Programmable Logic Controller (PLC) Courses

CCP146: ControlLogix System Fundamentals

**Time:** 8am to 4-5pm  
**Duration:** 2 Days  
**Cost:** $760.00 per student  
**Location:** 310 Technology Drive  
Bartow, FL  33830

This course will assist students in developing and building a solid foundation with a fundamental knowledge of Logix5000 systems. Students will be introduced to Logix5000 system components and functionality and will have an opportunity to use Studio 5000 Logix Designer application to perform basic system configuration tasks.

After completing this course, students should be able to perform the following tasks:

- Understand ControlLogix system components
- Select and connect to industrial networks in a Logix5000 system
- Download and go online to a Logix5000 controller
- Operate the Logix Designer application
- Configure local 1756-I/O modules
- Create tags and monitor data in a Logix Designer project
- Draft basic ladder logic for a Logix Designer routine
- Select basic ladder logic instructions for a Logix Designer routine
- Enter ladder logic components in a Logix Designer routine
- Locate ControlLogix system components, I/O Tags, and devices in a Logix5000 system

Who should attend?

Individuals who have little or no working experience with Logix5000 systems or other programmable controllers.
CCCL21: Basic Ladder Logic Interpretation

**Time:** 8am to 4-5pm  
**Duration:** 2 Days  
**Cost:** $760.00 per student  
**Location:** 310 Technology Drive  
Bartow, FL 33830

This course is a skill-building course that provides maintainers with a more detailed understanding of Studio 5000 Logix Designer ladder logic instructions and terminology. It also provides the resources and hands-on practice required to interpret ladder logic instructions for any Logix5000 controller. Students will have the opportunity to use the Logix Designer application to perform basic software tasks to meet the requirements of a given functional specification. In addition to using ladder logic, students will be introduced to ladder logic techniques, established standards, and common rules for interpretation ladder logic.

After completing this course, students should be able to perform the following tasks:

- Review basic ladder logic
- Document and search ladder logic
- Interpret timer and counter instructions
- Interpret program control instructions
- Interpret compare instructions
- Interpret move instructions
- Interpret math instructions
- Interpret expression handling instructions
- Interpret copy and file fill instructions

Who should attend?

Maintainers who need to interpret ladder logic using the Logix Designer application.
CCP153: ControlLogix Maintenance & Troubleshooting

Time: 8am to 4-5pm
Duration: 4 Days
Cost: $1,520.00 per student
Location: 310 Technology Drive
Bartow, FL 33830

This course provides students with the necessary resources and hands-on practice to efficiently troubleshoot a previously operational ControlLogix system and restore normal operation. This course adds to students’ skill sets by introducing new tasks, such as connecting to a network, interpreting project execution, and editing ladder logic online. After practicing such skills, students will be presented with a systematic strategy for diagnosing and troubleshooting a variety of system errors, such as controller, I/O, and other hardware problems, noise-related problems, and software configuration problems.

After completing this course, students should be able to perform the following tasks:

- Optional: Locate ControlLogix system components
- Interpret project organization and execution, frequently used instructions, arrays, and tags of user-defined data types
- Locate and edit tag values
- Force I/O and toggle bits
- Troubleshoot digital, analog, and remote I/O
- Update Logix5000 firmware
- Troubleshoot controller, power supply, noise related, and digital I/O module problems
- Analyze and troubleshoot a system using trend chart
- Edit ladder logic online
- Optional: Edit FDB’s online
- Document, print, and search project components

Who should attend?

Individuals who need to maintain and troubleshoot a ControlLogix or other Logix 5000 system.
CCP143: Project Development

**Time:** 8am to 4-5pm  
**Duration:** 4 Days  
**Cost:** $1,520.00 per student  
**Location:** 310 Technology Drive  
Bartow, FL 33830

This course covers tasks common to all controllers that use the Logix5000 control engine or operating system, including ControlLogix, CompactLogix, and SoftLogix controllers. This course presents a deeper understanding of project development tasks, such as organizing tasks and routines, organizing controller data, configuring modules, and sharing data. Students will use Producer/Consumer technology to multicast input and output devices, share data between controllers, and control remote I/O.

After completing this course, students should be able to perform the following tasks:

- Create and organize a project
- Develop an add-on instruction in ladder diagram and organize arrays
- Create a user-defined data type
- Enter, edit, and verify ladder logic
- Configure a controller to produce and consume data
- Configure controllers to share data over Ethernet/IP™
- Communicate with a local 1756-I/O module and over an Ethernet/IP network
- Allocate connections
- Retrieve and set controller status values with GSV/SSV instructions
- Program a BTD instruction
- Handle a major fault
- Manage project files and update firmware

Who should attend?

Individuals who need to develop Logix Designer projects for any Logix5000 controller.
SAF-LOG101: GuardLogix Application Development

**Time:** 8am to 4-5pm  
**Duration:** 2 Days  
**Cost:** $ 760.00 per student  
**Location:** 310 Technology Drive  
Bartow, FL 33830

Upon completion of this course, students will be able to create a Logix Designer project for a GuardLogix system and maintain the system. Students will have the opportunity to develop and practice these skills by: adding and configuring CompactBlock Guard I/O safety modules; creating and configuring a GuardLogix project; generating safety signatures and lock/unlock a GuardLogix controller; and programming safety instructions.

After completing this course, students should be able to perform the following tasks:

- Create a new GuardLogix project using the Logix Designer application
- Configure CompactBlock Guard I/O safety modules using the Logix Designer application
- Get CompactBlock Guard I/O point status information using the Logix Designer application
- Configure a GuardLogix controller to produce and consume safety data over Ethernet/IP
- Configure GuardLogix controller safety option
- Program a dual-channel input stop with test and mute instruction
- Program a configurable redundant output instruction
- Program a five position mode selector instruction
- Program a safety mat instruction

Who should attend?

Individuals who need to develop Logix Designer projects for GuardLogix controllers.
SAF-LOG103: GuardLogix Fundamentals & Troubleshooting

Time: 8am to 4-5pm  
Duration: 1 Day  
Cost: $380.00 per student  
Location: 310 Technology Drive  
Bartow, FL 33830

This course will assist students in developing and building a solid foundation with a fundamental knowledge of a GuardLogix system. Upon completion of this course, students should be able to efficiently troubleshoot a previously operational GuardLogix system. Students will have the opportunity to develop and practice these skills by learning basic GuardLogix concepts and terminology and troubleshooting a GuardLogix project.

After completing this course, students should be able to perform the following tasks:

- Understand GuardLogix controller safety operation
- Identify GuardLogix system hardware and project components
- Download and upload a GuardLogix project
- Troubleshoot GuardLogix controller components
- Troubleshoot and replace GuardLogix CompactBlock guard I/O safety modules

Who should attend?

Individuals who need to monitor and troubleshoot Logix Designer projects and hardware for GuardLogix controllers.
CCA101: AC/DC Motors & Drives Fundamentals

Time: 8am to 4-5pm  
Duration: 2 Day  
Cost: $760.00 per student  
Location: 310 Technology Drive  
Bartow, FL 33830

This course provides students with a basic understanding of AC and DC motor and drive concepts and terminology. Students will gain the hands-on skills required to build a miniature DC motor and investigate how a variable-speed drive controls the speed and direction of an attached motor. Students will become familiar with the drive Human Interface Module (HIM), which allows programmers, maintainers, and troubleshooters access to

After completing this course, students should be able to perform the following tasks:

• Identify electromechanical system components and concepts  
• Recognize AC/DC motor drive hardware and operation  
• Select a replacement motor  
• Recognize line protection and filtering device hardware and functions  
• Prevent electrostatic damage  
• Recognize AC/DC drive hardware and functions  
• Recognize AC/DC motor braking methods  
• Test a drive using electrical measuring tools  
• Preform pre-power and power-on checks  
• Monitor and control a drive using the HIM

Who should attend?

Individuals who need to gain a fundamental understanding of motor and drive concepts before they learn to program, maintain, and troubleshoot AC and DC drives.
CCA164: PowerFlex 700 Vector Control Communications on ControlNet

Time: 8am to 4-5pm  
Duration: 2 Day  
Cost: $760.00 per student  
Location: 310 Technology Drive  
Bartow, FL 33830

This course introduces students to techniques and instructions that will assist them in starting up a PowerFlex 700 AC drive and commissioning it on a ControlNet network. Students will learn how to configure PowerFlex 700 drive parameters and install and commission a ControlNet communications adapter. Students will learn to configure a ControlNet network and create network connections for Logix5000 controllers.

After completing this course, students should be able to perform the following tasks:

• Configure Vector Control drive parameters using an LCD HIM  
• Configure Vector Control drive parameters using DriveExplorer and DriveExecutive software  
• Upload and download PowerFlex 700 Vector Control drive data  
• Startup a PowerFlex 700 Vector Control drive  
• Install and configure a PowerFlex 700 Vector Control drive ControlNet communications adapter  
• Configure an offline ControlNet network  
• Go online to a ControlNet network  
• Enter scheduled ControlNet I/O data connections for Logix5000 controllers  
• Enter ControlNet messages for Logix5000 controllers  
• Control PowerFlex 700 Vector Control drive operation

Who should attend?

Individuals responsible for configuring parameters and starting up PowerFlex 700 Vector Control drives.
CCA161: PowerFlex 700 Vector Control Configuration & Start-Up

Time: 8am to 4-5pm  
Duration: 1 Day  
Cost: $380.00 per student  
Location: 310 Technology Drive  
            Bartow, FL 33830

This course introduces techniques and instructions that will assist students in successfully configuring and starting up a PowerFlex 700 vector control drive. Throughout the course, the instructor will demonstrate how to configure PowerFlex 700 drive parameters. The instructor will demonstrate how to install and commission one or more of the following communications adapters: remote I/O, DeviceNet, EtherNet/IP, and ControlNet. Then, students will practice these tasks during hands-on exercises using the LCD HIM, DriveExplorer software, and DriveExecutive software. This course is designed as a stand-alone course, or it can be taken in conjunction with other PowerFlex700 courses for further skill development.

After completing this course, students should be able to perform the following tasks:

• Configure drive parameters using DriveExplorer and DriveExecutive software
• Configure drive parameters using an LCD HIM
• Startup a drive, upload and download drive data
• Control drive operation
• Install and configure a EtherNet/IP communications adapter
• Install and configure a DeviceNet, ControlNet, and remote I/O communications adapter

Who should attend?

Individuals responsible for configuring parameters and starting up PowerFlex 700 vector control drives.
CCA162: PowerFlex 700 Vector Control Communications on DeviceNet

**Time:** 8am to 4-5pm  
**Duration:** 1 Day  
**Cost:** $380.00 per student  
**Location:** 310 Technology Drive  
Bartow, FL 33830

This skill-building course introduces techniques and instructions that will assist students in successfully configuring a PowerFlex 700 vector control drive to communicate on an existing DeviceNet network. Throughout the course, the instructor will demonstrate how to use RSNetWorx for DeviceNet software to perform tasks, such as browsing the network, commissioning the PowerFlex 700 node, and configuring drive parameters. Students will learn about scanner module configuration and input and output mapping. This course is designed as a stand-alone course or it can be taken in conjunction with other PowerFlex 700 courses for further skill development.

After completing this course, students should be able to perform the following tasks:

- Connect a drive to a DeviceNet network
- Commission a node on a DeviceNet network
- Configure drive and adapter parameters using RSNetWorx for DeviceNet software
- Manage DeviceNet EDS files for the PowerFlex 700 vector control drive
- Configure a 1756-DNB module to communicate with a PowerFlex 700 drive using RSNetWorx for DeviceNet software
- Map PowerFlex 700 drive inputs and outputs to a 1756-DNB module using RSNetWorx for DeviceNet software

Who should attend?

Individuals responsible for configuring PowerFlex 700 vector control drives to communicate on a DeviceNet network.
CCA165: PowerFlex 700 Vector Control Communications over EtherNet/IP

**Time:** 8am to 4-5pm  
**Duration:** 1 Day  
**Cost:** $380.00 per student  
**Location:** 310 Technology Drive  
Bartow, FL 33830

After completing this course, given a PowerFlex 700 vector control drive that has been successfully started up and configured, students should be able to add their drive to an EtherNet/IP network that includes Logix5000™ controllers or PanelView™ Plus terminals running FactoryTalk® View ME software. Throughout the course, students will have the chance to use a variety of hardware and software tools, including: A3 LCD HIM; Studio 5000 Logix Designer™ application; and drive configuration software (DriveExecutive™, Connected Components Workbench™). After each demonstration, students will be given exercises that offer extensive hands-on practice using a PowerFlex 700 vector control drive in tandem with a CompactLogix™ controller and/or PanelView Plus terminal.

After completing this course, students should be able to perform the following tasks:

- Add a PowerFlex 700 vector control drive to a Studio 5000 Logix Designer project
- Import PowerFlex 700 drive control code into a Studio 5000 Logix Designer project
- Create new PowerFlex 700 drive control code in a Studio 5000 Logix Designer project
- Synchronize data and test PowerFlex 700 vector control drive operating modes
- Configure PowerFlex 700 vector control drive peer-to-peer communications

**Who should attend?**

Individuals responsible for commissioning PowerFlex 700 vector control drives on an EtherNet/IP network.
CCA183: PowerFlex 750 Series Maintenance & Troubleshooting

Time: 8am to 4-5pm
Duration: 2 Day
Cost: $760.00 per student
Location: 310 Technology Drive
Bartow, FL 33830

This skill-building course introduces concepts and techniques that will assist students in successfully maintaining and troubleshooting a PowerFlex 750-Series (PowerFlex 753 or PowerFlex 755) drive. Students will learn how to recognize PowerFlex 750-Series drive hardware and properly wire the drive. Students will learn to diagnose specific faults. Throughout the course, students will have the chance to use a variety of maintenance and troubleshooting tools, including the A6 LCD HIM, DriveExplorer software, and DriveExecutive software. After each demonstration, students will be given exercises that offer extensive hands-on practice using a PowerFlex 753 or PowerFlex 755 drive.

After completing this course, students should be able to perform the following tasks:

- Locate PowerFlex 750-Series drive hardware
- Locate and modify PowerFlex 750-Series drive data using the A6 HIM and drive software
- Clear PowerFlex 750-Series drive alarms and faults
- Perform predictive maintenance using PowerFlex 750-Series parameters
- Troubleshoot PowerFlex 750-Series load/environmental faults and equipment malfunctions

Who should attend?

Individuals responsible for maintaining and troubleshooting PowerFlex 750-Series drives.
CCP310LD: Data Highway/Ethernet Peer-to-Peer Communications

**Time:** 8am to 4-5pm  
**Duration:** 4 Days  
**Cost:** $1,520.00 per student  
**Location:** 310 Technology Drive  
Bartow, FL 33830

This course provides students with an overall systems approach of how Data Highway Plus (DH+) and Ethernet networks relate to both programmable controllers and computers. General network architectures are discussed along with system interconnections, cabling, and installation. Students will be introduced to programming for controllers relative to the DH+ and EtherNet networks. Students will learn about the structure of DH+ and EtherNet communication protocols.

After completing this course, students should understand the following topics:

- DH+ and Ethernet topologies
- Token passing protocol
- Channel diagnostics
- PLC-5 channel buffers
- PC-PLC-5 communications
- PLC-5-to-PLC-5 remote communications
- Ethernet protocols
- PLC-5, SLC-5/05, and ControlLogix CIP Ethernet messages
- SLC-5/04 and ControlLogix DH+ messages

**Who Should Attend?**

Individuals who are responsible for designing, developing, or system programming

Programmable logic controllers
CCP151: Studio 5000 Logix Designer Level 2: Basic Ladder Logic Programming

Time: 8am to 4-5pm  
Duration: 2 Day  
Cost: $760.00 per student  
Location: 310 Technology Drive  
Bartow, FL 33830

This is a skill-building course that provides programmers with the resources and hands on practice required to program basic ladder logic instructions for a Logix5000 controller. Students will use the Logix Designer Application to perform basic software tasks to meet the requirements of a given functional specification. In addition, students will set up a sequencer to run equipment through a predefined procedure and separate production procedure from equipment control.

After completing this course, students should be able to perform the following tasks:

• Start and test a ladder diagram
• Program timer and counter instructions
• Program compare, move, and math instructions
• Document and search and handle expressions
• Program and separate the procedure from equipment control
• Copy and fill an array

Who Should Attend?

Individuals who are responsible for programming Logix5000 controllers using the Logix
CCP180: EtherNet/IP Fundamentals and Troubleshooting

**Time:** 8am to 4-5pm  
**Duration:** 1 Day  
**Cost:** $380.00 per student  
**Location:** 310 Technology Drive  
Bartow, FL  33830

This course will assist students in developing fundamental knowledge of industrial communications over an EtherNet/IP network. Students will learn basic concepts and learn how to use various tools to assign IP addresses to EtherNet/IP devices. This course prepares students to effectively resolve issues with communications between a controller and the devices it is controlling. Students will troubleshoot EtherNet/IP network media and components, including a Stratix 5700 switch. Students will have an opportunity to monitor diagnostic information using web-based technologies and modify web server module data views and tag values.

After completing this course, students should be able to perform the following tasks:

- Assign an IP address to a computer
- Ping a module IP address
- Assign IP addresses using: - RSLinx® classic software and rotary switches  
  - BOOTP-DHCP server software
- Isolate an EtherNet/IP network problem
- Diagnose problems with EtherNet/IP modules and network components
- Monitor an EtherNet/IP network using web-enabled technologies

**Who Should Attend?**

Individuals who are responsible for configuring and troubleshooting new EtherNet/IP networks