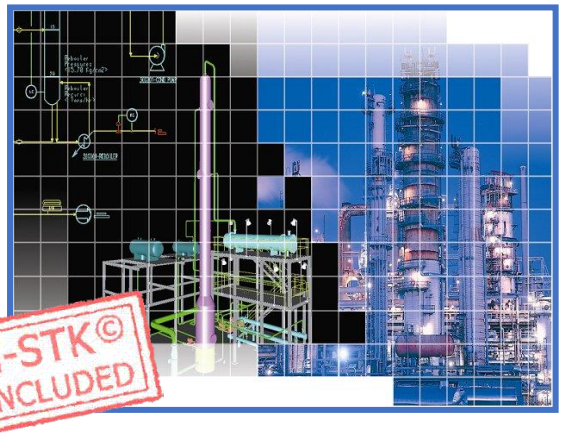
COURSE OVERVIEW PE0338
HYSYS Process Simulation

Course Title
HYSYS Process Simulation

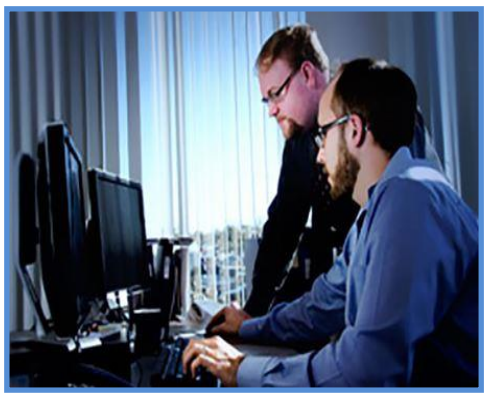
Course Date/Venue
Please see page 2

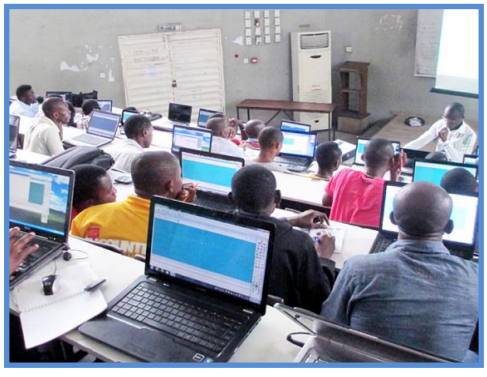
Course Reference
PE0338

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 process modelling simulator.

The course is designed to build, navigate and optimize steady state simulation models using Aspen HYSYS. It will utilize a wide variety of unit operation models and calculation tools to model process equipment, use templates and sub-flowsheets to streamline, organize simulation models and explore different means of reporting simulation results, including the use of the Aspen Simulation.

The course will discuss the benefits of process simulation and the capabilities of Aspen HYSYS; the graphical user interface and organizational structure; the propane refrigeration loop; the refrigerated gas plant; the report in Aspen HYSYS; the oil characterization and HP separation; and the two stage compression and heat exchanger rating.

At the completion of the course, participants will be able to employ best practices and troubleshooting: apply gas gathering and crude pre-heat train; carryout NGL fractionation and atmospheric crude column including gas dehydration and vacuum tower and heat integration; identify the acid gas property; use the LNG exchanger operation to stimulate multi-pass heat exchangers; and utilize the sub-flowsheet to build a modularized process flowsheet.

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
- Identify the benefits of process simulation and describe the capabilities of Aspen HYSYS
- Discuss the Aspen HYSYS graphical user interface and organizational structure
- Get started with HYSYS and discuss the propane refrigeration loop
- Identify refrigerated gas plant and apply proper report in Aspen HYSYS
- Describe oil characterization and HP separation
- Explain two stage compression and heat exchanger rating
- Employ best practices and troubleshooting as well as gas gathering and crude pre-heat train
- Carryout NGL fractionation and atmospheric crude column including gas dehydration and vacuum tower and heat integration
- Discuss acid gas property and use the LNG exchanger operation to stimulate multi-pass heat exchangers
- Utilize the sub-flowsheet to build a modularized process flowsheet

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 in process modelling for process engineers doing process design and optimization projects and studies, plant engineers checking plant performance under different operating conditions, R&D engineers and researchers using Aspen HYSYS for process synthesis and new Engineering graduates/technologists who will be using Aspen HYSYS in their daily work.

Course Date/Venue

Session(s)	Date	Venue
1	June 29-July 03, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
2	August 25-29, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
3	October 05-09, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
4	December 14-18, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Certificate(s)

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

Certificate Accreditations

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**. 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.

Accommodation

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

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 **Process Engineering & Systems Failure** Analysis, **Equipment & Mechanical Integrity**, **Process Failure** Prevention, **Engineering Modifications & Systems Failures**, Root Cause Failure Analysis (**RCFA**) Techniques, **Methodology Selection** based on Specific Scenarios, **Process Plant** Optimization, **Revamping & Debottlenecking**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Plant** Operations, **Mass & Material Balance**, **Oil & Gas Processing**, **Process Plant** Performance & Efficiency, **Crude Distillation** Process Saturated Gas Process Technology, **Crude Dehydration & Desalting**, **Crude** Stabilization Operations, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Pressure Vessels** Maintenance & Operation, **Piping Support**, **Ironworks**, **Rotating & Static Equipment** (**Pumps**, **Valves**, **Boilers**, **Pressure Vessels**, **Tanks**, **Bearings**, **Compressors**, **Pipelines**, **Motors**, **Turbines**, **Gears**, **Seals**), **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, **Vertical Columns/Pressure Vessels**, **Distillation Column**, **Steel Structures**, **Construction** Management, **Building** Structures and **Electrical-Mechanical Equipment**. Currently, he is the **Technical Consultant** of the **Association of Local Authorities** of **Greater Thessaloniki** wherein he oversees mechanical engineering services while focusing on system reviews and improvements. His role involves a strategic approach to enhancing operational efficiencies and implementing robust solutions in complex engineering environments.

During his career life, Mr. Dalas has gained his practical and field experience through his various significant positions and dedication as the **Technical Manager**, **Construction Manager**, **Senior Process Engineer**, **Process Safety Engineer**, **Process Design Engineer**, **Project Engineer**, **Production Engineer**, **Construction Engineer**, **Consultant Engineer**, **Technical Consultant**, **Safety Engineer**, **Mechanical Engineer**, **External Collaborator**, **Deputy Officer** and **Senior Instructor/Trainer** for various companies including the Alpha Astika, Anamorfosis Technical Firm, EKME, ASTE, Elof Consulting and Hypergroup.

Mr. Dalas is a **Registered Professional Engineer** and has a **Master's** degree in **Energy System** from the **International Hellenic University** and a **Bachelor's** degree in **Mechanical Engineering** from the **Mechanical Engineering Technical University**, **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.

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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Aspen HYSYS Process Simulation Overview*** *Identify the Benefits of Process Simulation ● Describe the Capabilities of Aspen HYSYS ● Introduce the Aspen HYSYS Graphical User Interface and Organizational Structure*
0930 – 0945	*Break*
0945 – 1130	***Getting Started*** *Enter Necessary Elements to Fully Define a Fluid Package ● Specify Required Parameters in Order to Execute Flash Calculations & Fully Define Material Streams ● Modify and Set Desired Units of Measure ● Review Stream Analysis Options ● Workshop: Introduce Basic Concepts Necessary for Creating Simulations in Aspen HYSYS*
1130 – 1230	***Propane Refrigeration Loop*** *Add and Connect Unit Operations to Build a Flowsheet ● Use Available Tools to Manipulate the User Interface ● View and Customize the Aspen Hysys Workbook*
1230 – 1245	*Break*
1245 – 1420	***Propane Refrigeration Loop (cont'd)*** *Convert a Simulation Case to a Template ● Workshop: Build and Analyze a Propane Refrigeration Loop*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Refrigerated Gas Plant*** *Utilize the Heat Exchanger Model in Aspen HYSYS ● Introduce Mathematical Operations, Starting with the Balance and Adjust ● Add a Template File to an Existing Simulation ● Workshop: Model a Simplified Version of a Refrigerated Gas Plant and Incorporate Multiple Flowsheet Architecture*
0930 – 0945	*Break*
0945 – 1100	***Reporting in Aspen HYSYS*** *Survey Common Result Reporting Techniques in Aspen HYSYS ● Generate Excel Reports from the HYSYS Workbook ● Use the Report Manager to Create Custom Unit Operation and Stream Reports*
1100 – 1230	***Reporting in Aspen HYSYS (cont'd)*** *Discover How to Report Non-Standard Physical Properties in Your Material Streams ● Introduce Data Tables as an Option to Create Customized Simulation Results Tables ● Provide a Brief Introduction to Aspen Simulation Workbook, Enabling Integration Between Microsoft Excel & Aspen HYSYS*
1230 – 1245	*Break*
1245 – 1420	***Oil Characterization & HP Separation*** *Introduce the Aspen HYSYS Oil Manager & Assay Management Features & How they are Used for Assay Characterization ● Perform Spreadsheet Calculations in Aspen HYSYS ● Use the Case Study Feature to Run Flowsheet-Wide Scenarios ● Workshop: Use the Assay Management Tools to Characterize a Crude Assay, then Employ the Spreadsheet & Case Study Features to Determine How Gas-Oil Ratio (GOR) Varies with Operating Pressure*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Two Stage Compression*** *Introduce the Recycle Operation in Aspen HYSYS ● Recognize Suitable Locations for a Recycle Operation ● Enter Compressor Curves to Determine Head & Efficiency as a Function of Inlet Flow ● Workshop: Utilize the Recycle Operation to Build a Two Stage Compression Flowsheet; Define & Activate Compressor Curves thus Modeling a HYSYS Compressor with Real-World Data*
0930 – 0945	*Break*
0945 – 1100	***Heat Exchanger Rating*** *Review the Available Heat Transfer Unit Operations in Aspen HYSYS ● Compare and Contrast the Applicability & Operation of Different Heat Exchanger Models ● Implement Aspen Exchanger Design & Rating (EDR) for Rigorous Heat Exchanger Calculations within Aspen HYSYS ● Introduce the Activated Exchanger Analysis Feature for Continuous Heat Exchanger Study & Design ● Workshop: Use A Rating Model To Determine if an Existing Heat Exchanger will Meet Desired Process Specifications; Design and Rate a Heat Exchanger Using the EDR Interface Inside Aspen HYSYS*

1100 – 1230	***Best Practices & Troubleshooting*** *Discover Activated Analysis for Continuous Evaluation of Economics, Energy Usage, Equipment Design, & Dynamic Modeling ● Identify Best Practices for Using Aspen HYSYS*
1230 – 1245	*Break*
1245 – 1420	***Best Practices & Troubleshooting (cont'd)*** *Investigate Reasons Why a Simulation may Produce Poor Results or Errors ● Use Suggested Tips to Debug a Variety of Simulations ● Workshop: Troubleshoot a Series of Aspen HYSYS Simulations and Implement Various Best Practices to get These Simulations to Solve Properly*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

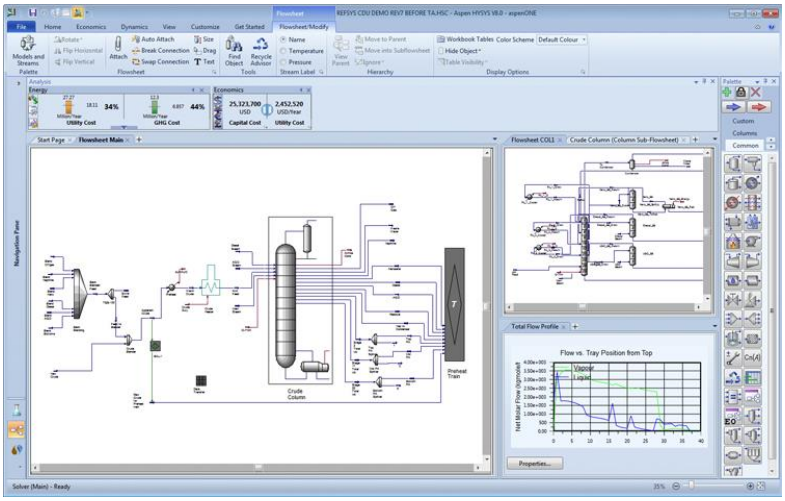
0730 – 0930	***Gas Gathering & Crude Pre-Heat Train*** *Use the Pipe Segment Operation to Model Single and Multi-Phase Fluid Flow ● Introduce Pipe Segment Flow Assurance Capabilities to Ensure Short and Long-Term Viability of Pipelines ● Workshop Gas Gathering (O&G Focus): Use the Pipe Segment and its Built-In Flow Assurance Tools to Model and Study a Piping Network in Aspen HYSYS or Workshop Crude Pre-Heat Train (Refinery Focus): Using a Variety of Heat Transfer, Separations, and Piping Unit Operations, Construct a Raw Crude Pre-Heat Train Flowsheet*
0930 – 0945	*Break*
0945 – 1100	***NGL Fractionation & Atmospheric Crude Column*** *Introduce Aspen HYSYS Column Models and Templates ● Use the Input Expert to Add and Define a Distillation Column ● Add and Manipulate Column Specifications to Meet Process Objectives ● Include Column Side Operations for Additional Distillation Configuration Options ● Workshop NGL Fractionation (O&G Focus): Model a Two Column Natural Gas Liquids (NGL) Fractionation Train or Workshop Atmospheric Crude Column (Refinery Focus): Construct, Run, Manipulate, and Analyze an Atmospheric Crude Distillation Column*
1100 – 1230	***Gas Dehydration & Vacuum Tower & Heat Integration*** *Review Methods for Saturating a Hydrocarbon Stream with Water in Aspen HYSYS ● Use the Hydrate Formation Analysis to Calculate Hydrate Formation Temperatures and Pressures ● Build a Vacuum Distillation Tower With Side Draws and Pump Arounds*
1230 – 1245	*Break*
1245 – 1420	***Gas Dehydration & Vacuum Tower & Heat Integration (cont'd)*** *Apply the Recycle Operation as A Flowsheet-Building Tool Appropriate for a Variety of Simulations ● Workshop Gas Dehydration (O&G Focus): Model a Typical Gas Dehydration Unit and Study Gas Saturation, Hydrate Formation Conditions, and Unit Operation Performance Throughout The Model or Workshop Vacuum Tower & Heat Integration (Refinery Focus): Define and Analyze a Vacuum Distillation Tower; Simulate Heat Integration to Reduce Energy Usage within an Overall Crude Processing System*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	***Optional Exercises & Extra Materials (Time Permitting)***
0930 – 0945	*Break*
0945 – 1100	***Acid Gas Package*** *Introduce the Acid Gas Property Package • Workshop: Model an Acid Gas Sweetening Process Using Diethanolamine*
1100 – 1230	***Liquefied Natural Gas (LNG) Plant*** *Use the LNG Exchanger Operation to Simulate Multi-Pass Heat Exchangers • Utilize the Sub-Flowsheet to Build a Modularized Process Flowsheet*
1230 – 1245	*Break*
1245 – 1345	***Liquefied Natural Gas (LNG) Plant (cont'd)*** *Workshop: Model an LNG Production Process*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions/Site Visit

Practical sessions 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 simulator "HYSYS".



Aspen HYSYS Process Simulation

Course Coordinator

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