

Advanced Electronics

Length of Course: 16 Weeks

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Required:

- Laptop running Windows XP or higher
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Course Description

This Course will build upon the learning from the previous class "Introduction to Applied Electronics". Students will take their learning to the next level by learning professional level programming used to run and automate industrial systems. Students will do a deep dive into the the PLC programming logic, and get to program real PLCs and Touch Screen Displays. Additionally, students will learn how about logic diagrams, PLC communication, programming instrucionts, troubleshooting, control system stability, and SQL querying

1. Logic Diagrams

Objectives:

- Understand bianary code
- Understand discrete logic
- Understand flat arrays & registers

2. Communication between PC and PLC

Objectives:

- Understand how PLCs talk to computers and eachother
 - Solderless serial cable
 - Ethernet
 - RS232
 - Modbus
 - DH232
 - Connect PLC to PLC

3. Communication between PC and HMI (Touch Screen)

Objectives:

- Program display interface of touch display
- Wire up physical outputs to ditigal buttons

4. Math Instructions

Objectives:

- Understand the importance of data vs. information
- Convert real time information into data points using:
 - Summing
 - Averageing
 - Totalizing
 - Accululating
 - Counting
 - Scaling Range

5. **Move and Logical Instructions**

Objectives:

- a. Learn to program dynamic decision making based on streaming data using
 - i. Logical Comparators
 - ii. Deviation Difference

6. **Control system stability and tuning basics**

Objectives:

- a. Troubleshooting data connections and communication
- b. PID tuning for stabilizing inconsistent flows

7. **Human Machine Interface (HMI)**

Objectives:

- a. Troubleshooting data connections and communication
- b. PID tuning for stabilizing inconsistent flows

8. **Interface Design & Interface Types**

Objectives:

- a. Design and develop interfaces for multiple template screens
- b. Create animation screens, trends, historical data logs, and rolling real-time data

9. **Data Handling & Monitoring**

Objectives:

- a. Run SQL queries on stored data points to develop trends
- b. Setup analog & digital monitoring set points on the Panelview Plus