

OrcaFlex Offshore Engineering

COURSE CONTENT

GET IN TOUCH



Multisoft Systems
B - 125, Sector - 2, Noida



(+91) 9810-306-956



info@multosoftsystems.com



www.multosoftsystems.com

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

OrcaFlex Offshore Engineering Training by Multisoft Systems provides a structured learning path for understanding the modelling and dynamic analysis of offshore systems. The program combines OrcaFlex software concepts with offshore engineering applications involving vessels, moorings, risers, umbilicals, pipelines, cables, environmental loading, and installation operations. Through practical simulation exercises, participants learn how to configure models, perform static and dynamic analyses, investigate system behaviour, and interpret engineering results for offshore project scenarios.

Module 1: Offshore Engineering and OrcaFlex Fundamentals

- ✓ Introduction to offshore engineering analysis
- ✓ Overview of floating and subsea systems
- ✓ Applications of OrcaFlex in offshore projects
- ✓ Understanding coupled offshore systems
- ✓ Fundamental concepts of marine dynamics
- ✓ Typical OrcaFlex engineering workflow
- ✓ Model creation, simulation, and assessment process

Module 2: OrcaFlex Interface, Model Architecture, and Workflow

- ✓ Understanding the OrcaFlex workspace
- ✓ Model browser and object organization
- ✓ Creating and configuring a new model
- ✓ Model coordinate systems and conventions
- ✓ Object connections and relationships
- ✓ Data input and model configuration
- ✓ Simulation stages and calculation sequence
- ✓ Model checking and troubleshooting
- ✓ Saving, managing, and reviewing simulation models

Module 3: Environmental Conditions and Hydrodynamic Loading

- ✓ Defining water depth and sea conditions

- ✓ Wave modelling concepts
- ✓ Regular and irregular waves
- ✓ Wave spectra and wave directions
- ✓ Current profiles and variation with depth
- ✓ Wind loading considerations
- ✓ Hydrodynamic coefficients
- ✓ Drag, inertia, and buoyancy effects
- ✓ Seabed definition and interaction
- ✓ Combining environmental loading conditions
- ✓ Selection of environmental cases for analysis

Module 4: Vessel Modelling and Vessel Response

- ✓ Creating vessel objects
- ✓ Vessel coordinate systems
- ✓ Vessel geometry and reference points
- ✓ Vessel types and configuration
- ✓ Displacement and draft considerations
- ✓ Vessel motion definition
- ✓ RAO concepts and application
- ✓ First-order vessel motions
- ✓ Low-frequency response considerations
- ✓ Vessel loading and environmental response
- ✓ Connecting offshore systems to vessels

Module 5: Lines, Sections, Materials, and Structural Properties

- ✓ OrcaFlex line modelling concepts
- ✓ Line types and line configuration
- ✓ Defining line geometry
- ✓ Segmentation principles
- ✓ Material and structural properties
- ✓ Mass and buoyancy characteristics
- ✓ Axial, bending, and torsional properties
- ✓ Hydrodynamic properties
- ✓ Line end conditions
- ✓ Connections and attachments
- ✓ Line contact and seabed interaction
- ✓ Reviewing line configuration and discretisation

Module 6: Mooring System Modelling and Analysis

- ✓ Fundamentals of offshore mooring systems
- ✓ Catenary and taut mooring concepts
- ✓ Mooring line components
- ✓ Chain, wire, and synthetic rope representation
- ✓ Anchor and fairlead configuration
- ✓ Multi-line mooring arrangements
- ✓ Pretension and equilibrium
- ✓ Vessel offset assessment
- ✓ Mooring line tension analysis

- ✓ Environmental loading on moored systems
- ✓ Intact mooring conditions
- ✓ Damaged or line-failure scenarios
- ✓ Evaluating maximum tension and system response

Module 7: Riser System Modelling and Analysis

- ✓ Introduction to offshore riser systems
- ✓ Flexible and dynamic riser concepts
- ✓ Riser configuration selection
- ✓ Lazy-wave and free-hanging configurations
- ✓ Top and bottom boundary conditions
- ✓ Buoyancy modules and distributed buoyancy
- ✓ Riser geometry and line properties
- ✓ Effective tension assessment
- ✓ Curvature and bend-radius evaluation
- ✓ Touchdown zone behaviour
- ✓ Riser–seabed interaction
- ✓ Static and dynamic riser response
- ✓ Identifying critical response locations

Module 8: Umbilicals, Flexible Pipes, and Subsea Cables

- ✓ Offshore umbilical modelling principles
- ✓ Flexible pipe representation
- ✓ Subsea power and communication cable modelling
- ✓ Line property definition

- ✓ Submerged weight and buoyancy
- ✓ Bend stiffness considerations
- ✓ End connections and termination points
- ✓ Suspended and seabed configurations
- ✓ Touchdown behaviour
- ✓ Tension and curvature assessment
- ✓ Cable and umbilical response under environmental loading

Module 9: Buoys, Clump Weights, Connectors, and Offshore Components

- ✓ 3D and 6D buoy concepts
- ✓ Buoy geometry and properties
- ✓ Mass, volume, and inertia
- ✓ Hydrodynamic loading on buoy objects
- ✓ Clump weight modelling
- ✓ Distributed and discrete buoyancy
- ✓ Links and connectors
- ✓ Constraints and connection arrangements
- ✓ Offshore component interaction
- ✓ Integrating auxiliary components with line systems

Module 10: Static Analysis and Equilibrium Assessment

- ✓ Purpose of static analysis
- ✓ Static equilibrium calculations

- ✓ Initial configuration assessment
- ✓ Line shape and equilibrium
- ✓ Pretension verification
- ✓ Vessel equilibrium
- ✓ Static environmental loading
- ✓ Static convergence considerations
- ✓ Reviewing static results
- ✓ Identifying modelling inconsistencies
- ✓ Preparing an equilibrated model for dynamic simulation

Module 11: Dynamic Analysis and Time-Domain Simulation

- ✓ Fundamentals of dynamic offshore analysis
- ✓ Transition from static to dynamic simulation
- ✓ Simulation stages and duration
- ✓ Time-step considerations
- ✓ Environmental load application
- ✓ Dynamic vessel motion
- ✓ Line dynamic response
- ✓ Tension variation with time
- ✓ Displacement and motion response
- ✓ Curvature and bending response
- ✓ Transient events
- ✓ Simulation stability and convergence
- ✓ Selecting appropriate simulation parameters

Module 12: Offshore Installation and Marine Operations Analysis

- ✓ Introduction to offshore installation analysis
- ✓ Installation sequence modelling concepts
- ✓ Line deployment and recovery
- ✓ Lowering operations
- ✓ Subsea equipment deployment
- ✓ Overboarding scenarios
- ✓ Winch modelling and line payout
- ✓ Crane and lifting operation concepts
- ✓ Vessel movement during operations
- ✓ Splash-zone considerations
- ✓ Installation tension assessment
- ✓ Clearance and seabed interaction
- ✓ Evaluating critical stages of marine operations

Module 13: Results Interpretation, Post-Processing, and Engineering Assessment

- ✓ Understanding OrcaFlex result categories
- ✓ Time histories
- ✓ Range graphs
- ✓ Statistics and extreme values
- ✓ Line tension results
- ✓ Effective tension interpretation
- ✓ Curvature and bend-radius results

- ✓ Vessel motion and offset results
- ✓ Position and displacement assessment
- ✓ Identifying critical locations
- ✓ Comparing multiple simulation cases
- ✓ Result extraction and reporting
- ✓ Engineering review of simulation outputs

Module 14: Advanced Offshore Engineering Cases and Integrated Project

- ✓ Building an integrated offshore model
- ✓ Selection of environmental conditions
- ✓ Vessel and mooring configuration
- ✓ Riser or subsea line integration
- ✓ Static equilibrium verification
- ✓ Dynamic simulation setup
- ✓ Operational scenario modelling
- ✓ Sensitivity studies
- ✓ Comparison of design cases
- ✓ Identification of critical responses
- ✓ Engineering interpretation of results
- ✓ Model quality checks
- ✓ Preparation of simulation findings
- ✓ Practical offshore engineering case study