



Fundamentals of Programmable Logic Controllers

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HANDS-ON



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- How PLCs are programmed and what types of programming can be used
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Programmable Logic Controllers

This 3-day **HANDS-ON** seminar is
NOW ONLY \$1,199

History

- Relay logic
- Programmable logic controller

PLC Architecture

- Rack, power supply, processor, inputs and outputs
- Smart modules and communication networks
- Programming tools – computers, terminals, software, and communications

Input and Output Systems

- I/O interfaces (AC/DC voltages, module point sizes)
- Data transfer from module to processor
- Number of I/O per module
- Analog data vs. digital data
- Remote I/O systems

Addressing, Data Memory, and Scan Time

- I/O address relationship to physical module location
- Internal data memory – binary files
- Internal data memory – integer files
- Register memory vs. bit-wise memory
- I/O, memory, rung, and instruction scan process

Ladder Logic vs. Relay Logic

- Ladder diagrams vs. ladder logic
- Sensor and load connections to the PLC and representation in ladder logic
- Rungs and instructions

Relay-Type Instructions

- Examine if on
- Examine if off
- Output energize, output latch, output unlatch
- Differences between instructions and devices (on/off vs. open/closed)

Additional Instructions and Associated Bits

- Timer on-delay, timer off-delay
- Timer done, enable, and timing bits
- Up counter, down counter, done, enable, overflow, underflow bits
- Move instruction – moving data among registers
- Math instructions – add, subtract, multiply, divide, compute
- Comparison instructions – equal, greater than, less than

Number Systems

- Decimal, octal, binary, and hexadecimal systems
- Binary Coded Decimal (BCD)
- Converting data from one number system to another

Sizing and Selection of PLCs

- Estimating the number of I/O modules required for your system
- CPU and memory sizing
- Interpreting the significance of I/O specs provided by the manufacturer
- Choosing a vendor

Installation and Diagnostics

- Precautions for installation and commissioning a PLC system
- Wiring requirements
- Debugging and diagnostic tools

“Hands-On” Exercise Examples

- Motor start/stop circuits
- Trapping random faults
- Signaling alarms
- Tank-level controls
- Sequence-controlled conveyors
- Inputting and outputting numerical data
- Batch control processes
- Automated control systems

- **Win-Win for Employees and Employers**—NTT seminars develop and enhance the skills and confidence level of employees making them more highly qualified technicians. This in turn creates increased productivity, less downtime, and cost-savings for the company. In fact, NTT's cost per training day is lower than most competitors! Companies that invest in NTT seminars provide the opportunity for employees to continue expanding their knowledge base and troubleshooting skills.
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Seminar Schedule

All sessions start promptly at 8:00 am and finish at 4:30 pm. An information-exchange luncheon is held from 12:00 to 1:00 pm and is included in the seminar fee.

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- **Fax Us** *Fill out this form and fax to:* **800-338-8441**
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