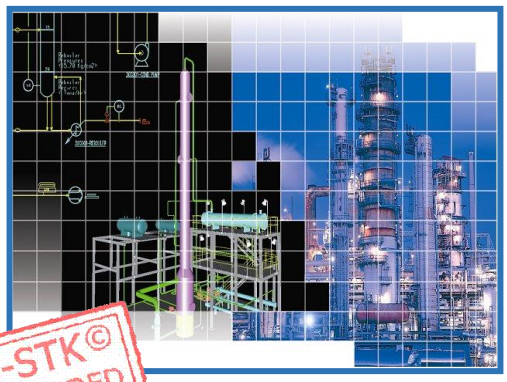
# COURSE OVERVIEW PE0339
# HYSYS Advanced Process Modelling

**Course Title**
HYSYS Advanced Process Modelling



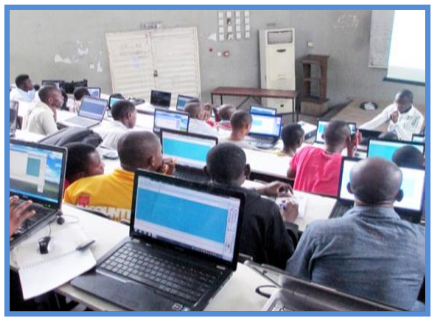

**Course Date/Venue**
Session 1: August 17-21, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
Session 2: October 26-30, 2025/Crowne Meeting Room, Crowne Plaza Al Khobar, an IHG Hotel, Al Khobar, KSA



**Course Reference**
PE0339

**Course Duration/Credits**
Five days/3.0 CEUs/30 PDHs

**Course Description**



***This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using Aspen HYSYS simulator.***

This course presents an overview of the natural gas process simulation using Hysys, from the wellhead to the marketplace, with emphasis on gas plant process operations. The overall process flowsheet will be used to illustrate how the various operations are integrated into plants capable of handling diverse feeds from gas fields around the world.

The key processes of dehydration, acid gas removal and hydrocarbon separation, including ethane and natural gas liquids (NGL) recovery, will be emphasized. Participants should bring their computers and a Hysys key as there will be an opportunity for participants to participate in process simulation.

The course covers Aspen HYSYS process simulation; how to get started; propane refrigeration loop; refrigerated gas plants; NGL fractionation, oil characterization and HP separation; gas gathering; two stage compression; heat exchanger rating; gas dehydration with TEG; reporting in Aspen HYSYS; best practices and troubleshooting; optional exercises and extra materials and liquefied natural gas (LNG) plant.

## Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on process modeling using Aspen HYSYS
- Discuss Aspen HYSYS process simulation including its benefits, capabilities and graphical user interface and organizational structure
- Enumerate all the necessary elements to fully define a fluid package, specify required parameters in executing flash calculations and identify material streams, desired units of measures and stream options
- Recognize the basic concepts necessary for creating simulations in Aspen HYSYS
- Determine propane refrigeration loop including unit operations to build a flow sheet, available tools to manipulate the user interface, Aspen HYSYS workbook and convertion of simulation case to template
- Illustrate refrigerated gas plants including heat exchanger model in Aspen HYSYS, mathematical operations and simplified version of a refrigerated gas plants and multiple flow sheet architecture
- Review NGL fractionation, Aspen HYSYS column models and templates, distillation column, column specifications to meet process objectives and two column NGL fractionation train
- Characterize oil and HP separation including its processes, spreadsheet calculations, feature in running flow sheet wide scenarios, crude assay and spreadsheet to determine gas-oil ratio varies with operating pressure
- Employ gas gathering using pipe segment operation and flow assurance
- Identify two stage compression and heat exchanger rating
- Explain gas dehydration with TEG and conduct proper reporting in Aspen HYSYS
- Employ best practices and troubleshooting using Aspen HYSYS
- Identify optional exercises and extra materials for acid gas property package
- Illustrate acid gas sweetening process using diethanolamine and LNG production process
- Discuss liquefied natural gas (LNG) plant and use LNG exchange operation to simulate multi-pass heat exchangers as well as utilize the sub-flow sheet to build a modularized process flow sheet

## Exclusive Smart Training Kit - H-STK®


*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

## Who Should Attend

This course provides an overview of all significant aspects and considerations of HYSYS steady state modeling advanced level for new engineering graduates and technologists who will be using Aspen HYSYS in their daily work. Further, the course is suitable for process engineers doing process design and optimization projects and studies, plant engineers checking plant performance under different operating conditions and R&D engineers and researchers using Aspen HYSYS for process synthesis.

## Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

## Certificate Accreditations

Haward's certificates are accredited by the following international accreditation organizations:

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

**Course Instructor(s)**

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

**Mr. Manuel Dalas, PEng**, MSc, BSc, is a **Senior Process Engineer** with almost **30 years** of industrial experience within the **Oil & Gas**, **Refinery**, **Petrochemical** and **Refinery** industries. His expertise widely includes in the areas of **Crude Distillation Process**, **Saturation Gas Process** Technology, **Oil Supply**, **Refining and Trading**, **Economic Factors** in Refining, Emerging Trends & Technologies, **Production** Operations, **Crude Dehydration & Desalting**, **Crude** Stabilization Operations, **Process Plant** Performance & Efficiency, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Process Plant** Optimization, **Revamping & Debottlenecking**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Mass & Material Balance**, **Oil & Gas** Processing, **Oil Field** Operation, **Process Plant** Operation & Troubleshooting, **Hydrogen Sulphide Stripping**, **Crude Oil De Salting** Process, **Gas Conditioning**, **NGL Recovery & NGL Fractionation**, **Flare** Systems, Pre-Fabrication of **Steel Structure**, Alloy Piping Pre-Fabrication, **Heat Exchangers**, **Vertical Columns/Pressure Vessels**, **Distillation Column**, **Steel Structures**, **Pressure Vessels** Maintenance & Operation, **Piping Support**, **Ironworks**, **Rotating & Static Equipment** (**Pumps**, **Valves**, **Boilers**, **Pressure Vessels**, **Tanks**, **Heat Exchangers**, **Bearings**, **Compressors**, **Pipelines**, **Motors**, **Turbines**, **Gears**, **Seals**), **Construction** Management, **Building** Structures and **Electrical-Mechanical Equipment**. Further, he is also a well-versed in **Aspen HYSYS** Process Simulation, **Aspen HYSYS** Dynamics, **Pipeline** Simulations, **Pipe Stress Analysis** using **CAESAR II**, **CAESAR II** Application, **Piping Dynamic**, **Static & Other Special Analysis** using **CAESAR II**, **Expansion Joints** Design & Analysis, **Impact Load** Analysis, **Piping** Systems, **Piping Codes** Used in **CAESAR II**, **Materials** Management, **Inventory Control** and Workplace Housekeeping. Currently, he is the **Technical Consultant** of the **Association of Local Authorities** of **Greater Thessaloniki** where he is in-charge of the mechanical engineering services for piping, pressure vessels fabrications and ironwork.

During his career life, Mr. Dalas has gained his practical and field experience through his various significant positions and dedication as the **Technical Manager**, **Project Engineer**, **Safety Engineer**, **Deputy Officer**, **Instructor**, **Construction Manager**, **Construction Engineer**, **Consultant Engineer**, **Mechanical Engineer** and **CAESAR II Application Consultant** for numerous multi-billion companies including the **Biological Recycling Unit** and the **Department of Supplies** of **Greece**, **Alpha Bank Group**, **EMKE S.A**, **ASTE LLC** and **Polytechnic College of Evosmos**.

Mr. Dalas has a **Master's** degree in **Energy System** from the **International Hellenic University, School of Science & Technology** and a **Bachelor's** degree in **Mechanical Engineering** from the **Mechanical Engineering Technical University of Greece** along with a **Diploma** in **Management & Production Engineering** from the **Technical University of Crete**. Further, he is a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), a **Certified Project Manager Professional** (**PMI-PMP**), a **Certified Instructor/Trainer**, a **Certified Energy Auditor** for **Buildings**, **Heating & Climate Systems**, a **Member** of the **Hellenic Valuation Institute** and the **Association of Greek Valuers** and a **Licensed Expert Valuer Consultant** of the **Ministry of Development and Competitiveness**. He has further delivered numerous trainings, courses, seminars, conferences and workshops internationally.

## Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

## Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

## Course Fee

**US$ 5,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

## Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

***Day 1***

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|---|---|
| *0730 – 0800* | *Registration & Coffee* |
| *0800 – 0815* | *Welcome & Introduction* |
| *0815 – 0830* | ***PRE-TEST*** |
| *0830 – 0930* | ***Aspen HYSYS Process Simulation Overview***<br>*Benefits of Process Simulation ● Capabilities of Aspen HYSYS ● Aspen HYSYS Graphical User Interface & Organizational Structure* |
| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***Getting Started***<br>*Necessary Elements to Fully Define a Fluid Package ● Required Parameters in Order to Execute Flash Calculations & Fully Define Material Streams ● Desired Units of Measure ● Stream Analysis Options* |
| *1100 – 1230* | ***Workshop***<br>*Basic Concepts Necessary for Creating Simulations in ASPEN HYSYS* |
| *1230 – 1245* | *Break* |
| *1245 – 1330* | ***Propane Refrigeration Loop***<br>*Unit Operations to Build a Flow Sheet ● Available Tools to Manipulate the User Interface ● Aspen HYSYS Workbook ● Convert a Simulation Case to Template* |
| *1330 – 1420* | ***Workshop***<br>*Propane Refrigeration Loop* |
| *1420 – 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day One* |

**Day 2**

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|---|---|
| 0730 - 0815 | ***Refrigerated Gas Plants***<br>*Heat Exchanger Model in Aspen HYSYS ● Mathematical Operations Starting with the Balance & Adjust ● Add Template File to an Existing Simulation* |
| 0815 – 0900 | ***Workshop***<br>*Simplified Version of a Refrigerated Gas Plants & Multiple Flow Sheet Architecture* |
| 0900 – 0915 | *Break* |
| 0915 – 1100 | ***NGL Fractionation***<br>*Aspen HYSYS Column Models & Templates ● Distillation Column ● Column Specifications to Meet Process Objectives* |
| 1100 – 1230 | ***Workshop***<br>*Two Column Natural Gas Liquids (NGL) Fractionation Train* |
| 1230 – 1245 | *Break* |
| 1245 – 1300 | ***Oil Characterization & HP Separation***<br>*Oil Characterization Process ● Spreadsheet Calculations in Aspen HYSYS ● Case Study Feature to Run Flow Sheet-Wide Scenarios* |
| 1300 – 1420 | ***Workshops***<br>*Crude Assay ● Spreadsheet & Case Study to Determine How Gas-Oil Ratio (GOR) Varies with Operating Pressure* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Two* |

**Day 3**

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|---|---|
| 0730 – 0815 | ***Gas Gathering***<br>*Pipe Segment Operation to Model Single & Multiple-Phase Fluid Flow ● Pipe Segment Flow Assurance Capabilities to Ensure Short & Long Term Viability of Pipelines* |
| 0815 – 0900 | ***Workshops***<br>*Pipe Segment & Its Built-In Flow Assurance Tools to Model & Study a Piping Network in Aspen HYSYS* |
| 0900 – 0915 | *Break* |
| 0915 – 1100 | ***Two Stage Compression***<br>*Recycle Operation in Aspen HYSYS ● Suitable Locations for Recycle Operation ● Enter Compressor Curves to Determine Head & Efficiency as a Function of Inlet Flow* |
| 1100 – 1230 | ***Workshops***<br>*Recycle Operation to Build a two Stage Compression Flow Sheet; Compressor Curves Thus Modeling a HYSYS Compressor with Real-World Data* |
| 1230 – 1245 | *Break* |
| 1245 – 1300 | ***Heat Exchanger Rating***<br>*Heat Transfer Unit Operations in Aspen HYSYS ● Applicable Operation of Different Heat Exchanger Models ● Aspen Exchanger Design & Rating for Rigorous Heat Exchanger Calculations within Aspen HYSYS* |
| 1300 - 1420 | ***Workshops***<br>*Rating Model to Determine if an Existing Heat Exchanger will meet Desired Process Specifications; Design & Rate a Heat Exchanger Using the EDR Interface Inside Aspen HYSYS* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Three* |

**Day 4**

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| 0730 – 0900 | ***Gas Dehydration with TEG***<br>*Methods for Saturating a Hydrocarbon Stream with Water in Aspen HYSYS ● Water-Related Physical Properties in a Material Stream ● Hydrate Formation Analysis to Calculate Hydrate Formation Temperatures & Pressures ● Typical Natural Gas Dehydration Unit* |
| 0900 – 0915 | *Break* |
| 0915 – 1100 | ***Workshops***<br>*Typical Gas Dehydration Unit & Determine the Water Dew Point for the Dry Gas; Hydrate Formation Analysis to Study Hydrate Formation Temperatures at Various Points of the Process* |
| 1100 – 1230 | ***Reporting in Aspen HYSYS***<br>*Reporting Techniques ● Excel Reports from HYSYS Workbook ● Using Report Manager to Create Custom Unit Operation & Stream Reports ● Aspen Simulation Workbook* |
| 1230 – 1245 | *Break* |
| 1245 – 1330 | ***Best Practices & Troubleshooting***<br>*Activated Analysis for Continuous Evaluation of Economics, Energy Usage & Equipment Design ● Aspen HYSYS Best Practices ● Why a Simulation may Produce Poor Results or Errors? ● Variety of Simulations Debugging Suggested Tips* |
| 1330 – 1420 | ***Workshops***<br>*Troubleshoot Existing Aspen HYSYS Cases & Determine Various Ways to Solve the Models* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Four* |

**Day 5**

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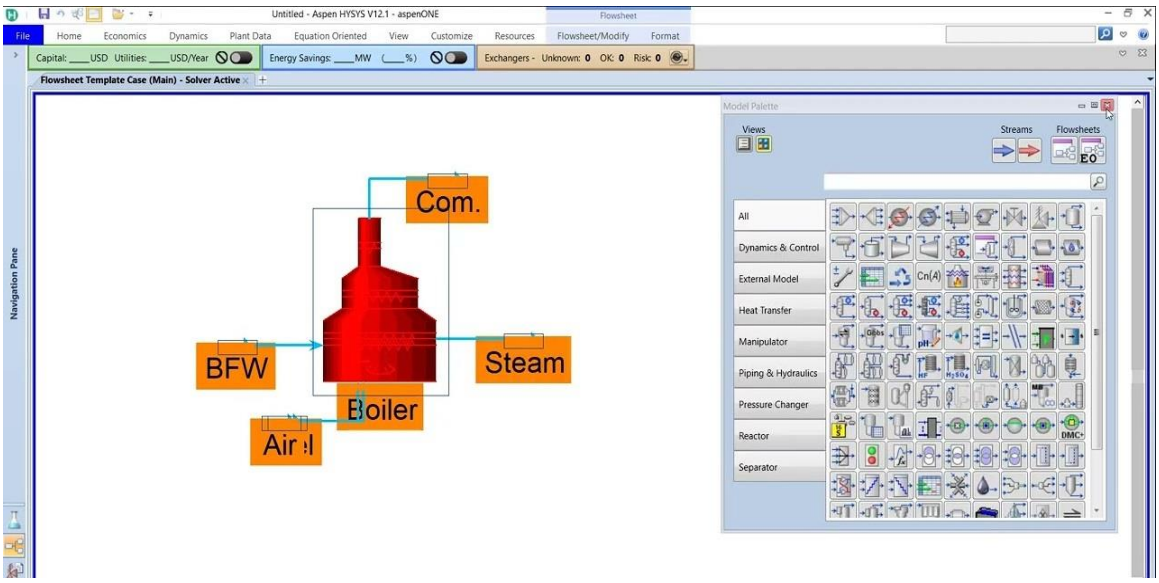
| 0730 - 0900 | ***Optional Exercises & Extra Materials***<br>*Acid Gas Property Package* |
| 0900 – 0915 | *Break* |
| 0915 – 1100 | ***Workshops***<br>*Model & Acid Gas Sweetening Process Using Diethanolamine* |
| 1100 – 1200 | ***Liquefied Natural Gas (LNG) Plant***<br>*LNG Exchanger Operation to Simulate Multi-Pass Heat Exchangers ● Sub-Flow Sheet to Build a Modularized Process Flow Sheet* |
| 1200 - 1215 | *Break* |
| 1215 – 1345 | ***Workshops***<br>*Model an LNG Production Process* |
| 1345 – 1400 | ***Course Conclusion*** |
| 1400 – 1415 | ***POST-TEST*** |
| 1415 – 1430 | *Presentation of Course Certificates* |
| 1430 | *Lunch & End of Course* |

## Simulator (Hands-on Practical Sessions)

Practical session will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the state-of-the-art simulators "ASPEN HYSYS" simulator.




**ASPEN HYSYS V12.1 Simulator**

## Course Coordinator

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