

Offshore Pipeline Engineering Software

COURSE CONTENT

GET IN TOUCH



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About Multisoft

Train yourself with the best and develop valuable in-demand skills with Multisoft Systems. A leading certification training provider, Multisoft collaborates with leading technologies to bring world-class one-on-one and certification training. Intending to empower professionals and businesses across the globe, we offer more than 1500 training courses, which are delivered by Multisoft's global subject matter experts. We offer tailored corporate training, a comprehensive learning solution with lifetime e-learning access, after-training support and globally recognized training certificates.

About Course

Offshore Pipeline Engineering Software Training by Multisoft Systems provides a structured learning path for professionals seeking practical exposure to offshore pipeline analysis and simulation. Rather than focusing only on software commands, the course explains the engineering principles behind model inputs, assumptions, boundary conditions, environmental loads, soil interaction, and analytical results.

Participants work through engineering scenarios covering pipeline stability, global response, free spans, installation conditions, and other critical offshore pipeline considerations. This approach helps learners understand not only how to configure and run an analysis, but also how to evaluate whether the resulting pipeline behavior is technically reasonable.

Module 1: Fundamentals of Offshore Pipeline Engineering

- ✓ Introduction to offshore and subsea pipeline systems
- ✓ Role of pipelines in offshore field development
- ✓ Oil, gas, water injection, and multiphase pipelines
- ✓ Flowlines, export pipelines, gathering lines, and tie-in systems
- ✓ Overview of rigid and flexible pipeline systems
- ✓ Offshore pipeline lifecycle
- ✓ Design, fabrication, transportation, installation, operation, and decommissioning
- ✓ Key pipeline engineering disciplines and interfaces
- ✓ Overview of offshore pipeline analysis software workflows

Module 2: Offshore Pipeline Design Basis and Engineering Data

- ✓ Understanding the pipeline design basis
- ✓ Design life and operating philosophy
- ✓ Design pressure and temperature conditions
- ✓ Fluid and operating data
- ✓ Pipeline diameter and wall thickness inputs
- ✓ Material specifications and mechanical properties
- ✓ Corrosion allowance
- ✓ Environmental design conditions
- ✓ Water depth and bathymetry information
- ✓ Geotechnical and seabed data
- ✓ Installation-related design inputs
- ✓ Identification of design and accidental load cases

- ✓ Preparing engineering inputs for software analysis

Module 3: Pipeline Route Selection and Seabed Considerations

- ✓ Offshore pipeline route engineering
- ✓ Bathymetric and geophysical survey information
- ✓ Seabed morphology and soil conditions
- ✓ Route constraints and engineering considerations
- ✓ Seabed slopes and irregularities
- ✓ Existing pipelines and cable crossings
- ✓ Subsea infrastructure interfaces
- ✓ Route optimization considerations
- ✓ Pipeline–seabed interaction
- ✓ Identification of potential free-span locations
- ✓ Route data preparation for engineering models

Module 4: Pipeline Configuration, Geometry, and Material Properties

- ✓ Pipeline outside and inside diameter
- ✓ Wall thickness definition
- ✓ Pipeline section properties
- ✓ Steel material characteristics
- ✓ Young's modulus and Poisson's ratio
- ✓ Yield strength and tensile properties

- ✓ Pipeline coating systems
- ✓ Concrete weight coating
- ✓ Corrosion coating considerations
- ✓ Marine growth considerations
- ✓ Pipeline submerged weight
- ✓ Contents and internal fluid properties
- ✓ Temperature-dependent properties
- ✓ Creating pipeline properties within engineering software

Module 5: Internal Pressure, External Pressure, and Pipeline Integrity

- ✓ Internal pressure loading
- ✓ External hydrostatic pressure
- ✓ Pressure differential across the pipe wall
- ✓ Hoop and longitudinal stress concepts
- ✓ Pressure containment considerations
- ✓ Collapse behavior
- ✓ Propagation buckling fundamentals
- ✓ Combined loading considerations
- ✓ Local buckling concepts
- ✓ Wall thickness engineering considerations
- ✓ Pressure and temperature load combinations
- ✓ Understanding utilization and acceptance criteria
- ✓ Reviewing software-generated integrity results

Module 6: Hydrodynamic Loads and Environmental Conditions

- ✓ Offshore environmental loading fundamentals
- ✓ Waves and currents
- ✓ Water depth effects
- ✓ Wave theories and applicability
- ✓ Current profiles
- ✓ Combined wave and current conditions
- ✓ Hydrodynamic coefficients
- ✓ Drag and inertia forces
- ✓ Morison-type loading concepts
- ✓ Pipeline exposure to hydrodynamic loads
- ✓ Marine growth effects
- ✓ Environmental load directions
- ✓ Extreme and operational environmental conditions
- ✓ Defining environmental inputs in analysis software
- ✓ Sensitivity of pipeline response to environmental parameters

Module 7: On-Bottom Stability Analysis

- ✓ Fundamentals of pipeline stability
- ✓ Vertical and lateral stability
- ✓ Submerged pipeline weight
- ✓ Hydrodynamic forces acting on pipelines
- ✓ Pipeline–soil interaction
- ✓ Soil resistance

- ✓ Friction-related considerations
- ✓ Pipeline embedment
- ✓ Lateral displacement considerations
- ✓ Concrete weight coating requirements
- ✓ Stability under wave and current loading
- ✓ Absolute and generalized stability concepts
- ✓ Creating stability analysis cases
- ✓ Reviewing displacement and resistance behavior
- ✓ Sensitivity analysis for soil and environmental parameters
- ✓ Interpretation of stability analysis results

Module 8: Pipeline Free-Span Analysis

- ✓ Formation of pipeline free spans
- ✓ Seabed irregularity and unsupported pipeline sections
- ✓ Free-span geometry
- ✓ Static response of pipeline spans
- ✓ Span length and gap considerations
- ✓ Effective axial force
- ✓ Natural frequency fundamentals
- ✓ Hydrodynamic excitation
- ✓ Vortex-induced vibration concepts
- ✓ Screening of free spans
- ✓ Fatigue-related considerations
- ✓ Identification of critical spans
- ✓ Modelling free-span conditions
- ✓ Boundary conditions for span analysis

- ✓ Interpretation of displacement, stress, and response results
- ✓ Free-span mitigation concepts

Module 9: Thermal Expansion and Pipeline Buckling

- ✓ Pipeline operating temperature effects
- ✓ Thermal expansion fundamentals
- ✓ Effective axial force
- ✓ Restrained pipeline behavior
- ✓ Pipeline–soil axial resistance
- ✓ Expansion at pipeline ends
- ✓ Walking and axial movement concepts
- ✓ Global buckling fundamentals
- ✓ Lateral buckling
- ✓ Upheaval buckling
- ✓ Initial imperfections
- ✓ Buckling initiation concepts
- ✓ Controlled buckling considerations
- ✓ Expansion spool requirements
- ✓ Software modelling of thermal load cases
- ✓ Evaluation of displacement and bending response
- ✓ Interpretation of buckling analysis results

Module 10: Pipeline Installation Engineering and Analysis

- ✓ Offshore pipeline installation methods
- ✓ S-lay installation

- ✓ J-lay installation
- ✓ Reel-lay concepts
- ✓ Installation vessel considerations
- ✓ Pipeline departure from vessel
- ✓ Overbend and sagbend regions
- ✓ Pipeline tension
- ✓ Layback distance
- ✓ Touchdown point
- ✓ Water depth influence
- ✓ Environmental loading during installation
- ✓ Installation configuration modelling
- ✓ Tension and curvature assessment
- ✓ Bending moment and stress evaluation
- ✓ Installation load cases
- ✓ Sensitivity to vessel tension and environmental conditions
- ✓ Interpretation of installation analysis outputs

Module 11: Risers, Spools, Tie-ins, and Subsea Connections

- ✓ Overview of subsea riser systems
- ✓ Pipeline-to-riser interfaces
- ✓ Rigid riser concepts
- ✓ Flexible riser overview
- ✓ Pipeline end terminations
- ✓ Pipeline end manifolds
- ✓ Subsea spools
- ✓ Jumper and connector concepts

- ✓ Tie-in arrangements
- ✓ Expansion spool configuration
- ✓ Interface loads
- ✓ Installation considerations for spools
- ✓ Modelling pipeline end conditions
- ✓ Evaluating connection forces and moments

Module 12: Pipeline Protection, Trenching, Burial, and Stabilization

- ✓ Pipeline protection philosophy
- ✓ Pipeline burial requirements
- ✓ Trenching methods
- ✓ Post-lay and pre-lay trenching concepts
- ✓ Rock dumping
- ✓ Concrete mattresses
- ✓ Grout bags and support systems
- ✓ Pipeline stabilization methods
- ✓ Crossing protection
- ✓ External interference considerations
- ✓ Fishing and dropped-object considerations
- ✓ Protection of free spans
- ✓ Selection of suitable mitigation measures
- ✓ Engineering implications of protection systems

Module 13: Offshore Pipeline Engineering Software Applications and Modelling

- ✓ Understanding the software-based analysis workflow
- ✓ Creating a new engineering model
- ✓ Model coordinate systems
- ✓ Pipeline geometry definition
- ✓ Defining line and pipe properties
- ✓ Material and coating inputs
- ✓ Environmental data configuration
- ✓ Seabed and soil definition
- ✓ Boundary conditions
- ✓ End constraints and connections
- ✓ Static analysis setup
- ✓ Dynamic analysis concepts
- ✓ Load case configuration
- ✓ Operational and installation scenarios
- ✓ Solver and convergence considerations
- ✓ Model verification and engineering checks
- ✓ Reviewing graphical results
- ✓ Extracting numerical outputs
- ✓ Comparing multiple analysis cases
- ✓ Troubleshooting common modelling issues

Module 14: Engineering Analysis, Results Interpretation, and Design Optimization

- ✓ Understanding software-generated results
- ✓ Displacement and deformation plots
- ✓ Axial force distribution
- ✓ Effective tension
- ✓ Bending moment
- ✓ Curvature
- ✓ Stress response
- ✓ Utilization results
- ✓ Contact force and seabed interaction
- ✓ Critical location identification
- ✓ Comparing operating and installation cases
- ✓ Sensitivity studies
- ✓ Parameter variation and scenario comparison
- ✓ Identifying unrealistic modelling behavior
- ✓ Engineering verification of simulation results
- ✓ Design iteration and optimization
- ✓ Preparing analysis summaries
- ✓ Engineering reporting and documentation

Module 15: Integrated Offshore Pipeline Case Study and Practical Project

- ✓ Understanding project design requirements
- ✓ Preparing pipeline design inputs

- ✓ Defining pipeline geometry and properties
- ✓ Setting environmental conditions
- ✓ Configuring seabed and soil parameters
- ✓ Creating the pipeline software model
- ✓ Establishing boundary conditions
- ✓ Developing relevant load cases
- ✓ Performing static analysis
- ✓ Evaluating environmental response
- ✓ Reviewing on-bottom stability considerations
- ✓ Assessing free-span conditions
- ✓ Evaluating thermal expansion behavior
- ✓ Reviewing installation-related conditions
- ✓ Identifying critical pipeline sections
- ✓ Comparing analysis scenarios
- ✓ Interpreting engineering outputs
- ✓ Recommending design modifications where required
- ✓ Preparing engineering results and analysis documentation
- ✓ Final project review and discussion