Process Control in Petrochemical Plants Training Course

Professional Development Training Course Outline

Category	General Training	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Process Control in Petrochemical Plants is a critical discipline that ensures operational safety, production efficiency, energy optimization, and product quality consistency in highly complex industrial environments. Modern petrochemical facilities rely on advanced automation systems, real-time process monitoring, DCS (Distributed Control Systems), PLC integration, and AI-driven predictive control strategies to maintain stable operations under varying feedstock and demand conditions. Process Control in Petrochemical Plants Training Course is designed to equip engineers, technicians, and plant operators with cutting-edge competencies in industrial process control, instrumentation systems, control loop tuning, and advanced regulatory control techniques used in oil, gas, and petrochemical industries.

With increasing global demand for smart refineries, Industry 4.0 automation, digital twin technology, and data-driven process optimization, petrochemical plants must adopt robust control strategies to minimize downtime, reduce emissions, and improve throughput. This course bridges theoretical foundations with real-world applications, enabling participants to master process dynamics, control system architecture, alarm management, safety instrumented systems (SIS), and advanced process control (APC). It is aligned with modern industry standards to prepare professionals for next-generation smart manufacturing environments.

Programme Curriculum

Process Control in Petrochemical Plants Training Course

Introduction

Process Control in Petrochemical Plants is a critical discipline that ensures operational safety, production efficiency, energy optimization, and product quality consistency in highly complex industrial environments. Modern petrochemical facilities rely on advanced automation systems, real-time process monitoring, DCS

(Distributed Control Systems), PLC integration, and AI-driven predictive control strategies to maintain stable operations under varying feedstock and demand conditions. Process Control in Petrochemical Plants Training Course is designed to equip engineers, technicians, and plant operators with cutting-edge competencies in industrial process control, instrumentation systems, control loop tuning, and advanced regulatory control techniques used in oil, gas, and petrochemical industries.

With increasing global demand for smart refineries, Industry 4.0 automation, digital twin technology, and data-driven process optimization, petrochemical plants must adopt robust control strategies to minimize downtime, reduce emissions, and improve throughput. This course bridges theoretical foundations with real-world applications, enabling participants to master process dynamics, control system architecture, alarm management, safety instrumented systems (SIS), and advanced process control (APC). It is aligned with modern industry standards to prepare professionals for next-generation smart manufacturing environments.

Course Duration

5 days

Course Objectives

1. Understand fundamentals of process control systems in petrochemical industries
2. Master PID control loop tuning and optimization techniques
3. Apply advanced process control (APC) strategies in refineries
4. Analyze process dynamics and system response behavior
5. Implement DCS and PLC-based automation systems
6. Improve plant efficiency using real-time process optimization tools
7. Ensure safety using Safety Instrumented Systems (SIS) and HAZOP analysis
8. Develop skills in alarm management and operator decision support systems
9. Integrate industrial IoT (IIoT) in petrochemical monitoring systems
10. Enhance production through energy optimization and emission reduction control
11. Use digital twin technology for process simulation and forecasting
12. Troubleshoot control loop failures using root cause analysis techniques
13. Align plant operations with Industry 4.0 smart manufacturing standards

Target Audience

1. Process Control Engineers
2. Petrochemical Plant Operators
3. Instrumentation & Automation Technicians
4. Chemical Engineers
5. Maintenance Engineers
6. Production Supervisors
7. Control System Designers
8. Industrial Automation Consultants

Course Modules

Module 1: Fundamentals of Process Control Systems

- Basics of process variables
- Open loop vs closed loop control systems
- Control system architecture in petrochemical plants

- Introduction to feedback and feedforward control
- **Case Study:** Stabilizing distillation column temperature control loop

Module 2: PID Control and Loop Tuning

- Proportional, Integral, Derivative control principles
- Manual and automatic tuning methods
- Loop performance evaluation techniques
- Common tuning errors and correction strategies
- **Case Study:** Optimizing reactor pressure control using PID tuning

Module 3: Advanced Process Control (APC)

- Multivariable control systems (MPC)
- Constraint-based optimization techniques
- Predictive control applications in refineries
- APC integration with DCS systems
- **Case Study:** Crude distillation unit throughput optimization

Module 4: Distributed Control Systems (DCS) & PLC Integration

- DCS architecture and configuration
- PLC communication protocols
- Human Machine Interface (HMI) design
- System redundancy and reliability engineering
- **Case Study:** Integration of PLC-based compressor control system

Module 5: Safety Instrumented Systems (SIS) & Process Safety

- Layers of protection analysis (LOPA)
- Emergency shutdown systems (ESD)
- HAZOP methodology in petrochemical plants
- Safety integrity levels (SIL) classification
- **Case Study:** Preventing overpressure failure in storage tanks

Module 6: Industrial IoT & Smart Plant Monitoring

- Sensor networks and real-time data acquisition
- Cloud-based process monitoring systems
- Predictive maintenance using AI/ML
- Cybersecurity in industrial automation systems
- **Case Study:** IIoT-based predictive maintenance for pumps

Module 7: Process Optimization & Energy Efficiency

- Energy balancing in petrochemical processes
- Heat integration and recovery systems
- Emission reduction strategies
- Key performance indicators (KPIs) in process plants
- **Case Study:** Energy optimization in ethylene production unit

Module 8: Digital Twin & Simulation Technologies

- Digital twin modeling for process plants
- Simulation tools for process validation
- Scenario analysis and forecasting
- Virtual commissioning of control systems
- **Case Study:** Digital twin implementation in refinery operations

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price

23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com