OPTIMIZE™ | 24

Partnering for the Future

Training Courses

Thursday, May 2, 2024 | 8:30 a.m. - 4:30 p.m.

aspentech

Introduction

Aspen Technology, Inc. awards Continuing Education Units (CEUs) for training classes conducted by our organization. One CEU is granted for every 10 hours of class participation. Each training session offered at OPTIMIZE 2024 is eligible for 0.7 CEUs. All of the courses offered at OPTIMIZE 2024 are at the introductory level. All courses take the following approach:

- Clear guidance on fundamental topics

- Industry workflows hands-on workshops

- Experienced instructor-guided demonstrations

- Q&A on student-specific problems

Please Note: All OPTIMIZE training classes are located off site. Transportation will be provided to and from the training facility, leaving from the Marriott Marquis Houston.

For further details or questions, please reach out to the OPTIMIZE24 Training team at Optimize24Training@aspentech.com.

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Asset Performance Management (APM) Courses

Petroleum Supply Chain (PSC) Courses

Advanced Process Control (APC) and Aspen GDOT™ Courses

DataWorks Course

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Gain Visibility into Asset Health and Performance with Aspen Mtell® KPIs & Dashboards | MPM024

Create and configure dashboards to monitor asset health and performance, and easily identify opportunities and resolve risks without causing financial or safety impact. Optimize workflows by implementing your existing maintenance practices with user-configurable pages.

APM Courses

COURSE BENEFITS

- Monitor plant performance and asset health
- Develop dashboards customized to your specific work processes
- Learn how to optimize existing maintenance practices
- Synergize cross-functional team operations

Who Should Attend?

Reliability/Maintenance/Process Engineers

Plant/Facilities Supervisors

Prerequisites

Introductory knowledge to Aspen Mtell is recommended

Suggested Subsequent Courses

MPM101, MPM111, MPM121, MPM131, MPM221

AGENDA

AspenTech Operational Insights™ Overview

Navigate the Dashboard as a Standard Operator

- Check tag data for an online asset
- View current efficiency metrics for an asset
- View open Aspen Mtell alerts for one asset
- Triage and close an existing Aspen Mtell alert
- Redirect alert triaging to Aspen Mtell Alert Manager

Workshop 1: Learn how to navigate the Dashboard as a Standard Operator

Navigate the Dashboard as an Operations Manager

- View high-level KPIs of your operations
- Visualize general asset health by site
- Review summary report of overall site health
- View current efficiency metrics for an asset

Workshop 2: Learn how to navigate the Dashboard as an Operations Manager

Build your own Dashboards for Integration with Aspen Mtell

- Add references to existing hierarchical elements in Aspen Mtell
- Create elements for reporting Aspen Mtell agent alert data
- Generate KPIs and summaries for overall site health
- Import custom information such as historical efficiency metrics
- Create a custom link to access external pages

Workshop 3: Learn how to build a Custom Dashboard

Conduct Strategic Decisions for Plant and Sustainability Projects with Aspen Fidelis™ | **AFR024**

Use Aspen Fidelis to quantify future plant performance, identify which unplanned equipment failures or events are limiting such performance and compare the benefits and costs of different improvement options to make informed decisions on capital asset management. Learn to initiate new sustainability projects and assess their value potential.

APM Courses

COURSE BENEFITS

- Gain the practical skills and knowledge to begin modeling new and existing processes
- Learn how to use the software to reduce plant cost by increasing predictability
- Learn how to make better plant decisions based on System Reliability results
- Gain an understanding of the Asset Management Model by learning how reliability and maintainability affect cost and decision making

Who Should Attend?

Process/Project Engineers Working on Capital Projects

Reliability/Facilities/Industrial Engineers Focused on System Reliability

Prerequisites - None

Suggested Subsequent Courses

AFR101

AGENDA

Introduction to Aspen Fidelis

Overview of Aspen Fidelis Functionalities

- Model inputs and outputs
- Understand the modeling approach
- Explain how Aspen Fidelis simulation runs are performed

How to Interpret Outputs from an Aspen Fidelis run

- Navigate through the results from the simulation environment pane
- Understand histograms, probability curves and pareto charts generated by a model

Workshop 1: Interpret Aspen Fidelis Results (H_2 Production, Revenue, Levelized Cost of H_2)

Navigate the Aspen Fidelis User Interface

- Simulation environment
- Model data environment

Workshop 2: Import Asset Register and Build a Green Hydrogen Model

Customize your Aspen Fidelis model to incorporate your unique business logic

- Overview of Aspen Fidelis integration with Visual Studio Tools for Applications (VSTA)
- Understand how custom logic is executed during a simulation
- Explain which elements from a model are available in VS Interface
- Write an example of custom logic

Continued

Conduct Strategic Decisions for Plant and Sustainability Projects with Aspen Fidelis™ | **AFR024**

Use Aspen Fidelis to quantify future plant performance, identify which unplanned equipment failures or events are limiting such performance and compare the benefits and costs of different improvement options to make informed decisions on capital asset management. Learn to initiate new sustainability projects and assess their value potential.

APM Courses

Workshop 3: Custom Coding (Financial KPIs, Performance Degradation)

Perform What-If Analysis to Help Drive Decisions

- Modify model inputs
- Compare results from multiple runs
- Understand options to automate multiple runs

Optimize Processes Through Batch Data Analysis With Aspen ProMV® | **PMV024**

Use Aspen ProMV to get actionable insights from your industrial batch data, and use the information for process optimization and troubleshooting.
Learn how to relate time-varying process data, raw material properties and initial conditions to final product quality and productivity.

APM Courses

COURSE BENEFITS

- Gain the practical skills and knowledge to begin modeling new and existing batch processes

- Learn how to use the software to reduce plant cost by optimizing quality

- Discover underlying latent variables correlated with your batch operations

Who Should Attend?
Process Engineers/Control Systems Engineers/Quality Control Engineers

Prerequisites
None

Suggested Subsequent Courses
PMV101

AGENDA

Introduction to Batch Processes

Overview of Aspen ProMV Functionalities

- Understand batch processes and the use cases

- Visualize batch data

- Understand what batch process problems can be resolved using latent variable modeling

Review Algorithms and Models

- Explain Principal Component Analysis (PCA)

- Explain Partial Least Squares (PLS)

Model and Analyze Historical Batch Data

- Understand approaches to modeling batch data

- Use PCA and PLS methods to analyze different blocks of data

- Use batch alignment tool to align process data trajectories

Workshop 1: PCA and PLS Modeling for Batch Process

Workshop 2: PPCA Modeling for batch Process

Workshop 3: Batch Alignment for PCA and PLS Modeling

Workshop 4: Batch Analysis of FMC Dataset to Diagnose Bad Batches

Online Monitoring of Batch Processes (MSPC)

- Use shewhart charts to identify the common and special causes of variation

- Use online monitoring to view current trajectory and forecast using extrapolation

- Implement online monitoring to landmark models

Continued

Optimize Processes Through Batch Data Analysis With Aspen ProMV® | **PMV024**

Use Aspen ProMV to get actionable insights from your industrial batch data, and use the information for process optimization and troubleshooting. Learn how to relate time-varying process data, raw material properties and initial conditions to final product quality and productivity.

APM Courses

- Use online monitoring to view instantaneous and evolving SPE values

Optimization of Batch Processes

- Use Model Explorer to explore the operation space of your batch process
- Use Model Optimizer to optimize batch recipes and obtain desired results
- Implement optimization to develop new products
- Understand the latent variable approach for process optimization

Workshop 5: Deploy Online Batch Model

Improve Product Quality with Multivariate Analysis using Aspen Unscrambler™ | MVA024

Learn the basics of multivariate analysis with the Aspen Unscrambler interface. Uncover multivariate relationships from process and spectroscopic data, and use this information for classification, quality prediction and production management. Learn how to relate process data, raw material properties and initial conditions to final product quality and productivity.

APM Courses

COURSE BENEFITS

- Understand the basics of multivariate analysis
- Learn how to apply multiple algorithms to analyze spectroscopic data
- Optimize process quality and output by identifying key controllable variables

Who Should Attend?
Data Analysts/Process Engineers Conducting Spectroscopic Analysis

Prerequisites
Understanding of multivariate analysis is helpful but not mandatory

Suggested Subsequent Courses
MVA903, MVA904, PAT901

AGENDA

Introduction to Multivariate Analysis (MVA)

Introduction to Principal Component Analysis (PCA)

- Describe the benefits of multivariate analysis
- Explain how PCA is performed
- Create a simple model in Aspen Unscrambler
- Understand results from a PCA analysis

Workshop 1: Interpret PCA results in Aspen Unscrambler

Validate a Multivariate Model

- Detect and remove outliers
- Perform a multivariate regression
- Analyze data using Partial Least Squares Regression (PLSR)
- Make predictions based on model results

Workshop 2: Create Predictions PLSR

Monitor an Aspen Unscrambler Model with Aspen Process Pulse

- Prepare a model for online monitoring
- Deploy a model to Aspen Process Pulse™
- Navigate Aspen Process Pulse to monitor current events

Workshop 3: Deploy a Model for Monitoring with Aspen Process Pulse

Integrate Python with Aspen Unscrambler and Process Pulse

- Create a simple python script
- Add python as a datasource for Aspen Process Pulse
- Modify an Aspen Unscrambler model to include inputs from python to create an advanced model

Continued

Improve Product Quality with Multivariate Analysis using Aspen Unscrambler™ | **MVA024**

Learn the basics of multivariate analysis with the Aspen Unscrambler interface. Uncover multivariate relationships from process and spectroscopic data, and use this information for classification, quality prediction and production management. Learn how to relate process data, raw material properties and initial conditions to final product quality and productivity.

APM Courses

- Monitor an advanced model in Aspen Process Pulse

Workshop 4: Integrate Python into Aspen Unscrambler and Process Pulse

Take Production Planning to the Next Level with Aspen Unified PIMS™ | **AUP024**

Enhance your LP planning efficiency and increase value capture with Aspen Unified PIMS, featuring an advanced multi-user platform, high performance computing techniques and robust diagnostic functions. Hands-on workshops will boost user skills in planning model management and analysis with cutting-edge technologies.

PSC Courses

COURSE BENEFITS

Leverage the latest Aspen Unified PIMS innovations to improve efficiencies and capture value in the planning process

Who Should Attend?
Refinery and Petrochemical Planners

Prerequisites
Basic knowledge of Refinery Planning concepts and petrochemical operations recommended

Suggested Subsequent Courses
AUP101

AGENDA

Introduction to Aspen Unified Planning
- Overview of Aspen Unified home page
- Manage user roles and permissions
- PIMS-AO model to AUP model migration

AUP Flowsheet and Process Submodels
- Introduction to the flowsheet interface
- Explain Data Panels and Sub-flowsheets
- Overview of basic workflows (updating cases, running cases and visualizing results)
- Overview of various AUP submodels types

Workshop 1: Learn how to create a submodel

Overview of Planner's Work Area
- Introduction to Planner's Work Area Configuration

Workshop 2: Create a Planner's Work Area and visualize the results

AUP Excel Add-In and Automation
- Overview of Excel Add-In configuration
- Automation by GraphQL

Troubleshoot AUP Models with Infeasibility Diagnostics

Learn New Modeling Features: Fixed Recovery Tower, CO_2 Emissions, and Periods Totalizer
- Fixed Recovery Tower: Simplify gas plant stream splitting
- CO_2 Emissions Analysis: Enable precise emissions estimations
- Periods Totalizer: Enhanced reporting capability for multi-period models

Continued

Take Production Planning to the Next Level with Aspen Unified PIMS™ | **AUP024**

Enhance your LP planning efficiency and increase value capture with Aspen Unified PIMS, featuring an advanced multi-user platform, high performance computing techniques and robust diagnostic functions. Hands-on workshops will boost user skills in planning model management and analysis with cutting-edge technologies.

PSC Courses

Learn New Modeling Features:

Fixed Recovery Tower, CO_2 Emissions, and Periods Totalizer

- Fixed Recovery Tower: Simplify gas plant stream splitting
- CO_2 Emissions Analysis: Enable precise emissions estimations
- Periods Totalizer: Enhanced reporting capability for multi-period models

Workshop 3: Build and configure a CO_2 Emissions submodel to visualize the benefits

Streamline and Simplify Refinery Scheduling with Aspen Unified Scheduling™ | **AUS024**

Simplify refinery scheduling, increase workflow efficiencies and improve results with schedule optimization.

Utilize the latest innovations to streamline refinery operations.

PSC Courses

COURSE BENEFITS

Learn how to use Aspen Unified Scheduling to increase efficiencies and optimize schedules to improve results

Who Should Attend?
Refinery Schedulers

Prerequisites
Experience in refinery and petrochemical operations coupled with a fundamental grasp of refinery scheduling and product blending

Suggested Subsequent Courses
AUS101

AGENDA

Aspen Unified Scheduling Overview

AUS Model Creation and AUS Flowsheet
- AUS model elements

Workshop 1: Working with an AUS flowsheet

AUS Gantt Chart and Events
- Explain Gantt chart
- Events creation for AUS

Workshop 2: Import and Create Events in AUS

AUS Reconciliation Data hub and AUS Case Management
- Understand reconciliation mode in AUS
- 'Data hub' for importing the data from third-party applications
- AUS case management

Multi-site and Primary Distribution Modeling in AUS
- Learn scheduling across the refinery value chain

AUS Crude Schedule Optimization and Planning Targets Sharing
- Learn how to optimize crude schedule
- Planning target sharing from AUP to AUS

AUS Process Unit Scheduling
- Learn about the various process units
- Learn about user-defined automation based custom units

AUS Blend Schedule Modeling
- Learn about the different blend elements, blend scheduling and blend optimization workflows

Continued

Streamline and Simplify Refinery Scheduling with Aspen Unified Scheduling™ | **AUS024**

Simplify refinery scheduling, increase workflow efficiencies and improve results with schedule optimization.

Utilize the latest innovations to streamline refinery operations.

PSC Courses

Workshop 3: Create a Blend Schedule

Aspen Unified Site Catalog

- Import data from the site catalog

- Explain site catalog set and publish data to site catalog

AUS Reporting and Integration APIs

Drive Controller Performance and Uptime with AI-driven Innovations in Aspen DMC3™ | **APC024**

Use the latest Aspen DMC3 AI/ML innovations: Aspen Deep Learning™, Aspen Maestro™ and Aspen Virtual Advisor for DMC3™.
Learn how to apply these innovations to your existing applications to improve controller uptime and performance.

APC and GDOT Courses

COURSE BENEFITS

- Gain skills and knowledge on the latest Aspen Advanced Process Control features
- Learn to use Deep Learning for IQ and DMC3
- Learn how to use Aspen Virtual Advisor (AVA) for DMC3 to evaluate operating scenarios and provide guidance

Who Should Attend?
Process Control Engineers/Engineers Designing, Implementing or Maintaining APC Controllers

Prerequisites
Basic knowledge of APC concepts and software recommended

Suggested Subsequent Courses
APC105

AGENDA

Reduce controller deployment and maintenance effort with new Aspen DMC3 Builder features

- Explore Aspen DMC3 Builder latest features such as IP.21 Data import, Assembled Models, Vector Transforms, MV/CV Interlock and SP-PV tracking
- Walk through the Aspen DMC3 Builder workflow and explore the new capabilities

Simplify IQ deployments with direct communication with Aspen DMC3 via APC Gateway

- Deep dive into APC gateway capabilities and how to enable and configure it

Workshop 1: Learn how to read IQ predictions into an Aspen DMC3 application via APC gateway

Utilize Aspen DMC3 Builder and embedded Deep Learning TensorFlow algorithms to develop nonlinear models for IQ and DMC3

- Focus on the development of inferentials using available DL algorithms
- Learn some of the best practices to build DL models for Aspen DMC3 applications

Workshop 2: Build and deploy an inferential created using DL

Use AVA (Aspen Virtual Advisor for DMC3) to evaluate real-time operating scenarios and provide actionable guidance

- Learn the latest features available in Aspen APC Web including flowsheet, custom filters and tag search
- Understand the core aspects of AVA and how to configure it for a DMC3 application

Continued

Drive Controller Performance and Uptime with AI-driven Innovations in Aspen DMC3™ | **APC024**

Use the latest Aspen DMC3 AI/ML innovations: Aspen Deep Learning™, Aspen Maestro™ and Aspen Virtual Advisor for DMC3™.
Learn how to apply these innovations to your existing applications to improve controller uptime and performance.

APC and GDOT Courses

Workshop 3: Explore the latest functionalities on the APC Web, learn how to deploy a DMC3 application with AVA and evaluate different scenarios with AVA-assisted strategies for DMC3 controller applications.

Align Process Operations with Plant-Wide Economics using Aspen GDOT™ | **GDOT024**

Apply Aspen GDOT to petroleum refining and petrochemical processes. Rapidly configure applications using standard templates in Aspen Unified and deploy GDOT applications online, including best practices for implementation and sustaining benefits.

APC and GDOT Courses

COURSE BENEFITS

- Gain the skills and knowledge to model new and existing processes.
- Learn practical techniques for building and troubleshooting simulations
- Reduce process design by testing various plant configurations
- Determine optimal process conditions to improve current processes

Who Should Attend?
Process Control Engineers/Planners/Schedulers

Prerequisites
Basic knowledge of advanced process control, planning and scheduling recommended

Suggested Subsequent Courses
GDOT101

AGENDA

Introduction to Dynamic Optimization using Aspen GDOT

- Leverage Aspen GDOT for streamlined planning and APC alignment to optimize margins
- Learn how Aspen GDOT is helping refineries and olefins production units meet their production and sustainability goals

Model Building using Aspen Unified GDOT

- Explore Aspen Unified GDOT workflow, including use of templates, APC models import feature, custom calculations, understand how to map measurements, and compiling and exporting applications
- Discover the latest features, unveiling hybrid model templates

Workshop 1: Build GDOT models for a crude unit

Learn the steps involved in deploying GDOT applications online

- Deep dive into GDOT applications connection to DMC3 controllers using APC gateway

Workshop 2: Deploy middle distillate applications

Gain insights on monitoring and troubleshooting GDOT Applications

- Explore GDOT Watch capabilities and build GDOT Web diagrams

Workshop 3: Deploy applications on GDOT Web

Build a Stronger Data Foundation with AspenTech Inmation™ | **INM024**

Install and configure AspenTech Inmation. Easily connect to diverse data sources, access real-time and historical data.
Use AspenTech Inmation to improve business decision-making through actionable insights.

DataWorks Course

COURSE BENEFITS

- An introduction to the essential components of Inmation and how they work together
- Learn how to connect to external datasources to bring real-time and historical data into your Inmation environment
- Learn how to access inmation data from your applications, and how to generate insights with web dashboards

Who Should Attend?
IT/Data Integration Specialists

Prerequisites
None

Suggested Subsequent Courses
INM101

AGENDA

Introduction to AspenTech Inmation
- Overview of the components and their functions
- Explore possible solutions by combining distributed components

Installation and Configuration
- Explore various options for installing the component services
- Introduction to AspenTech Inmation DataStudio
- Using AspenTech Inmation DataStudio to create and configure component objects

Workshop 1: Install and Configure the Main Components of AspenTech Inmation

Key Concepts
- Creating objects to produce data and make calculations using Lua script

- Viewing real-time and historized data
- Monitoring the system with performance counters and the system log

Workshop 2: Visualize Historized Calculations with the History Trend and History Grid

Explore Different Connection Options
- Learn about the datasource object and connection options

Workshop 3: Connect to a Third-Party OPC UA Server with the Datasource Object

Consumer Interfaces
- Configuring and connecting to the AspenTech Inmation OPC Server

Continued

Build a Stronger Data Foundation with AspenTech Inmation™ | INM024

Install and configure AspenTech Inmation. Easily connect to diverse data sources, access real-time and historical data. Use AspenTech Inmation to improve business decision-making through actionable insights.

DataWorks Course

Workshop 4: Set-Up AspenTech Inmation OPC UA Server and Connect with a Third-Party Client

- Connecting with the AspenTech Inmation Web API

- Introduction to AspenTech Inmation WebStudio

Workshop 5: Use Simple WebStudio Widgets to Visualize Real-Time and Historical Data

Create Rapid Conceptual Layout and Cost Estimates for Sustainability Projects | **EEE024**

Understand the workflows for creating a rapid conceptual layout and cost estimates from an existing process simulation (Simulation to Layout to Estimating). Estimate a modular project in Aspen Capital Cost Estimator™ using equipment from Aspen OptiPlant 3D Layout™, create modules and develop custom sustainability equipment models for hydrogen manufacturing, carbon capture, sequestration and solar capital projects.

Engineering Courses

COURSE BENEFITS

Gain practical knowledge of rapid layout design and cost optimization for sustainability projects

Who Should Attend?
Project Engineers/Process Engineers/Cost Estimators/Layout Designer/Piping Designer

Prerequisites
Basic knowledge of cost estimation and conceptual design recommended

Suggested Subsequent Courses
EOP101, EEE101

AGENDA

Introduction to Aspen OptiPlant 3D Layout and Aspen Capital Cost Estimator (ACCE)

- Piping Layout and 3D Conceptual Modeling using Auto Routing
- Cost Estimation Techniques in Conceptual Engineering

Workshop 1: Create a Basic Project Using Aspen OptiPlant 3D Layout and ACCE

Developing and Analyzing Designs using Aspen OptiPlant 3D Layout and ACCE

- Developing and Analyzing Designs with Aspen OptiPlant 3D Layout
- Volumetric Modeling and Plant Piping in ACCE

Workshop 2: Equipment Lists and Volumetric Models

Accelerating Sustainability Projects Integrating Solutions

Accelerating sustainability projects integrating OptiPlant and ACCE

Workshop 3: Integration Between Aspen OptiPlant 3D Layout and ACCE

Workshop 4: Importing from Aspen OptiPlant 3D Layout to ACCE

Workshop 5: Importing from ACCE to Aspen OptiPlant 3D Layout

Learn Best Practices and Troubleshooting Techniques

Model a Green Hydrogen Production Unit with Aspen Custom Modeler® | **EAP024**

Build an alkaline electrolysis cell stack model through hands on workshops. Use the detailed modeling approach to improve process performance and achieve sustainability targets.

Engineering Courses

COURSE BENEFITS

Get hands-on experience building an alkaline electrolysis cell stack model

Who Should Attend?
Process Engineers working on Green Hydrogen projects

Prerequisites
Basic knowledge of Aspen Plus recommended

Suggested Subsequent Courses
EAP2311

AGENDA

Topic 1: Introduction to Alkaline Electrolyzer for Hydrogen Production

Topic 2: Overview of Alkaline Electrolyzer unit in Aspen Plus®

Topic 3: Learn to setup an Alkaline Electrolyzer in different modes

Workshop 1: Aspen Plus Alkaline Electrolyzer - Simple Mode

Workshop 2: Aspen Plus Alkaline Electrolyzer - Rigorous Mode

Optional: Learn custom modeling of Alkaline Electrolyzer in Aspen Custom Modeler® and exporting to Aspen Plus/Aspen HYSYS®

Model Carbon Capture Processes with Aspen HYSYS® | EHY024

Create rigorous simulation of carbon capture processes with amine solvent. Set up component properties and reactions needed to model carbon capture processes to meet sustainability goals. Identify the steps and unit operations involved in accurately modeling carbon capture processes. Learn how to set up, run and interpret results using a realistic, rigorous approach for accurate model prediction results.

Engineering Courses

COURSE BENEFITS

Learn how to optimize energy consumption for process units

Who Should Attend?

Process Engineers Working on Sustainability Projects

Prerequisites

Basic knowledge of Aspen HYSYS required

Suggested Subsequent Courses

EHY202, EHY223, EHY121, EHY2102, EHY2351

AGENDA

Aspen HYSYS Process Simulation Overview

Carbon Capture Overview

- CO_2 removal process overview
- AspenTech's carbon capture technologies
- Advantages of modeling carbon capture in Aspen HYSYS

Model Amine Treatment Unit for Carbon Capture

- Introduce the Acid Gas Property Package
- Unit operations used in CO_2 removal processes
- Efficiency vs. advanced modeling mode
- Hydraulic Analysis in Aspen HYSYS

Workshop 1: Model Amine Treatment Unit for Carbon Capture

Emissions Calculations and Optimization

- GHG Emission calculations and utilities definition
- Optimization techniques in Aspen HYSYS
- Hyprotech SQP Optimizer

Workshop 2: Emissions calculations and Optimization

Improve Model Accuracy using First Principles Driven Hybrid Models | **EHM024**

Understand the advantages of using first principles driven hybrid models. Develop accurate hybrid models using both mechanistic and AI/ML fundamentals. Build and deploy predictive hybrid models within process simulators to improve accuracy for several units such as distillation columns, reactors, heat exchangers, pressure changers, separators, etc. Use plant data to replace inadequately modeled relationships not fully captured by traditional engineering models.

Engineering Courses

COURSE BENEFITS

Leverage plant data to enhance first-principles models using AI/ML to improve modeling accuracy

Who Should Attend?
Process Engineers

Prerequisites
Basic knowledge of Aspen Plus/Aspen HYSYS recommended

Suggested Subsequent Courses
EAP101, EHY101

AGENDA

Introduction to First Principles Driven Hybrid Models

- Learn the general concepts and definitions of First Principles Driven Hybrid Models
- Identify different types of workflows and their uses
- Recognize First Principles Driven Hybrid Modeling architecture and use cases

Data Formatting and Pre-Processing

- Become familiar with the format required for building First Principles Driven Hybrid Models from plant data
- Identify different types of data pre-processing available
- Understand the new AI training interface in the simulator
- Learn how to import raw data into the simulator

Workshop 1: Format and Import Plant Data

Analyzing and Conditioning Raw Data

- Understand the tools to analyze raw data
- Identify trends and correlations within the data
- Learn how to apply different conditioning techniques to raw data

Workshop 2: Analyze and Condition Raw Data

Building the Hybrid Model

- Evaluate the need to train a hybrid model for your process
- Build a hybrid model from conditioned plant data
- Select dependent and independent variables to be used in the hybrid model
- Identify a Neural Network Output to be trained in the hybrid model

Continued

Improve Model Accuracy using First Principles Driven Hybrid Models | **EHM024**

Understand the advantages of using first principles driven hybrid models. Develop accurate hybrid models using both mechanistic and AI/ML fundamentals. Build and deploy predictive hybrid models within process simulators to improve accuracy for several units such as distillation columns, reactors, heat exchangers, pressure changers, separators, etc. Use plant data to replace inadequately modeled relationships not fully captured by traditional engineering models.

Engineering Courses

Workshop 3: Evaluate and Train a Hybrid Model

Validating the Hybrid Model

- Identify best practices to validate the hybrid model
- Use the snapshot feature to try different data conditioning and NN configuration
- Understand key parameters to evaluate the accuracy of the hybrid model before its deployment

Workshop 4: Validating the Hybrid Model

Deploying the Hybrid Model

- Learn how to deploy hybrid models in the process simulator
- Explore the automatic changes made to the simulation interface once the model has been deployed

Workshop 5: Deploying the Hybrid Model

Using and Sustaining the Hybrid Model

- Enter the minimum input required for running the hybrid model
- Recognize the usability of the model
- Identify the need to re-train the model with newly updated data

Workshop 6: Using and Sustaining the Model

Optimize Plant Utilities to Reduce Energy Consumption | **EAU024**

Develop the skills and techniques required to create a utilities system flowsheet. Learn methods of minimizing total utilities operating cost by accounting for economic, operation and environmental constraints simultaneously. Gain knowledge on methods of analyzing and optimizing typical business processes within the energy management domain.

Engineering Courses

COURSE BENEFITS

Optimize utility variability by adopting a consistent methodology to model, simulate and analyze energy management business processes

Who Should Attend?
Process and Design Engineers

Prerequisites
None

Suggested Subsequent Courses
SUS-U101

AGENDA

Overview of building a Utilities Model

Workshop 1: Create a Utilities Flowsheet with Aspen Utilities Planner

• Set up your optimization constraints and multiperiod optimization with user friendly excel add-in

• Setting your environmental constraints

Workshop 2: Use the Aspen Utilities Planner Excel Add-in to Set Up Optimization Constraints

• Optimize your utilities for meeting energy demand, while reducing your emissions for meeting your constraints

• Review results with optimization

Workshop 3: Optimize a Utilities Flowsheet

• Set up for your model line for emissions monitoring and real-time optimization

Design, Optimize and Monitor Your Process using Aspen HYSYS® Digital Twins | **EAO024**

Build carbon capture models using Aspen HYSYS. Create projects in Aspen OnLine® to operate an Aspen HYSYS model as an advisor or for real-time optimization. This enables meeting sustainability goals, such as reducing emissions and conserving energy. Understand the key first-principles modeling concepts and learn how to deploy the model online.

Engineering Courses

COURSE BENEFITS

Get hands-on experiencing building a Digital Twin for Carbon Capture

Who Should Attend?
Process Engineers/Process Control Engineers

Prerequisites
Basic knowledge of Aspen HYSYS recommended

Suggested Subsequent Courses
SUS-H101

AGENDA

Getting Started
- Recognize the Digital Twin Concept
- Learn about the salient features of the Aspen HYSYS Carbon Capture Model

Workshop 1: Review key features of the Aspen HYSYS Carbon Capture Model

Aspen Online Overview
- Review the Aspen OnLine software
- Learn the steps for model execution under Aspen OnLine

Workshop 2: Create an Aspen OnLine Project and prepare a model for use under Aspen OnLine

Aspen Online GUI
- Overview on the Aspen OnLine graphical user interface

- Learn about the use of the Aspen OnLine Run-Time display and the Navigation Pane forms
- Learn the configuration of tags and connecting them to model variables

Workshop 3: Configure a model with input and output tags, schedule and run the model in Aspen OnLine

Aspen Online Case History
- Learn the configuration of the case history system that is embedded in the Aspen OnLine software

Workshop 4: Use a case history directory to repeat an online case execution

Building and Optimizing an Integrated Production Model Using Aspen METTE™| MET024

Integrate Aspen HYSYS® with Aspen METTE simulations to run multiple production scenarios and enhance project efficiency.
Build a modern hydrocarbon production optimization model using these two solutions.

SSE Courses

COURSE BENEFITS

Learn how to optimize holistically across entire subsurface and surface systems

Who Should Attend?
Production Engineers/Flow Assurance Engineers/Process Engineers

Prerequisites
Basic knowledge of production and process simulation

Suggested Subsequent Courses
None

AGENDA

Create a Aspen METTE model
- Learn about Aspen METTE workflow and structure
- Create new branches
- Learn about fluid and items

Workshop 1: Create a Network Model

Aspen METTE Run File
- Learn types of simulations
- Introduce Life of Field simulation run file
- Learn about constraints and events

Running Life of Field
- Learn to run life of field simulations
- Learn to analyze the results

Workshop 2: Build and Explore a Life of Field Simulation

Aspen HYSYS-Aspen METTE Integration
- Integration and configuration steps
- Explore PVTx Capabilities

Workshop 3: Make an Integrated Aspen HYSYS-Aspen METTE Model

Explain how to run the integrated simulation
- Reviewing and interpreting results

Workshop 4: Run the Integrated Aspen HYSYS-Aspen METTE Link and Investigating the Results

Improve Geological Modeling with Jupyter Network using Aspen SKUA™ and Aspen RMS™ | **SKG024**

Access Aspen RMS and Aspen SKUA project data using Jupyter Notebook and Python. Learn to run Aspen RMS jobs, execute Aspen SKUA CLI commands, perform data visualization and improve efficiency of reservoir modeling.

SSE Courses

COURSE BENEFITS

Learn how to use Python API to create customized workflows and visualization

Who Should Attend?

Geoscientists/Reservoir Engineers

Prerequisites

Basic Python knowledge recommended

Suggested Subsequent Courses

RMS101, RMS201, RMS231, RMS211
SKG101, SKG201, SKG202, SKG301

AGENDA

Introduction to Aspen RMS

- Learn to use the user interface
- Learn to use geological modeling

Introduction to RMS Python Environment

- Understand the capabilities and features of the RMS Python API
- Discover the power of third-party packages available within the environment
- Explore the possibilities of extending the functionality of scripting using external libraries

Work with Wells, Seismic, Horizons and 3D grids using Scripting

- Learn how to utilize scripting to work with seismic data, well data, horizons, and 3D grids

Access Aspen RMS Jobs to Set-Up and Perform Calculations

Workshop 1: Engage in a Hands-On Workshop Where You Will Practice Working Inside the Aspen RMS GUI Using Python

Customize RMS Workflows with Plugins

- Understand the benefits of RMS Plugins
- Showcase an example of RMS Plugins

Integrate Jupyter Notebook

- Learn how to integrate Jupyter Notebook into the Aspen RMS environment
- Utilize Jupyter Notebook to access project data and perform calculations using Matplotlib and Plotly
- Utilize Jupyter Notebook to calculate CO_2 storage capacity in an existing model

Continued

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SSE Courses

Introduction to RMS Apps

- Discover how to create external apps to access project data and explore the possibilities of extending functionality through custom apps.

Workshop 2: Work with Aspen RMS Data Outside GUI Using Jupyter Notebook

Introduction to Aspen SKUA

Automation in Aspen SKUA through CLI commands and Macros

- Discover how to automate Structural Modeling, Gridding and Property Modeling through CLI commands and Macros

Introduction to Python Environment in SKUA-GOCAD

- Learn scripting inside Aspen SKUA Python Editor
- Explore different data types covered inside Aspen SKUA Python environment
- Demonstrate a use case using Python API (Wells/Grids)

Workshop 3: Run the Model Building Workflow Using Python API

Integrating Jupyter Notebook into an RMS environment

- Extend python environment with third-part libraries
- Learn how to integrate Jupyter Notebook into the Aspen SKUA environment.
- Run Model Building workflow python script in the notebook

Workshop 4: Run the Model Building Workflow through Jupyter Notebook

Increase Quantitative Interpretation Effectiveness with Aspen SeisEarth™ | SEI024

Use innovative tools for workflow-driven quantitative interpretation, ranging from seismic interpretation and well data display to interactive extraction of geobodies. Learn how advanced visualization enables efficient and comprehensive seismic interpretation.

SSE Courses

COURSE BENEFITS

Learn how to integrate seismic and well data to map out prospective geobodies

Who Should Attend?
Geoscientists and Engineers

Prerequisites
Base knowledge of Seismic Interpretation, Experience with the Aspen SeisEarth/QSI Interpretation Suite

Suggested Subsequent Courses
QSI101

AGENDA

Chapter 1: Overview of Aspen SeisEarth

Workshop: Learn the Aspen SeisEarth User Interface:
- Get familiar with an Epos project and Epos databases
- Integrated Canvas overview

Chapter 2: Seismic Data Screening

Workshop: Learn to reveal geological features hidden in your seismic data by applying advanced visualization techniques.

Chapter 3: Prospect Visualization using AVO attribute volumes

Workshop: Learn to create cross plot AVO attribute volumes and use rendering tools in 3D Canvas to visualize the spatial distribution of AVO anomalies.

Chapter 4: Seismic Classification Workflow and Geobody Extraction

Introduction to Seismic Facies Analysis

Learn to easily utilize unsupervised classification methods (Attribute Clustering) to generate seismic facies and probability volumes and compare the target seismic facies with the Electrofacies.

Integrated Analysis of AVO Anomalies and Target Seismic Facies to Identify High-Quality Prospect Areas

Workshop: Use the Geobody Detection workflow to visually isolate and map target facies or features identified in the facies volume; use different tools to analyze its thickness and volumetrics.

Continued

Increase Quantitative Interpretation Effectiveness with Aspen SeisEarth™ | SEI024

Use innovative tools for workflow-driven quantitative interpretation, ranging from seismic interpretation and well data display to interactive extraction of geobodies. Learn how advanced visualization enables efficient and comprehensive seismic interpretation.

SSE Courses

Chapter 5: Neural Network Inversion Workflow

Introduction to Neural Network Inversion

Workshop: Learn to use a convolutional neural network trained with well logs to predict any log property volume from post-stack seismic data and its attributes.

Optimize Asset Net Present Value (NPV) using Aspen Geolog™ | **GEO024**

Use Aspen Geolog to capture and assess uncertainty at every stage of the petrophysical process. Quantify and reduce uncertainty through meticulous analysis and improve your investment decisions.

SSE Courses

COURSE BENEFITS

Learn how to capture uncertainty at every step of the process and understand the value of quantifying petrophysical uncertainty on determining the NPV of an asset

Who Should Attend?
Petroleum Geologists and Engineers/Petrophysicists

Prerequisites
Basic knowledge of Aspen Geolog software and Petrophysics recommended

Suggested Subsequent Courses
GEO103

AGENDA

Topic 1: Introduction to Petrophysical Uncertainty Theory

Learn the fundamentals of the petrophysical uncertainty and the impact of petrophysical parameters on reserves estimation by evaluating different probability scenarios.

Topic 2: Monte Carlo Simulation Overview

Learn to include the Monte Carlo uncertainty in Geolog modules.

Workshop 1: Estimate uncertainties by applying Monte Carlo method in log analysis.
- Inclusion of Monte Carlo in the Shale Volume module
- Inclusion of Monte Carlo in a combination of multiple Loglan modules

Topic 3: Learn about Deterministic Uncertainty

Learn the Monte Carlo Uncertainty used in Geolog's Deterministic Petrophysics Uncertainty workflow. Determine the probability distributions of porosity, saturation and permeability that help reservoir engineers evaluate risks.

Workshop 2: Learn to estimate uncertainties in Deterministic log analysis

Topic 4: Environmental Corrections Uncertainty Calculations

Topic 5: Deterministic Uncertainty Analysis

Topic 6: Perform Reserves Estimation

Learn to quantify the petrophysical uncertainty for a better understanding of reservoir behavior and to make accurate volumetric estimates.

Continued

Optimize Asset Net Present Value (NPV) using Aspen Geolog™ | **GEO024**

Use Aspen Geolog to capture and assess uncertainty at every stage of the petrophysical process. Quantify and reduce uncertainty through meticulous analysis and improve your investment decisions.

SSE Courses

Workshop 3: Reserves and NPV (Net Present Value) estimation

Topic 7: Learn about the Reservoir Summary Report

Topic 8: Learn to Perform Sensitivity Analysis

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About Aspen Technology

Aspen Technology, Inc. (NASDAQ: AZPN) is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance life-cycle. Through our unique combination of deep domain expertise and innovation, customers in asset-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence.

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