site or On Campus

With training available right at your work location or on our campus, OCC can make it convenient for you and your employees to get the training they need to help stay ahead of trends and technology.

Financing Training

For employers and professional associations, OCC will work with you to find grants and other resources to help you meet your needs. They will assist you to discover ways to finance the cost of training.

Employer Services at Onondaga Community College

- Distance Learning: OCC's programs are designed to be flexible so they meet your needs. So if in-person training on site or on campus doesn't work for you, they can provide distance learning through the College's online learning program.
- The Career and Applied Learning Center, or CAL Center, partners with local employers to connect qualified individuals with internships or job placements. This service is free to students and free for local businesses.
- The Small Business Development Center (SBDC) at OCC is a valuable resource for start-ups and existing businesses. Visit them online at sbdc.sunyocc.edu.

OCC has degree programs in nearly 50 different areas, but below is a partial listing of the subjects offered through OCC that may be of interest to manufacturers:

- Architectural Technology
- Automotive Technology
- Business Courses
 - Writing
 - Communication
 - Customer Service
- Computer Technology
- Electrical Technology
- Hospitality Management
- Information Technology
 - Basic Skills in Computers
 - Intro to MS Office (Word, Excel, Access, PowerPoint)
 - Advanced Skills in IT (leading to industry certifications)
- Mechanical Technology

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Debbie Sindone at 315-474-4201 ext 24 or dsindone@macny.org***

Below are some special classes offered to MACNY members - OCC enrollment is not required



MET 151 Machine Tools

A study of basic theory and laboratory experiences for lathes, milling, drilling, grinding, bench work, and shaping operations. Study of cutting feeds and speeds, surface finishes as well as machine capabilities is included. Two class hours and laboratory.



MET 152 Machine Tools

A continuation of MET 151. Additional theory and laboratory experiences include: milling, attachments, broaching, machine tooling, tapers, heat treating, metal finishes, and inspection. Also basic programming and operations of numerical control equipment. The basic applications of jigs and fixtures. Two class hours and laboratory. Prerequisite: MET 151 or Permission of Instructor



MET 254 Numerical Control Programming

Designed to prepare students with the necessary skills to program NC and CNC controlled machine tools. Lectures address such topics as drawing interpretation, program formats, input media, sub-routines, canned cycles, and tooling, while the laboratory sessions give the students practice in programming learned techniques. Two class hours and three laboratory hours. Prerequisite: MET 261 or Permission of Instructor; Co-requisite: MET 151.

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