Process Flow Diagram (PFD) and P&ID Design Training Course

Professional Development Training Course Outline

Category	General Training	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Modern process industries depend heavily on accurate Process Flow Diagrams (PFDs) and Piping & Instrumentation Diagrams (P&IDs) to ensure operational excellence, process safety, regulatory compliance, digital transformation, and asset integrity. These engineering documents serve as the foundation for process design, plant operation, commissioning, maintenance, troubleshooting, hazard analysis, and lifecycle asset management. As industries embrace Industry 4.0, Smart Manufacturing, Digital Twins, Process Automation, Advanced Process Control (APC), and Industrial IoT (IIoT), the demand for professionals skilled in PFD and P&ID development continues to grow globally.

Process Flow Diagram (PFD) and P&ID Design Training Course provides participants with practical knowledge and industry best practices for developing, reviewing, interpreting, and managing PFDs and P&IDs across oil & gas, petrochemicals, power generation, pharmaceuticals, water treatment, food processing, and manufacturing facilities. Participants will gain hands-on exposure to engineering standards, instrumentation integration, process optimization techniques, risk management methodologies, and real-world industrial case studies that improve plant safety, reliability, and operational efficiency.

Programme Curriculum

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Course Objectives

Upon completion of this course, participants will be able to:

1. Understand modern Process Engineering Fundamentals.
2. Develop professional Process Flow Diagrams (PFDs).
3. Create detailed Piping & Instrumentation Diagrams (P&IDs).
4. Apply international engineering standards and best practices.
5. Integrate Industrial Automation Systems into P&ID designs.
6. Identify critical process equipment and instrumentation.
7. Perform Process Hazard Analysis (PHA) using engineering diagrams.
8. Support Digital Twin Implementation through accurate documentation.
9. Optimize plant performance using process mapping techniques.
10. Enhance Asset Integrity Management through documentation control.
11. Implement Process Safety Management (PSM) principles.
12. Conduct effective engineering reviews and design audits.
13. Support Industry 4.0 Smart Plant Initiatives using intelligent P&IDs.

Target Audience

1. Process Engineers
2. Chemical Engineers
3. Mechanical Engineers
4. Instrumentation & Control Engineers
5. Plant Operators and Supervisors
6. Project Engineers and Managers
7. Maintenance Engineers
8. EPC and Design Consultants

Course Modules

Module 1: Introduction to Process Engineering Documentation

- Role of engineering drawings
- PFD vs P&ID comparison
- Plant documentation hierarchy
- Engineering lifecycle documentation
- Industry applications

- **Case Study:** Documentation structure for a refinery expansion project.

Module 2: Fundamentals of Process Flow Diagrams (PFDs)

- Purpose and objectives of PFDs
- Process representation techniques
- Flow stream identification
- Material balance concepts
- Energy balance fundamentals
- **Case Study:** Developing a crude oil processing PFD.

Module 3: Process Equipment Identification

- Pumps and compressors
- Heat exchangers
- Columns and reactors
- Storage tanks and vessels
- Utility systems
- **Case Study:** Equipment mapping in a petrochemical plant.

Module 4: PFD Symbols and Industry Standards

- ISA standards overview
- ISO engineering symbols
- Equipment numbering systems
- Process notation conventions
- Documentation standards
- **Case Study:** Standardization project for a multinational manufacturing facility.

Module 5: Introduction to P&ID Development

- Purpose of P&IDs
- Design philosophy
- Drawing architecture
- Engineering deliverables
- P&ID lifecycle management
- **Case Study:** P&ID development for a gas processing unit.

Module 6: Piping Systems Design

- Pipe classifications
- Line numbering systems
- Pipe specifications
- Valves and fittings
- Piping layout concepts
- **Case Study:** Piping network design for a water treatment facility.

Module 7: Instrumentation Fundamentals

- Measurement principles
- Pressure instruments
- Temperature instruments

- Flow instruments
- Level instruments
- **Case Study:** Instrument selection for a chemical processing plant.

Module 8: Control Systems Integration

- Control loop design
- PLC integration
- DCS architecture
- SCADA systems
- Industrial communication protocols
- **Case Study:** Automation integration in a smart manufacturing plant.

Module 9: Advanced P&ID Symbols and Tagging

- Instrument tagging methods
- ISA identification standards
- Signal representation
- Alarm systems
- Safety interlocks
- **Case Study:** Instrumentation audit in a pharmaceutical facility.

Module 10: Process Safety and Risk Management

- HAZOP methodology
- Layer of Protection Analysis (LOPA)
- SIL concepts
- Emergency shutdown systems
- Safety instrumented systems
- **Case Study:** HAZOP review of an ammonia production unit.

Module 11: PFD and P&ID Review Techniques

- Design verification
- Drawing validation
- Error detection methods
- Interdisciplinary reviews
- Quality assurance procedures
- **Case Study:** Engineering review workshop for an EPC project.

Module 12: Digitalization and Smart P&IDs

- Intelligent P&IDs
- Digital engineering platforms
- Data integration strategies
- Digital twin concepts
- Asset lifecycle management
- **Case Study:** Smart plant implementation using intelligent P&IDs.

Module 13: Document Control and Revision Management

- Revision tracking

- Change management
- Version control systems
- Regulatory compliance
- Audit readiness
- **Case Study:** Management of change (MOC) implementation project.

Module 14: Integrated Plant Design Workshop

- PFD development exercise
- P&ID creation workshop
- Equipment specification review
- Instrumentation integration
- Engineering documentation package
- **Case Study:** Complete processing plant design simulation.

Module 15: Capstone Project and Industry Applications

- End-to-end design project
- Team-based engineering exercise
- Process optimization review
- Presentation of deliverables
- Lessons learned and best practices
- **Case Study:** Design and review of a complete LNG processing facility.

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	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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

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