Training Course on Subsea Production Systems and Flow Assurance

Professional Development Training Course Outline

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

Course Introduction

The global demand for deepwater and ultra-deepwater oil and gas exploration has rapidly increased, driving a surge in innovative subsea production systems and advanced flow assurance techniques. Training Course on Subsea Production Systems & Flow Assurance equips engineers, managers, and offshore professionals with cutting-edge knowledge in subsea architecture, multiphase flow, and asset integrity management. The program focuses on real-world scenarios and critical insights for improving operational efficiency and minimizing risks in offshore oil & gas fields.

Participants will gain deep knowledge of subsea trees, manifolds, umbilicals, risers, and flowlines (SURF) integrated with thermohydraulic modeling and hydrate mitigation strategies. With the global energy sector emphasizing digital twin technology, carbon footprint reduction, and smart subsea fields, this course ensures that learners remain ahead in subsea production innovation and flow assurance reliability.

Programme Curriculum

Training Course on Subsea Production Systems & Flow Assurance

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Course Objectives

1. Understand the architecture of subsea production systems and their applications.
2. Analyze the role of flow assurance in multiphase production systems.
3. Explore deepwater subsea field development planning.
4. Assess integrity management of subsea equipment.
5. Model flow assurance scenarios using digital simulation tools.
6. Evaluate risks associated with hydrate formation and wax deposition.
7. Learn subsea tieback design and optimization strategies.
8. Examine control systems such as subsea umbilicals and SCMs.
9. Understand HPHT (High Pressure High Temperature) subsea challenges.
10. Study the impact of digital twin and predictive analytics on flow assurance.
11. Implement sustainable flow management for ESG compliance.
12. Gain insights on flowline insulation, pigging, and slugging control.
13. Explore real-time monitoring and data acquisition in subsea operations.

Target Audiences

1. Subsea Engineers
2. Flow Assurance Specialists
3. Petroleum Engineers
4. Offshore Project Managers
5. Subsea Equipment Designers
6. Oil & Gas Technical Consultants
7. Operations and Maintenance Engineers
8. Energy Transition Analysts

Course Duration: 10 days

Course Modules

Module 1: Introduction to Subsea Production Systems

- Overview of subsea production technologies
- Components: Trees, manifolds, templates
- Applications in shallow vs. deepwater
- Life cycle of a subsea system
- Key design considerations
- **Case Study**: Subsea architecture deployment in Gulf of Mexico

Module 2: Subsea Field Development Planning

- Site selection and reservoir analysis
- Infrastructure layout planning
- Tieback system strategy
- Asset development economics
- Technology feasibility evaluation
- **Case Study**: BP’s Quad 204 redevelopment project

Module 3: Flow Assurance Fundamentals

- Definition and scope of flow assurance
- Thermal, hydraulic, and chemical aspects

- Multiphase flow challenges
- Slugging, hydrate, wax, and scale
- Pipeline flow simulation techniques
- **Case Study**: Flow assurance failures in West Africa subsea wells

Module 4: Subsea Trees, Manifolds, and Jumpers

- Types of subsea trees (vertical/horizontal)
- Manifold design and flow distribution
- Flexible jumpers and flow routing
- Well intervention access points
- Equipment material selection
- **Case Study**: Total’s Kaombo subsea tree strategy

Module 5: Umbilicals, Risers, and Flowlines (SURF)

- SURF system components overview
- Umbilical types and configurations
- Dynamic riser engineering
- Flowline routing and trenching
- Installation techniques and safety
- **Case Study**: Installation challenges in Shell’s Bonga North

Module 6: Subsea Control and Monitoring Systems

- Subsea Control Modules (SCMs)
- Hydraulic/Electrical signal transmission
- Fiber optics for real-time data
- Power supply and reliability
- Interface with topside systems
- **Case Study**: Chevron’s digital subsea monitoring in Angola

Module 7: Hydrate Formation & Prevention

- Conditions for hydrate formation
- Inhibitor injection strategies
- Thermal insulation and line heating
- Depressurization and remediation
- Flow assurance modeling tools
- **Case Study**: Hydrate plug incident in North Sea tieback

Module 8: Wax & Asphaltene Deposition

- Causes of wax and asphaltene formation
- Crude oil properties and deposition risks
- Inhibitor use and mechanical removal
- Wax appearance temperature (WAT)
- Pipeline pigging schedules
- **Case Study**: Wax build-up in Brazilian pre-salt fields

Module 9: Slugging & Multiphase Flow

- Types of slug flow
- Effects on downstream processing
- Slug catchers and separators
- Modeling multiphase flow behavior

- Flow stabilization strategies
- **Case Study**: Slug control in Statoil’s Troll project

Module 10: Subsea Tieback Systems

- Single vs. multi-well tiebacks
- Extended reach design
- Thermal management requirements
- Economics of long-distance tiebacks
- Subsea boost and compression
- **Case Study**: Tieback optimization in Equinor’s Johan Sverdrup

Module 11: HPHT Subsea System Design

- Material selection for HPHT
- Design pressure and temperature specs
- Advanced seal technologies
- Structural reliability
- Equipment qualification testing
- **Case Study**: HPHT developments in Gulf of Mexico Keathley Canyon

Module 12: Subsea Equipment Integrity Management

- NDT & condition monitoring techniques
- Fatigue analysis and failure prediction
- Subsea inspection tools (ROVs/AUVs)
- Integrity assurance programs
- Life-extension strategies
- **Case Study**: Asset integrity overhaul in Woodside’s Pluto field

Module 13: Digital Twin in Subsea Operations

- Definition and benefits of digital twin
- Integration with flow assurance modeling
- Predictive maintenance applications
- AI and machine learning in subsea
- Real-time simulation
- **Case Study**: Shell’s digital twin deployment in Prelude FLNG

Module 14: ESG & Sustainable Subsea Design

- Carbon footprint analysis in subsea
- Sustainable flowline materials
- Energy efficiency strategies
- ESG reporting frameworks
- Environmental impact mitigation
- **Case Study**: Equinor’s low-carbon subsea compression initiative

Module 15: Real-Time Flow Monitoring and Analytics

- Data acquisition and analytics platforms
- Fiber-optic sensing technologies
- SCADA systems in subsea
- Pressure, temperature, vibration trends
- Anomaly detection with AI
- **Case Study**: Data-driven monitoring in Anadarko’s Lucius field

Training Methodology

- Instructor-led interactive sessions with presentations, videos, and real-time Q&A.
- Hands-on simulation exercises using flow assurance software and modeling tools.
- Case study reviews to reinforce real-world understanding.
- Group discussions and workshops to promote collaboration and peer learning.
- Pre-assessment and post-assessment to evaluate learning outcomes.
- Digital access to course materials, charts, models, and recorded sessions.

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

Start Date	End Date	Location	Price
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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