00_SG_What_is_a_PLC

Student Guide: Module 00 – What is a PLC?

Estimated Duration: 30–45 minutes
Format: Lecture + Discussion + Guided Reading
Power Requirements: None – this module is conceptual only
Materials Needed: Printed handout or digital copy, whiteboard or screen

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Resources

- Arduino PLC Course – “What is a PLC?”

Opta Hardware Overview

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Learning Objectives

By the end of this module, students will be able to:

- Define what a PLC is and explain its core function
- Identify real-world applications of PLCs
- Understand why the Arduino Opta is used as a learning tool
- Explain the importance of PLCs in industrial automation and safety
- Describe how PLCs interact with sensors and actuators

Setup Steps

1. **Intro Reading (10 min)**
   Read “What is a PLC? Why Should You Care?” individually or as a class.

2. **Class Discussion (10–15 min)**
   - Where have you seen automation in your life?
   - Why is real-time response critical for some systems?
   - What might happen if a PLC fails?
3. **Mini-Scenario Challenge (10 min)**
   In small groups, pick a scenario (e.g., traffic light, water pump, furnace) and describe how a PLC would control it.
4. **Preview the Opta (5–10 min)**
   Show the Arduino Opta, explain its inputs/outputs, and why it's used for this course.

Key Terms

- **PLC:** Programmable Logic Controller
- **Sensor:** A device that measures a physical quantity
- **Actuator:** A device that performs an action (motor, valve, etc.)
- **Logic Routine:** Set of conditions programmed to control outputs
- **Real-Time Control:** Processing and responding immediately as inputs change

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Reflection Questions

- What makes a PLC different from a regular computer?
- Why does reliability matter more than speed in industrial automation?
- How might understanding PLCs help you in your career path?

Completion Checklist

- [ ] Read and discussed introduction
- [ ] Participated in scenario challenge
- [ ] Can explain at least 3 real-world PLC uses
- [ ] Understands why the Arduino Opta is used in this bootcamp