COURSE OVERVIEW PE0655-4D
Rules of Thumb in Process Design

Course Title
Rules of Thumb in Process Design

Course Reference
PE0655-4D

Course Duration/Credits
Four days/2.4 CEUs/24 PDHs

Course Date/Venue

Session(s)	Date	Venue
1	September 02-05, 2024	Boardroom, Warwick Hotel Doha, Doha, Qatar
2	December 16-19, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of rules of thumb in process design. It covers the nature of design, design constraints and design categories; the petroleum properties, parameters and definitions; the composition of petroleum, petroleum processing, hydrocarbon properties and characterization parameters; and the development of process design data and calculation methods that include process design tasks, sequence and process calculations methods.

Further, this course will also discuss the refrigeration including its types of systems, estimating horsepower per ton, horsepower and condenser duty for specific refrigerants and refrigerant replacements; the ethylene/propylene cascaded system, steam jet type utilities requirements and ammonia absorption type utilities requirements; the gasification, feedstocks for gasification, features of gasification systems, commercial gasification systems and trace components in gasifier syngas; and the gas treating processes, chemical solvent processes, physical solvent processes, physical/chemical solvent processes, biological processes, solid bed scavengers and membranes.

During this interactive course, participants will learn the vacuum systems, vacuum jets, typical jet systems, steam supply, measuring air leakage, time to evacuate, design recommendations and ejector specification sheet; the pneumatic conveying, types of systems, differential pressures and equipment sizing; the blending comprising of single-stage mixers, multistage mixers, gas/liquid contacting, liquid/liquid mixing, liquid/solid mixing as well as mixer applications, shrouded blending nozzle and vapor formation rate for tank filling; and the process evaluation, study and process definition, battery limits specifications, offsite specifications, capital investments, operating costs, economics and financing.

Course Objectives

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

- Apply and gain an in-depth knowledge on rules of thumb in process design
- Discuss the nature of design, design constraints and design categories
- Explain petroleum properties, parameters and definitions covering the composition of petroleum, petroleum processing, hydrocarbon properties and characterization parameters
- Develop of process design data and calculation methods that include process design tasks, sequence and process calculations methods
- Identify refrigeration including its types of systems, estimating horsepower per ton, horsepower and condenser duty for specific refrigerants and refrigerant replacements
- Recognize ethylene/propylene cascaded system, steam jet type utilities requirements and ammonia absorption type utilities requirements
- Discuss gasification, feedstocks for gasification, features of gasification systems, commercial gasification systems and trace components in gasifier syngas
- Carryout gas treating processes, chemical solvent processes, physical solvent processes, physical/chemical solvent processes, biological processes, solid bed scavengers and membranes
- Identify vacuum systems, vacuum jets, typical jet systems, steam supply, measuring air leakage, time to evacuate, design recommendations and ejector specification sheet
- Illustrate pneumatic conveying and identify the types of systems, differential pressures and equipment sizing
- Determine blending comprising of single-stage mixers, multistage mixers, gas/liquid contacting, liquid/liquid mixing, liquid/solid mixing as well as mixer applications, shrouded blending nozzle and vapor formation rate for tank filling
- Explain process evaluation, study and process definition, battery limits specifications, offsite specifications, capital investments, operating costs, economics and financing

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 is intended for process, chemical, operation, production and design engineers and other technical staff involved in the design, operation and troubleshooting of major processes in petrochemical plants, refineries and oil/gas plants and fields.

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

Doha	**US$ 5,000** per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai	**US$ 4,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

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

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

Certificates are accredited by the following international accreditation organizations:-

- 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 **2.4 CEUs** (Continuing Education Units) or **24 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.

- 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.

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:

Dr. Hesham Abdou, PhD, MSc, BSc, is a **Senior Mechanical & Petroleum Engineer** with over **35 years** of integrated industrial and academic experience as a **University Professor**. His specialization widely covers in the areas of **Crude Oil Testing & Water Analysis**, **Crude Oil & Water** Sampling Procedures, **Equipment Handling** Procedures, **Crude & Vacuum Process** Technology, **Gas Conditioning & Processing**, **Cooling Towers** Operation & Troubleshooting, **Sucker Rod Pumping**, **ESP & Gas Lift**, **PCP & Jet Pump**, **Pigging** Operations, Electric Submersible Pumps (**ESP**), Progressive Cavity Pumps (**PCP**), **Natural & Artificial Flow Well Completion**, **Well Testing** Procedures & Evaluation, **Well** Performance, **Coiled Tubing** Technology, **Oil Recovery Methods** Enhancement**, Well Integrity** Management, **Well Casing & Cementing**, **Acid Gas** Removal, **Heavy Oil Production** & Treatment Techniques, **Water Flooding**, **Water Lift Pumps** Troubleshooting, **Water System Design** & Installation, **Water Networks Design** Procedures, **Water Pumping** Process, **Pipelines**, **Pumps**, **Turbines**, **Heat Exchangers**, **Separators**, **Heaters**, **Compressors**, **Storage Tanks**, **Valves** Selection, **Compressors**, **Tank & Tank Farms** Operations & Performance, **Oil & Gas Transportation**, **Oil & Gas Production** Strategies, **Artificial Lift** Methods, **Piping & Pumping** Operations, Oil & Water Source Wells Restoration, **Pump** Performance Monitoring, **Rotor Bearing** Modelling, **Hydraulic** Repairs & Cylinders, **Root Cause Analysis**, **Vibration & Condition** Monitoring, **Piping Stress** Analysis, **Amine Gas Sweetening & Sulfur Recovery**, Heat & Mass Transfer and Fluid Mechanics.

During his career life, Dr. Hesham held significant positions and dedication as the **General Manager**, **Petroleum Engineering Assistant General Manager**, **Workover Assistant General Manager**, **Workover Department Manager**, **Artificial Section Head**, **Oil & Gas Production Engineer** and **Senior Instructor/Lecturer** from various companies and universities such as the Cairo University, Helwan University, British University in Egypt, Banha University and Agiba Petroleum Company.

Dr. Hesham has a **PhD** and **Master** degree in **Mechanical Power Engineering** and a **Bachelor** degree in **Petroleum Engineering**. Further, he is a **Certified Instructor/Trainer** and a **Peer Reviewer**. Dr. Hesham is a member of Egyptian Engineering Syndicate and the Society of Petroleum Engineering. Moreover, he has published technical papers and journals and has delivered numerous trainings, workshops, courses, seminars and conferences internationally.

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	***Introduction*** *Nature of Design ● Design Constraints ● Design Categories*
0930 – 0945	*Break*
0945 – 1030	***Petroleum Properties, Parameters & Definitions*** *Composition of Petroleum ● Petroleum Processing: An Overview*
1030 – 1130	***Petroleum Properties, Parameters & Definitions (cont'd)*** *Hydrocarbon Properties: (Pure Hydrocarbons, Defined Mixtures, Undefined Mixtures)*
1130 – 1245	*Break*
1245 – 1420	***Petroleum Properties, Parameters & Definitions (cont'd)*** *Characterization Parameters & Definitions*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Development of Process Design Data & Calculation Methods*** *Process Design Tasks & Sequence*
0930 – 0945	*Break*
0945 – 1100	***Development of Process Design Data & Calculation Methods (cont'd)*** *Process Calculations Methods: (Empirical Procedure, Rigorous Procedure)*
1100 – 1230	***Refrigeration*** *Types of Systems ● Estimating Horsepower per Ton ● Horsepower & Condenser Duty for Specific Refrigerants ● Refrigerant Replacements*
1230 – 1245	*Break*
1245 – 1420	***Refrigeration (cont'd)*** *Ethylene/Propylene Cascaded System ● Steam Jet Type Utilities Requirements ● Ammonia Absorption Type Utilities Requirements*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Gasification*** *What is Gasification? ● Gasification Theory ● Feedstocks for Gasification*
0930 – 0945	*Break*
0945 – 1100	***Gasification (cont'd)*** *Features of Gasification Systems ● Commercial Gasification Systems ● Trace Components in Gasifier Syngas*
1100 – 1230	***Gas Treating*** *Gas Treating Processes ● Chemical Solvent Processes ● Physical Solvent Processes ● Physical/Chemical Solvent Processes ● Biological Processes ● Solid Bed Scavengers ● Membranes*

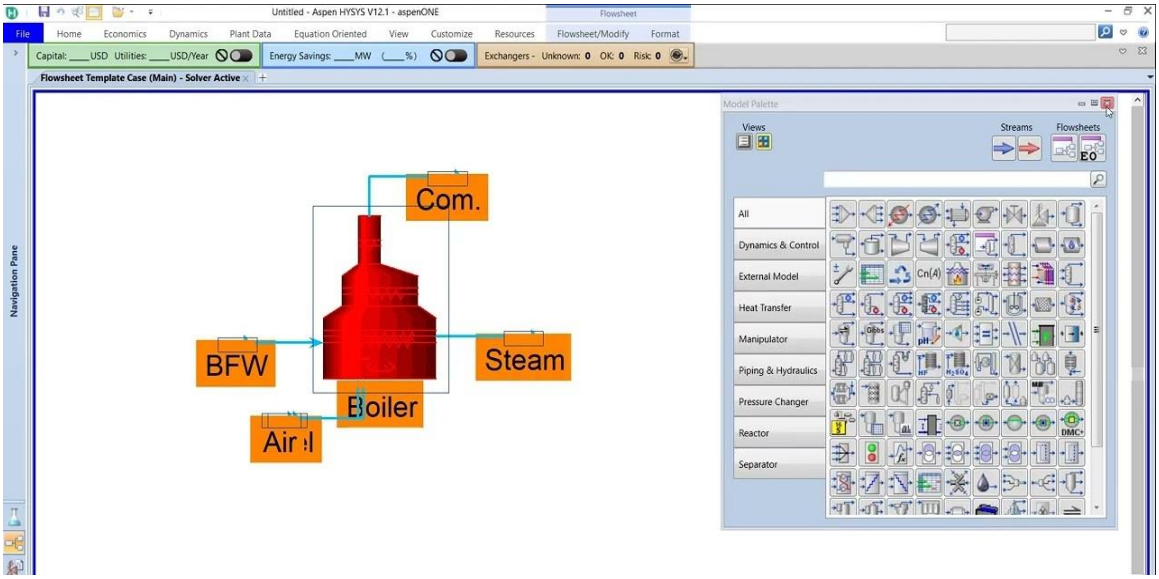
1230 – 1245	*Break*
1245 – 1420	***Vacuum Systems*** *Vacuum Jets ● Typical Jet Systems ● Steam Supply ● Measuring Air Leakage ● Time to Evacuate ● Design Recommendations ● Ejector Specification Sheet*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0930	***Pneumatic Conveying*** *Types of Systems ● Differential Pressures ● Equipment Sizing*
0930 – 0945	*Break*
0945 – 1100	***Blending*** *Single-Stage Mixers ● Multistage Mixers ● Gas/Liquid Contacting ● Liquid/Liquid Mixing ● Liquid/Solid Mixing ● Mixer Applications ● Shrouded Blending Nozzle ● Vapor Formation Rate for Tank Filling*
1100 – 1230	***Process Evaluation*** *Study Definition ● Process Definition ● Battery Limits Specifications ● Offsite Specifications*
1230 – 1245	*Break*
1245 – 1345	***Process Evaluation (cont'd)*** *Capital Investments ● Operating Costs ● Economics ● Financing*
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 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 “ASPEN HYSYS” simulator.



ASPEN HYSYS V12.1 Simulator

Course Coordinator

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