भारतीय प्रौद्योगिकी संस्थान तिरुपति

TIRUPATI

CEMS

Centre of Excellence in Maritime & Shipbuilding (CEMS)

Advanced Industrial Automation & Control Systems

A PROFESSIONAL DEVELOPMENT PROGRAM IN COLLABORATION WITH INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI

PROGRAM OVERVIEW

Elevate your technical expertise with this intensive 3-day professional development program on Industrial Automation & Control Systems. Developed and delivered jointly by IIT Tirupati, an institution of national importance, and CEMS, a leader in advanced industrial training, this program is designed to deepen practical and theoretical knowledge of modern automation frameworks. Participants will engage with cutting-edge technologies through a balanced curriculum of academic insight and hands-on industrial application.

Graduates receive a prestigious **Joint Certificate from IIT Tirupati & CEMS,** recognized across industry and academia.

WHY THIS PROGRAM IS DISTINCT

Academic Rigor + Industrial Relevance: Content will be delivered by both the faculty members from **IIT Tirupati CEMS**, providing depth in control theory and system design, and dedicated to hands-on labs.

Prestigious Certification: A joint credential from **IIT Tirupati and CEMS** that enhances professional credibility.

State-of-the-Art Industrial Lab: Hosted at **CEMS Vizag Campus,** equipped with industry-grade PLCs, HMIs, SCADA

Outcome-Focused Curriculum: Designed around real-world applications, system integration challenges, and professional skill advancement.

LEARNING OBJECTIVES

Upon completion, participants will be able to:

- Architect and deconstruct modern industrial automation systems.
- Develop, debug, and optimize PLC programs using advanced ladder logic.
- Design and integrate SCADA/HMI interfaces for monitoring and control.
- Implement industrial communication protocols (Ethernet/IP, PROFINET) in system integration.
- Apply and tune advanced control strategies (PID, Cascade, Feedforward) in real processes.

Execute a capstone automation project from concept to operational demo.

WHO SHOULD ATTEND?

- Corporate Professionals & Engineers from automation, manufacturing, process, and embedded systems domains.
- Industry Practitioners in roles such as Automation Engineer, Control Systems Engineer, Instrumentation Specialist, or Project Lead.
- Academic Faculty & Researchers in Electronics & Communication Engineering (ECE), Instrumentation, Electrical, and allied disciplines seeking industry-aligned knowledge.
- Technical Managers & Team Leaders overseeing automation projects or digital transformation initiatives.

PROGRAM LEADERS & FACULTY

From IIT Tirupati:

Dr. P. S. Sai Krishna

- Associate Professor, Department of Electrical Engineering, IIT Tirupati.
- Ph.D., IIT Madras. Expertise in Control Systems, Robotics, and Automation.

From CEMS:

Mrs. T V Sowmya SriLalitha

- Senior Automation Engineer, CEMS
- 10+ years of industry experience with IGIAT
- Certified Expert in Siemens TIA Portal, Step 7, WinCC (SCADA/HMI).

PROGRAM SCHEDULE AT A GLANCE

3 Days | Full-Time Immersive | CEMS Vizag Campus

Course Contents

Day 1: Introduction to Factory Automation		
Session 1 (9.30am – 11am)	**Introduction to Factory Automation**	Introduction to Factory Automation, Sensors and Actuators, and System Hierarchy.
		Overview of assembly lines, material handling, packaging, and machining involving robotics, conveyors, CNC machines, and PLC-controlled systems
Tea Break 11am to 11.30am		
Session 2 (11.30am to 1pm)	**Programmable Controllers**	PLC architecture, modules, and I/O organization; comparison of relay logic and PLC logic

Lunch 1pm to 2pm		
Session 3 (2pm – 4 pm)	**Essentials of Process Control**	Basics of Feedback Control, Process Dynamics, Response of first and second order systems
		PID Control Fundamentals and PID Tuning
		Time delays and Dead-time in processes and control philosophy
		Advanced Control Strategies: Cascade control, Feedforward control, Ratio control, and Split range control
Tea Break 4pm to 4.30pm		
Session 4 (4.30pm to 5.30pm)	**CEMS Lab**	Lab Familiarization – Equipment overview, PLC modules, I/O structure, upcoming hands-on exercises.

Day 2: PLCs and Control Systems		
Session 1 (9.30am – 11am)	**IIT Faculty**	Recap of Day 1 concepts
		Case studies on Factory Automation
Tea Break 11am to 11.30am		
Session 2 (11.30am to 12pm)	**Industrial Networks and System Integration**	Importance of communication in automation.
		Communication protocols: Ethernet/IP, PROFINET.
Session 3 (12pm to 1pm)	**Data Acquisition**	Role of SCADA in data acquisition.
		Data acquisition and monitoring.
		Read sensor & Actuator data using PLC.
		Create a simple automation sequence (e.g., conveyor belt control).
Lunch 1pm to 2pm		
Session 4 (2pm to 4pm)	**SCADA/HMI**	Integrating PLCs with SCADA/HMI.
		Create a basic HMI screen.
		Case studies of automation in real factories.
Tea Break 4pm to 4.30pm		
Session 5 (4.30 pm to 5.30 pm)	**Hands-on**	Program a PLC to control a conveyor belt with start/stop buttons and emergency stop. Design SCADA/HMI Screen for the same

Day 3: Practical Hands-on Workshop

Session 1 (9.30am to 11am)	**Hands-On: PLC Programming**	Programming a simple ladder logic sequence.
		Using timers and counters in a control loop.
		Troubleshooting common PLC errors.
Tea Break 11am to 11.30am		
Session 2 (11.30am to 1pm)	**Hands-On: System Integration Project**	Build a Tank level Control System integrating PLC, HMI, and sensors.
		Configure communication between devices.
		Monitor and control system via HMI.
		Final presentation and demo of project.
Lunch 1pm to 2pm		
Session 3 (2pm to 4pm)	**Hands-On: System Integration Project**	**Exercise:** Build a sorting system for defective products in a product assembly line.
Tea Break 4pm to 4.30pm		
Session 5 (4.30pm to 5.30pm)	**Mini Project**	**Exercise:** Programming & Designing of pick-and-place robots for Assembly line automation.

Review, Feedback, Certifications

INVESTMENT & INCLUSIONS

With Accommodation: ₹ 20,000 + GST

Includes program material, lab access, 3-night accommodation (twin-sharing), daily breakfast, lunch, and refreshments.

Without Accommodation: ₹ 15,000 + GST

Includes program material, lab access, daily lunch, and refreshments.

Corporate Group Enrolment (3+): *15% discount on total fee.*

REGISTRATION & INFORMATION

Secure your participation in this exclusive program.

PROGRAM COORDINATOR:

Ms. Neha Roy:

+91 70932 67396

Neha.R@cemsindia.org

SCAN THE QR TO REGISTER

Seats are limited to ensure premium learning engagement. ***Enroll today.***

Certified by:

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