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Aspen HYSYS: Process Modeling MBA

17 November - 5 Decem...

Manama (Bahrain)

Aspen HYSYS: Process Modeling MBA

course code: E636 From: 17 November - 5 December 2024 Venue: Manama (Bahrain) - Crowne Plaza course Fees: 3750 Euro

Course Overview

- Learn to build, navigate and optimize process simulations using Aspen HYSYS
- Learn the efficient use of different HYSYS functions to build steady state process simulations

Course Benefits

- Leverage the intuitive bi-directional solver and other key features of Aspen HYSYS that allow for rapid flowsheet construction
- Use the Workbook and Process Flow Diagram (PFD) interfaces for quick and effective modeling
- Discover how multi-flowsheet integration can streamline and organize simulation efforts
- Explore different means of reporting results, including the use of Microsoft Excel VB macros
- Evaluate the performance of existing equipment by leveraging the rating capabilities of Aspen HYSYS
- Improve the convergence characteristics of columns and flowsheets; troubleshoot common problems
- Perform Case studies to determine the optimum operating point for a process
- Understand the pipeline hydraulics calculations used to assess the sizing requirements for a gas gathering system

Approach

- Instruction on basic topics
- Experienced instructor will select an appropriate order in which to present the modules
- Discussion about the general approach and the key elements for successful simulations
- Instructor-guided demonstrations of features
- Hands-on workshops using examples from the petroleum processing industry
- Detailed course notes

Getting Started

- Create and define a fluid package
- Utilize the built-in expert system to choose an appropriate thermodynamic model
- Select components, including hypotheticals
- Install streams and attach stream utilities
- Customize the Workbook
- Workshop: Introduce basic concepts necessary for creating simulations in Aspen HYSYS®.

Propane Refrigeration Loop

- Add and connect operations to construct a simple flowsheet
- Use the graphic interface to manipulate flowsheet objects and provide a clearer representation of the process
- Understand how process information is propagated both forwards-and backwards
- Convert simulation cases to templates

- Workshop: Build and analyze a propane refrigeration loop simulation

Refrigerated Gas Plant

- Install and converge heat exchangers
- Use logical operations: Adjust and Balance
- Workshop: Model a simplified version of a refrigerated gas plant.

NGL Fractionation Train

- Model distillation columns with the assistance of the Column Input Expert
- Manipulate column specifications to better represent process constraints
- Evaluate utility requirements using the Process Utility Manager
- Workshop: Model a two column natural gas liquid (NGL) recovery plant

Oil Characterization and HP Separation

- Introduce Oil Characterization in Aspen HYSYS
- Use the Aspen HYSYS Spreadsheet and Case Study functionality
- Workshop: Use the Oil Environment to characterize a crude assay and then employ the Case Study and Spreadsheet operation to determine how the Gas Oil Ratio (GOR) varies with pressure

Gas Gathering System

- Simulate a gas gathering system located on varied terrain using the steady state capabilities of Aspen HYSYS
- Workshop: Use the pipe segment and the Hydraulics subflowsheet to model a piping network in Aspen HYSYS.

Two Stage Compression

- Introduce the use of the recycle operation
- Recognize suitable recycle locations
- Implement performance curves for rotating equipment
- Workshop: Utilize the recycle operation to build a two stage compression flowsheet; define and activate compressor curves.

Natural Gas Dehydration with TEG

- Review the recommended methods to saturate single phase and two phase hydrocarbon streams
- Discuss the implications of hydrate formation and the different means available to avoid hydrate problems
- Model a typical TEG dehydration unit
- Workshop: Model a typical TEG dehydration unit and determine water dew point for the dry gas; use the hydrate utility to investigate the effects of methanol injection on hydrate inhibition.

Rating Heat Exchangers

- Review heat transfer calculation models in Aspen HYSYS

- Configure a shell and tube heat exchanger to use a built-in Rating model
- Integrate rigorous Exchanger Design and Rating (EDR) calculations into an Aspen HYSYS flowsheet
- Workshop: Use a Rating model to determine if an existing heat exchanger will meet process specifications; design and rate a heat exchanger using the EDR interface inside Aspen HYSYS.

Troubleshooting / Best Practices

- Introduce best practices for product integration and automation
- Investigate reasons why a simulation may produce poor results, consistency errors, etc.
- Identify appropriate thermodynamic models for common processes
- Use suggested tips to debug simulations and columns
- Workshop: Troubleshoot existing Aspen HYSYS cases; recognize common problem areas in an Aspen HYSYS case.

Reporting in Aspen HYSYS

- Create a variety of customized reports using newly added functionality in the Report Manager
- Access free Excel utilities designed to extract simulation data
- Use Aspen Simulation Workbook to deploy models in Microsoft Excel
- Workshop: Use the Report Manager, Excel utilities and Aspen Simulation Workbook to obtain custom reports.

Optional Topics Per Request

Optional Topic: Acid Gas Sweetening

- Simulate amine towers; supply tray dimensions
- Discuss efficiencies for amine towers
- Use the Set operation and the Spreadsheet
- Workshop: Simulate a typical acid gas treating facility.

Optional Topic: Liquid Natural Gas (LNG)

- Use the LNG Exchanger operation to simulate multi-pass heat exchangers
- Utilize the Sub-Flowsheet to build a modularized PFD
- Model an LNG production process
- Workshop: Simulate a typical LNG facility

Appendix A: What's New in Aspen HYSYS

- Review the latest features introduced in Aspen HYSYS V7.3.

Appendix B: Pro/II Converter

- Describe the key features of the new Pro/II file converter
- Demonstrate workflow and identify existing limitations of the file conversion tool
- Workshop: Use the new Pro/II Converter to create an Aspen HYSYS simulation based on an existing keyword file.