

PLC-Based Automatic Water Level Monitoring and Pump Control System

Overview

The Mechanical Engineering Department, MET's Institute of Engineering, Nashik, offers a focused, hands-on internship/training program on **PLC-Based Automatic Water Level Monitoring and Pump Control Systems**. This **four-week (25-day)** internship is designed to introduce engineering students to the core concepts of industrial automation using Programmable Logic Controllers (PLCs), with emphasis on real-time control, safety interlocks, and reliable water management systems widely used in domestic, industrial, and agricultural applications.

The project demonstrates automated monitoring of overhead or storage tank water levels using multiple sensors and PLC logic to control pump operation without manual intervention. The system effectively prevents tank overflow, pump dry-running, and energy wastage, thereby enhancing operational safety, efficiency, and equipment lifespan.

Internship / Training Highlights and Core Modules

1. Industrial Automation & PLC Fundamentals

- Role of automation in modern industries
- PLC architecture, scan cycle, memory, and I/O addressing
- Comparison of PLC control with conventional relay logic

2. Sensors, Actuators, and Hardware Interfacing

- Level sensing techniques (Low-Level, High-Level, and Dry-Run sensors)
- Relays, contactors, motor starters, and alarms
- Safe wiring practices and power supply selection

3. PLC Programming and Control Logic

- Ladder Logic basics: NO/NC contacts, coils
- Latching, interlocking, and timer operations
- Implementation of Auto and Manual operating modes
- Dry-run protection and alarm logic for pump safety

4. System Integration and Testing

- Preparation of block diagrams, flowcharts, and I/O lists
- PLC simulation, debugging, and fault handling
- Hardware wiring, sensor testing, and pump operation

5. Documentation and Presentation

- Technical report writing and wiring diagrams
- Code explanation and system demonstration
- Final presentation and viva-voce

6. Project Description (Control Philosophy)

The system utilizes **LL**, **HL** and **DR** sensors as digital inputs to the PLC. When the water level falls below the LL sensor, the PLC automatically starts the pump. Once the HL sensor detects a full tank, the PLC switches the pump off. In the event of dry-running, the PLC immediately stops the pump and activates an alarm to prevent motor damage. Manual/Auto mode selection provides operational flexibility while ensuring that all safety interlocks remain active.

7. Eligibility and Internship Details

Detail	Specification
Department	Mechanical Engineering Department, MET's Institute of Engineering, Nashik
Internship Area	Mechatronics Laboratory, Mechanical Engineering Department
Duration	4 Weeks (25days in the month of January/ February 2026)
Working Mode	Hybrid
Working Hours	2-4 Hours per day
No. of Students	10
Eligibility	All branches of Engineering (2nd Year, 3rd Year & Final Year) students.
Pre-requisites	Basics of PLCs, sensors, wiring, and relays
Last Date to Apply	30 December 2025

8. Expected Learning Outcomes

- To **develop hands-on skills in PLC systems**, including programming, industrial I/O interfacing, and the design of safety interlocks.
- To **enable effective troubleshooting of automation systems** using real-world diagnostic techniques and systematic testing practices.
- To **design, implement, and demonstrate a complete PLC-based control system**, supported by professional-quality technical documentation.

9. Deliverables and Evaluation

- **Deliverables:** Project report, PLC ladder code, and wiring and block diagrams, simulation results, final presentation, and working prototype demonstration.
- **Evaluation:** Viva-voce, daily logbook, attendance, project demonstration, documentation quality, and rubric-based assessment.



Mr.N.B.Ahire

Internship/Training/Boot camp Coordinator



Dr.S.D.Kalpande

H.O.D