Pipeline Flow Assurance Engineering 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

Pipeline Flow Assurance Engineering is a critical discipline in the oil & gas, energy transition, and subsea production industry focused on ensuring uninterrupted, safe, and economically optimized transport of hydrocarbons and multiphase fluids from reservoir to processing facilities. Pipeline Flow Assurance Engineering Training Course integrates multiphase flow dynamics, hydrate prevention, wax and asphaltene control, slugging management, pressure-temperature profiling, and subsea pipeline integrity to address real-world operational challenges. With increasing complexity in deepwater developments, Arctic operations, and long-distance transport systems, flow assurance has become a cornerstone of production optimization, asset integrity, and operational reliability.

This course is designed to equip engineers with cutting-edge skills in digital flow assurance modeling, AI-driven predictive analytics, real-time monitoring, digital twins, hydrogen blending pipelines, and carbon capture transport systems (CCS). Participants will gain hands-on knowledge of industry-leading simulation tools and best practices to mitigate risks such as hydrate blockage, wax deposition, corrosion, scaling, and severe slugging. The program bridges traditional engineering fundamentals with modern Industry 4.0 technologies, enabling professionals to design resilient pipeline systems that meet global energy transition demands.

Programme Curriculum

Pipeline Flow Assurance Engineering Training Course

Introduction

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Course Duration

5 days

Course Objectives

1. Master fundamentals of multiphase flow & pipeline hydraulics
2. Analyze pressure drop, flow regimes & transient behavior
3. Implement hydrate prediction & prevention strategies
4. Control wax deposition & paraffin management techniques
5. Mitigate asphaltene instability in crude transport systems
6. Evaluate corrosion mechanisms & chemical inhibition programs
7. Manage slug flow dynamics in pipeline networks
8. Design subsea pipeline systems for deepwater operations
9. Apply flow assurance simulation tools
10. Integrate AI-based predictive maintenance & digital twins
11. Assess thermal insulation & heating systems for pipelines
12. Optimize carbon capture (CCS) and hydrogen transport pipelines
13. Improve asset integrity & lifecycle performance management

Target Audience

1. Petroleum & Chemical Engineers
2. Pipeline Design & Integrity Engineers
3. Subsea Production Engineers
4. Process Engineers in Oil & Gas Industry
5. Flow Assurance Specialists
6. Energy Transition & Hydrogen Project Engineers
7. Offshore Operations & Production Engineers
8. Graduate Engineers entering upstream/midstream sector

Course Modules

Module 1: Fundamentals of Flow Assurance

- Introduction to flow assurance concepts and challenges
- Multiphase flow behavior in pipelines
- Flow regimes: stratified, slug, annular, bubble flow

- Thermodynamics of hydrocarbon transport
- Pressure-temperature relationship in pipelines
- **Case Study:** Flow assurance failure in a long-distance crude pipeline leading to shutdown due to unexpected slugging

Module 2: Multiphase Flow Modeling & Simulation

- Governing equations of multiphase flow
- Steady-state vs transient simulation
- Flow modeling using industry tools
- Sensitivity analysis and uncertainty modeling
- Production system network simulation
- **Case Study:** Optimization of offshore production system using multiphase flow simulation reducing pressure losses by 18%

Module 3: Hydrate Formation & Management

- Gas hydrate formation mechanisms
- Thermodynamic vs kinetic hydrate models
- Chemical inhibition
- Thermal insulation and heating systems
- Operational hydrate risk management
- **Case Study:** Deepwater hydrate blockage incident and successful mitigation using MEG injection strategy

Module 4: Wax Deposition & Asphaltene Control

- Wax crystallization and deposition mechanisms
- Cloud point and pour point analysis
- Pigging operations and flow assurance strategies
- Asphaltene precipitation behavior
- Chemical treatment and mitigation strategies
- **Case Study:** Wax buildup in subsea pipeline resolved through optimized pigging and thermal management system

Module 5: Scale Formation & Corrosion Management

- Types of scaling in pipelines
- Corrosion mechanisms in wet gas systems
- Chemical inhibition programs
- Cathodic protection systems
- Integrity monitoring techniques
- **Case Study:** Corrosion-induced leak in offshore pipeline prevented through real-time corrosion monitoring system

Module 6: Slugging & Transient Flow Analysis

- Types of slugging
- Slug tracking and mitigation techniques
- Transient flow simulation methods
- Separator and facility impact of slugging

- Flow stability enhancement strategies
- **Case Study:** Severe slugging in riser system eliminated using choke optimization and flow control strategy

Module 7: Subsea Pipeline & Deepwater Flow Assurance

- Deepwater pipeline design challenges
- Riser systems and subsea architecture
- Thermal management in deepwater environments
- Flow assurance in ultra-deepwater fields
- Intervention and maintenance strategies
- **Case Study:** Successful flow assurance design for deepwater field reducing hydrate risk by 40%

Module 8: Digitalization, AI & Smart Flow Assurance

- Digital twins for pipeline systems
- AI/ML predictive flow assurance models
- Real-time monitoring and IoT sensors
- Data analytics for failure prediction
- Hydrogen & CCS pipeline integration
- **Case Study:** AI-based predictive system preventing pipeline shutdown by detecting early hydrate risk anomalies

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

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