MERCURY

Natural Gas Pipeline Simulation Using Aspen HYSYS & PIPE STUDIO

22 November – 3 December 2026
Istanbul (Turkey)



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Ref: 17_1082871 **Date:** 22 November – 3 December 2026 **Location:** Istanbul (Turkey) **Fees:** 9000 Euro

Introduction

Natural gas pipeline systems require accurate modelling and simulation to ensure safe, reliable, and efficient transportation of gas. This course by Mercury Training covers steady-state and dynamic simulation of natural gas pipelines using Aspen HYSYS or PIPE STUDIO: hydraulics, pressure and temperature profiles, compression, linepack, capacity, and transient operations.

Targeted Groups

- Pipeline, Process, Mechanical, Production, Facilities and Operations Engineers
- Gas Transmission Engineers and Pipeline Operations Personnel
- Process Simulation and Flow Assurance Engineers
- Control and Instrumentation Engineers
- Technical Professionals involved in natural gas transportation and pipeline systems

Course Objectives

- Understand the fundamental principles governing natural gas pipeline flow
- Develop natural gas pipeline models using Aspen HYSYS or PIPE STUDIO
- Perform steady-state simulations and interpret pressure and temperature profiles
- Model compressors, valves, and key pipeline components
- Determine pipeline capacity and identify hydraulic bottlenecks
- Understand linepack and its operational significance
- Develop dynamic models for transient operating conditions
- Use simulation results for troubleshooting and optimization

Course Content

Day 1–2: Unit 1 – Fundamentals of Natural Gas Pipeline Modelling

- Gas systems, composition, properties, and equations of state
- Compressible flow, hydraulics, and pressure-loss principles
- Effects of diameter, length, roughness, and elevation; operating envelopes
- Required data; introduction to Aspen HYSYS or PIPE STUDIO; boundary conditions

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Day 3–4: Unit 2 – Building Steady-State Natural Gas Pipeline Models

- Gas composition, property methods, geometry, and elevation profiles
- Boundary conditions, heat transfer, valves, fittings, and pressure control
- Single and interconnected models; running steady-state simulations
- Convergence, calibration, and validation with operating data

Day 5–6: Unit 3 – Pipeline Performance, Compression, and Capacity Analysis

- Hydraulic performance, pressure drop, and throughput
- Capacity assessment and bottlenecks
- Compressor stations, curves, power, series and parallel configurations
- Sensitivity analysis and debottlenecking

Day 7–8: Unit 4 – Dynamic and Transient Simulation of Natural Gas Pipelines

- Transient gas flow; converting and initializing dynamic models
- Linepack calculation and management
- Supply and demand changes, start-up, shutdown, and valve scenarios
- Interpreting dynamic trends and system stabilization

Day 9–10: Unit 5 – Operational Scenarios, Troubleshooting, and Pipeline Optimization

- Operating scenarios, pressure conditions, and compressor strategy
- Abnormal conditions and actual vs. simulated performance
- Troubleshooting and optimizing pressure profiles, compressor operation, and energy use
- Integrated steady-state and dynamic case study