

AVEVA Process Simulation

COURSE CONTENT

GET IN TOUCH



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About Multisoft

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About Course

AVEVA Process Simulation Training provides practical knowledge of process modeling, equipment simulation, thermodynamics, flowsheet analysis, and process optimization. Through hands-on exercises and industry-focused scenarios, participants learn to analyze process behavior and apply simulation techniques across oil & gas, chemical, petrochemical, and other process industries.

Module 1: Introduction to Process Simulation

- ✓ Role of process simulation in engineering
- ✓ Steady-state and dynamic simulation concepts
- ✓ Applications across process industries
- ✓ Process modeling workflow
- ✓ Engineering data required for simulation
- ✓ Understanding simulation assumptions
- ✓ Introduction to model validation
- ✓ Typical process simulation lifecycle

Module 2: AVEVA Process Simulation Environment

- ✓ Introduction to AVEVA Process Simulation
- ✓ Understanding the simulation workspace
- ✓ Navigation and model organization
- ✓ Creating and managing simulation cases
- ✓ Adding process components
- ✓ Building flowsheet structures
- ✓ Connecting process objects
- ✓ Working with engineering units
- ✓ Viewing and interpreting simulation results

Module 3: Components, Properties, and Thermodynamics

- ✓ Component selection and definition
- ✓ Pure components and mixtures

- ✓ Understanding physical properties
- ✓ Phase equilibrium concepts
- ✓ Vapor-liquid equilibrium
- ✓ Selecting suitable thermodynamic methods
- ✓ Equation-of-state concepts
- ✓ Property package considerations
- ✓ Understanding thermodynamic predictions
- ✓ Impact of thermodynamic selection on simulation results

Module 4: Material and Energy Streams

- ✓ Creating material streams
- ✓ Defining stream composition
- ✓ Temperature and pressure specifications
- ✓ Flow specifications
- ✓ Vapor fraction and phase conditions
- ✓ Energy streams
- ✓ Stream property calculations
- ✓ Stream connectivity
- ✓ Reviewing calculated stream results
- ✓ Understanding degrees of freedom

Module 5: Fluid Characterization and Feed Definition

- ✓ Defining process feed conditions
- ✓ Composition basis and flow basis
- ✓ Gas and liquid feed characterization

- ✓ Handling multicomponent mixtures
- ✓ Petroleum and hydrocarbon considerations
- ✓ Feed property evaluation
- ✓ Phase behavior analysis
- ✓ Checking feed consistency before simulation

Module 6: Pressure-Flow Equipment Modeling

- ✓ Valve modeling
- ✓ Pressure reduction calculations
- ✓ Pump modeling
- ✓ Pump operating specifications
- ✓ Compressor modeling
- ✓ Compression calculations
- ✓ Efficiency considerations
- ✓ Pressure-flow relationships
- ✓ Equipment operating constraints
- ✓ Evaluating equipment performance

Module 7: Heat Transfer and Thermal Equipment

- ✓ Heater and cooler models
- ✓ Energy balance concepts
- ✓ Heat duty calculations
- ✓ Heat exchanger fundamentals
- ✓ Heat exchanger configuration
- ✓ Hot and cold stream specifications

- ✓ Temperature approach considerations
- ✓ Pressure drop considerations
- ✓ Utility requirements
- ✓ Evaluating exchanger performance

Module 8: Separation Process Modeling

- ✓ Flash separation principles
- ✓ Two-phase separators
- ✓ Three-phase separation concepts
- ✓ Separator operating conditions
- ✓ Phase split calculations
- ✓ Gas-liquid separation
- ✓ Liquid-liquid behavior
- ✓ Separation performance evaluation
- ✓ Multi-stage separation arrangements
- ✓ Industrial separator case study

Module 9: Distillation and Column Simulation

- ✓ Fundamentals of staged separation
- ✓ Column configuration
- ✓ Feed stage definition
- ✓ Condenser and reboiler concepts
- ✓ Operating pressure specifications
- ✓ Reflux and boil-up concepts
- ✓ Product specifications

- ✓ Column convergence
- ✓ Temperature and composition profiles
- ✓ Evaluating column performance
- ✓ Troubleshooting convergence issues
- ✓ Column operating scenario analysis

Module 10: Reactor and Reaction Modeling

- ✓ Introduction to reaction simulation
- ✓ Reaction definitions
- ✓ Stoichiometry and conversion concepts
- ✓ Reaction sets and process conditions
- ✓ Reactor model selection considerations
- ✓ Heat effects of reactions
- ✓ Reactor feed and product analysis
- ✓ Evaluating conversion and yield
- ✓ Integrating reactors with downstream equipment

Module 11: Recycle, Adjustments, and Flowsheet Convergence

- ✓ Understanding recycle loops
- ✓ Recycle stream configuration
- ✓ Tear stream concepts
- ✓ Initial estimates and initialization
- ✓ Convergence behavior

- ✓ Process specifications and calculated variables
- ✓ Handling interdependent calculations
- ✓ Diagnosing convergence failures
- ✓ Improving simulation stability
- ✓ Validating converged process models

Module 12: Process Analysis and Optimization

- ✓ Evaluating process performance
- ✓ Key operating variable identification
- ✓ Sensitivity and scenario analysis
- ✓ Investigating operating alternatives
- ✓ Energy consumption analysis
- ✓ Equipment loading considerations
- ✓ Process constraint evaluation
- ✓ Identifying optimization opportunities
- ✓ Comparing alternative operating cases
- ✓ Interpreting simulation results for engineering decisions

Module 13: Dynamic Simulation and Process Behavior

- ✓ Introduction to dynamic process simulation
- ✓ Difference between steady-state and dynamic models
- ✓ Process inventories and accumulation
- ✓ Pressure and flow dynamics
- ✓ Equipment dynamic behavior
- ✓ Disturbance response

- ✓ Introduction to control variables
- ✓ Manipulated and controlled variables
- ✓ Basic control loop concepts
- ✓ Evaluating process response over time
- ✓ Startup and operational scenario concepts

Module 14: Integrated Process Simulation and Case Studies

- ✓ Developing an integrated process flowsheet
- ✓ Defining simulation objectives
- ✓ Selecting components and thermodynamics
- ✓ Configuring feed streams
- ✓ Integrating separation equipment
- ✓ Adding heat transfer equipment
- ✓ Configuring pressure-changing equipment
- ✓ Implementing recycle streams
- ✓ Checking mass and energy balances
- ✓ Reviewing equipment performance
- ✓ Performing operating scenario studies
- ✓ Troubleshooting the integrated model
- ✓ Interpreting engineering results
- ✓ Documenting simulation assumptions and findings
- ✓ Practical oil & gas / petrochemical process case study