

OrcaFlex Python Automation

COURSE CONTENT

GET IN TOUCH



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About Multisoft

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About Course

OrcaFlex Python Automation Training focuses on using Python to streamline simulation-intensive engineering activities within OrcaFlex. Participants learn how to interact with models through OrcFxAPI, automate parameter modifications, generate analysis cases, execute simulations, and retrieve engineering results without relying entirely on repetitive manual operations. The course combines programming concepts with practical offshore simulation workflows, making it relevant for engineers handling large numbers of models, load cases, sensitivity studies, and result datasets. Through structured exercises and practical automation scenarios, participants gain exposure to creating reusable and scalable scripts for more efficient OrcaFlex engineering analysis.

Module 1: Introduction to OrcaFlex Python Automation

- ✓ Overview of OrcaFlex automation capabilities
- ✓ Role of Python in OrcaFlex engineering workflows
- ✓ Understanding the OrcaFlex Python interface
- ✓ Introduction to OrcFxAPI
- ✓ Python environment requirements
- ✓ Importing and accessing the OrcFxAPI module
- ✓ Basic automation workflow
- ✓ Creating and running a simple OrcaFlex Python script

Module 2: Working with OrcaFlex Models through Python

- ✓ Loading existing OrcaFlex models
- ✓ Creating models programmatically
- ✓ Saving models through Python
- ✓ Accessing model properties
- ✓ Understanding OrcaFlex model objects
- ✓ Identifying and retrieving objects by name
- ✓ Creating new model objects
- ✓ Deleting and managing objects
- ✓ Iterating through model components
- ✓ Working with model state and simulation status

Module 3: Model Data Access and Parameter Manipulation

- ✓ Reading OrcaFlex input data using Python

- ✓ Updating model parameters programmatically
- ✓ Working with scalar data
- ✓ Handling indexed and tabular data
- ✓ Accessing object-specific properties
- ✓ Automating environmental parameters
- ✓ Modifying wave, wind, and current conditions
- ✓ Manipulating vessel and line properties
- ✓ Updating line lengths, sections, and configuration data
- ✓ Creating reusable parameter modification routines

Module 4: Simulation Execution and Control

- ✓ Running OrcaFlex simulations using Python
- ✓ Managing static analysis
- ✓ Automating dynamic simulations
- ✓ Monitoring simulation progress
- ✓ Working with simulation states
- ✓ Saving simulation files automatically
- ✓ Managing multiple simulation cases
- ✓ Handling failed or incomplete simulations
- ✓ Automating model reset and rerun processes

Module 5: Automated Results Extraction and Processing

- ✓ Understanding OrcaFlex result types
- ✓ Extracting simulation results programmatically
- ✓ Working with time history results

- ✓ Retrieving range graph results
- ✓ Accessing static and dynamic results
- ✓ Extracting minimum, maximum, and statistical values
- ✓ Selecting result variables and objects
- ✓ Specifying periods and result locations
- ✓ Processing results using Python data structures
- ✓ Exporting engineering results for further analysis
- ✓ Structuring automated result reports

Module 6: Batch Processing and Parametric Analysis

- ✓ Introduction to batch simulation automation
- ✓ Creating multiple analysis cases
- ✓ Automating parameter variations
- ✓ Running models across environmental conditions
- ✓ Automating load-case combinations
- ✓ Performing sensitivity studies
- ✓ Looping through multiple OrcaFlex models
- ✓ Organizing simulation inputs and outputs
- ✓ Comparing results across simulation cases
- ✓ Identifying governing cases programmatically
- ✓ Managing large simulation datasets efficiently

Module 7: Advanced Python Automation for OrcaFlex

- ✓ Structuring reusable OrcaFlex scripts
- ✓ Creating functions for repetitive engineering operations

- ✓ Working with Python modules and libraries
- ✓ File and directory automation
- ✓ Automated model naming and file management
- ✓ Exception handling and error management
- ✓ Logging simulation activities
- ✓ Validating model parameters before execution
- ✓ Automating quality checks
- ✓ Improving script maintainability
- ✓ Designing scalable automation workflows

Module 8: Practical Offshore Engineering Automation Workflow

- ✓ Defining an automated engineering analysis workflow
- ✓ Preparing a baseline OrcaFlex model
- ✓ Automating environmental load cases
- ✓ Programmatically modifying model configurations
- ✓ Executing multiple simulations
- ✓ Extracting critical engineering responses
- ✓ Processing and comparing simulation results
- ✓ Automating result summaries
- ✓ Reviewing governing simulation cases
- ✓ Organizing model and result files
- ✓ Troubleshooting automation scripts
- ✓ End-to-end OrcaFlex Python automation exercise