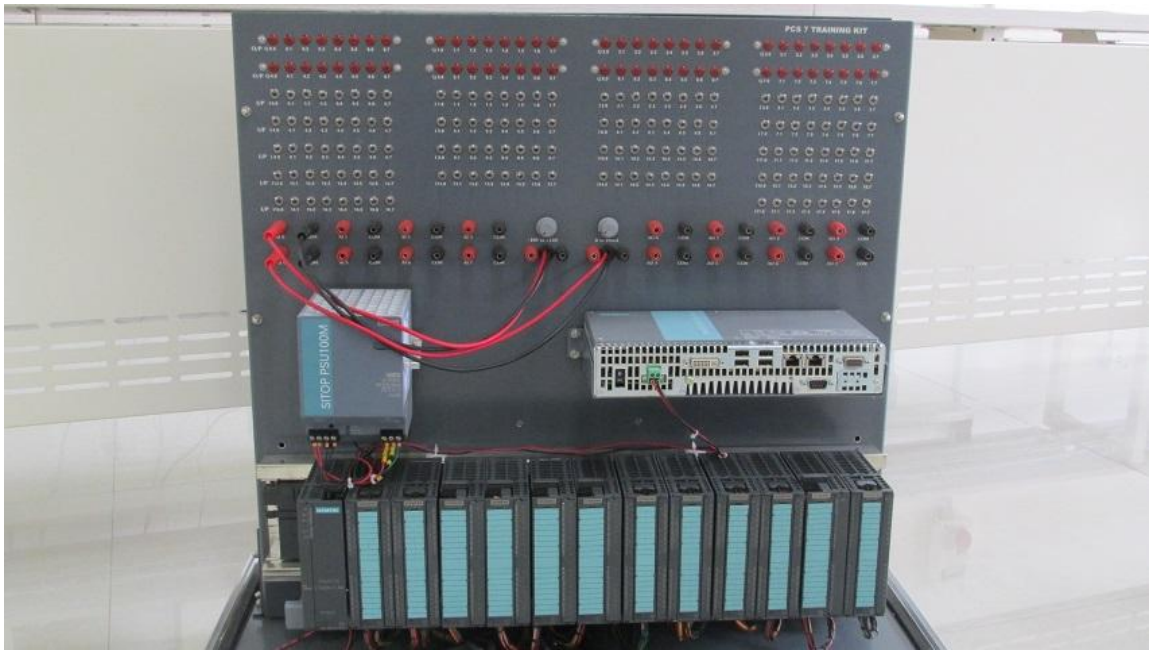
Industrial Automation Lab

Overview:

This lab focuses on **automated control systems, robotics, and smart manufacturing technologies**, providing students with hands-on training in **Programmable Logic Controllers (PLC), Supervisory Control and Data Acquisition (SCADA), Human-Machine Interface (HMI), and industrial communication systems**.

By integrating **Siemens automation technologies**, the lab helps students gain **real-world experience in factory automation, process control, and Industry 4.0 solutions**, making them industry-ready for sectors such as **automotive, manufacturing, pharmaceuticals, and power generation**.



Key Features:

1. **Programmable Logic Controllers (PLC) & Automation Systems**
   - Hands-on training with **Siemens S7 series PLCs**.
   - **Ladder logic programming & function block diagram implementation**.
2. **SCADA & Human-Machine Interface (HMI) Training**
   - **Supervisory Control and Data Acquisition (SCADA) systems** for real-time monitoring.
   - **HMI-based process control** for interactive industrial operations.
3. **Industrial Robotics & Motion Control**
   - **Robotic arms** for material handling, welding, and precision assembly.
   - **Servo and stepper motor control** for high-precision automation.
4. **Sensor Technology & Data Acquisition**
   - Hands-on experience with **proximity, temperature, flow, and pressure sensors**.
   - **Data logging and analytics** for predictive maintenance.
5. **Industrial Communication & IoT Integration**
   - Training in **PROFIBUS, PROFINET, and Modbus industrial networks**.
   - Implementation of **IoT-enabled automation and cloud-based monitoring**.
6. **Smart Manufacturing & Industry 4.0 Concepts**
   - **Digital twin technology** for real-time machine simulations.
   - Integration of **artificial intelligence (AI) for predictive maintenance**.
7. **Hands-on Training & Industry Certifications**
   - **Siemens-certified courses in industrial automation, robotics, and digital manufacturing**.
   - Real-world projects in **automated production lines and smart factories**.

Expected Outcomes:

- **Industry-Ready Professionals** – Expertise in **PLC programming, SCADA, and industrial automation**.
- **Enhanced Productivity & Efficiency** – Optimized **manufacturing and process automation**.
- **Innovation & Research** – Support for **automation-based startups and Industry 4.0 applications**.
- **Bridging the Skill Gap** – Training students for **high-demand automation careers**.

The **Industrial Automation Lab** is revolutionizing **traditional manufacturing** by equipping students with **modern automation skills**, helping industries transition to **smart factories and digital production systems**.