



المركز العالمي للتدريب والتطوير  
International Centre For Training & Development



# ICE045

## PLC Overview, Maintenance, Troubleshooting & Problem Solving



**ACTVET**  
Abu Dhabi Centre for  
Technical and Vocational  
Education and Training

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## Course Introduction:

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This "learn-by-doing" course covers the setup, use, programming, troubleshooting, and maintenance of the Allen-Bradley PLC-5 family of programmable logic controllers. Lab exercises cover field devices, input/output modules, wiring, fusing, and processor programming leading to indepth troubleshooting and maintenance of the equipment. The exercises are performed on actual equipment setups and are applicable to process control, motor control, level control, and safety interlocking.

## Course Objectives:

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**Upon successful completion of this course, the delegates will be able to:**

- Understand PLC Control Principles and Applications with Field Devices
- Connect and Wire Field Devices to PLC Inputs and Outputs
- Understand and use basic Ladder Logic Programming
- Use and Configure a Delay Timer and Counter in a Controller
- Connect a Power Device Using an Interposing Relay
- Identify Allen-Bradley PLC-5 Hardware Components and Equipment
- Connect a Programming Terminal to the PLC; KT Card, KE Card, and PCMK Card
- Use the Programming Terminal to Troubleshoot Failed Field Devices
- Determine Address Names for Input and Output Points
- Add Comments to Instructions and Rungs for Program Documentation
- Use Symbolic Addressing to Speed Development and Troubleshooting
- Use Address and Function Searches within the Program
- Save Ladder Logic Ladders and Data Files from the PLC to a Floppy Disk
- Restore Ladder and Data Files to a Processor from a Programming Terminal
- Print Reports and Documentation of the PLC System and Program
- Use the Force Function to Troubleshoot and Maintain Equipment Operation
- Troubleshoot Failed Input and Output Field Devices, Power Supplies, and Processors

## Who Should Attend?

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This course is recommended for all Production Technicians, Maintenance Specialists, and Engineering Technicians who desire a hands-on approach to understanding and troubleshooting the Allen-Bradley line of PLC's. Some background in basic electrical principles is helpful but not a strict requirement. Minimal coverage of theory and mathematical principles is provided with an emphasis on hands-on use of the actual equipment.

# Course Outline:

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## Day 1:

### **INTRODUCTION TO CONTROL SYSTEMS**

- An introduction to control systems and ladder logic is provided by building relay logic circuits using batteries, relays, switches, lights, and connecting wires. Fundamental PLC principles are established as the participants work together to perform the functions of a PLC wired with input and output devices

### **ALLEN-BRADLEY HARDWARE AND LADDER LOGIC PROGRAMMING**

- The components of an A-B PLC5 programmable logic controller are covered noting their function and use. Participants attach input switches and output lights to a PLC system and write basic ladder logic to control their operations. Normally open contacts (XIC), normally closed contacts (XIO), output coils, timers, and counters are used to build and/or motor starter, and safety monitoring circuits.

## Day 2:

### **USING A PROGRAMMING TERMINAL TO MONITOR AND EDIT**

- The use of 6200 series software to monitor and edit control systems is the focus as participants practice the use of KE, KT, and PCMK modules to establish communications between their PC and the PLC. After locating the proper address on the Data Highway, participants log on to the appropriate PLC and check data and program file operation.

## Day 3:

### **SYSTEM TROUBLESHOOTING USING THE PROGRAMMING TERMINAL**

- The programming terminal can shorten the time required to locate and repair failed components. Participants practice using the terminal to locate contacts that are preventing equipment operation, locate the addresses in field hardware, verify proper voltages and current levels, and isolate and repair failed devices.

## Day 4:

### **SYSTEM UTILITIES FOR MAINTENANCE AND REPAIR**

- Steps required to create backup copies of the ladder logic in a PLC and the steps to restore a program to a PLC in the event of a hardware failure or power upset are covered.
- In addition, practice with utilities like printing ladder logic and status reports to a printer is provided. Also included are forcing inputs and outputs, adding symbols and comments to ladder logic, and moving from data files to ladder files while troubleshooting

## Day 5:

### **PUMP CONTROL OPERATIONS**

- The use of the PLC as a controller for pumps and other electrical and safety equipment is studied. Typical ladder logic as used on offshore platforms is used to demonstrate control and safety principles. Participants will view existing code and have the opportunity to build and enhance control systems during the hands-on sections of the course.

## Course Methodology:

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A variety of methodologies will be used during the course that includes:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionnaires
- Group Work
- Discussion
- Presentation

## Course Certificate:

**International Center for Training & Development (ICTD)** will award an internationally recognized certificate(s) for each delegate on completion of training.

## Course Fees:

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**To be advised as per course location.** This rate includes participant's manual, and-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

## Course Timings:

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### Daily Course Timings:

08:00 - 08:20	Morning Coffee / Tea
08:20 - 10:00	First Session
10:00 - 10:20	Coffee / Tea / Snacks
10:20 - 12:20	Second Session
12:20 - 13:30	Lunch Break & Prayer Break
13:30 - 15:00	Last Session