COURSE OVERVIEW PE0296
Koch-Glitch Mass Transfer Fundamentals

Course Title
Koch-Glitch Mass Transfer Fundamentals

Course Date/Venue
December 08-12, 2024/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
PE0296

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

Course Description

This practical and highly-interactive course includes real-life case studies where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a fundamental overview of Koch-Glitch Mass Transfer. It covers the mass transfer concepts including diffusion, convection and phase equilibrium and the significance of mass transfer in industrial processes; the mass transfer mechanisms, mass transfer coefficients, distillation principles and Koch-Glitsch equipment; the phase equilibria and its importance in the design and analysis of separation processes; the tray designs commonly used in distillation including sieve, valve and bubble cap trays; and the packed column design and operation including random and structured packings and their applications in distillation and absorption processes.

Further, the course will also discuss the function and design of column internals including liquid distributors, collectors and supports emphasizing Koch-Glitsch products; the fundamentals of hydraulic design of distillation columns including pressure drop considerations, flooding and weeping; and the process control in distillation, absorption and stripping, liquid-liquid extraction processes, reactive distillation, membrane separation and process intensification.

During this interactive course, participants will learn the common issues encountered in mass transfer operations; the process simulation tools for designing and optimizing mass transfer operations; the energy efficiency in mass transfer operations, retrofitting, revamping and optimization techniques; the environmental considerations, advancements in mass transfer equipment design and sustainable separation technologies; and the future challenges in mass transfer including resource scarcity, regulatory changes and the need for energy-efficient processes.

Course Objectives

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

- Apply and gain a fundamental knowledge on Koch-Glitch mass transfer
- Explain mass transfer concepts including diffusion, convection and phase equilibrium and the significance of mass transfer in industrial processes
- Discuss mass transfer mechanisms, mass transfer coefficients, distillation principles and Koch-Glitsch equipment
- Describe the phase equilibria and its importance in the design and analysis of separation processes
- Examine tray designs commonly used in distillation including sieve, valve and bubble cap trays
- Carryout packed column design and operation including random and structured packings and their applications in distillation and absorption processes
- Discuss the function and design of column internals including liquid distributors, collectors and supports emphasizing Koch-Glitsch products
- Identify the fundamentals of hydraulic design of distillation columns including pressure drop considerations, flooding and weeping
- Illustrate process control in distillation, absorption and stripping, liquid-liquid extraction processes, reactive distillation, membrane separation and process intensification
- Troubleshoot common issues encountered in mass transfer operations
- Recognize process simulation tools for designing and optimizing mass transfer operations
- Apply energy efficiency in mass transfer operations, retrofitting, revamping and optimization techniques
- Discuss environmental considerations, advancements in mass transfer equipment design and sustainable separation technologies
- Determine future challenges in mass transfer including resource scarcity, regulatory changes and the need for energy-efficient processes

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, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a **Tablet PC***

Who Should Attend

This course provides fundamental overview of all significant aspects and considerations of Koch-Glitch mass transfer for process engineers, industrial engineers, operating engineers and other technical staff.

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 **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.

- 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:

Mr. Karl Thanasis, PEng, MSc, MBA, BSc, is a **Senior Engineer** with over **30 years** of practical experience within the **Oil**, **Gas**, **Refinery** and **Petrochemical** industries. His wide expertise includes **Process Plant** Optimization Technology & Continuous Improvement, **Process Engineering** Calculations, **Process Plant** Start Up & Commissioning, Applied **Process Engineering** Elements, **Coke Cooler**, **Mass Transfer** Mechanisms, **Process Plant** Start-up & Commissioning, **Process Plant** Troubleshooting, **Operations Abnormalities & Plant Upset**, **Process Equipment** Applications & Troubleshooting, **Process Plant Performance & Efficiency**, **Gas Sweetening & Sulphur Recovery**, **Distillation-Column** Control & Troubleshooting, **Oil Movement & Troubleshooting**, **Process Plant Operations & Control**, **Process Equipment** Operation, **Fired Heaters & Air Coolers** Maintenance, **Heat Exchangers**, **Pumps & Compressors**, **Crude Desalter**, **Pressure Vessels & Valves**, **Steam Trapping & Control**, **Pumps & Valve** Maintenance & Troubleshooting, **Turbomachinery**, **Mechanical Alignment**, **Rotating Equipments**, **Diesel Generators**, **Lubrication** Technology, **Bearing**, **Predictive & Preventive** Maintenance, **Root Cause Analysis**, **Boilers**, **Oil Field** Operation, **Production** Operation, Plant Operation & Commissioning, **Crude Oil De Salting** Process, **Gas Conditioning**, **NGL Recovery & NGL Fractionation**, **Flare** System, **Storage Tanks**, **Oil Recovery** System and **Chemical Injection**.

Mr. Thanasis has acquired his thorough and practical experience as the **Project Manager**, **Plant Manager**, **Area Manager - Equipment Construction**, **Construction Superintendent**, **Project Engineer** and **Design Engineer**. His duties covered **Plant Preliminary Design**, **Plant Operation**, **Write-up** of **Capital Proposal**, **Investment Approval**, **Bid Evaluation**, **Technical Contract Write-up**, **Construction** and **Sub-contractor Follow up**, **Lab Analysis**, **Sludge Drying** and **Management** of **Sludge Odor** and **Removal**. He has worked in various companies worldwide in the **USA**, **Germany**, **England** and **Greece**.

Mr. Thanasis is a **Registered Professional Engineer** in the **USA** and **Greece** and has a **Master** and **Bachelor** degrees in **Mechanical Engineering** with **Honours** from the **Purdue University** and **SIU** in **USA** respectively as well as an **MBA** from the **University of Phoenix** in **USA**. Further, he is a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) and a **Certified Instructor/Trainer**.

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.

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 Program

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

Day 1: ***Sunday, 08th of December 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Mass Transfer:*** *Mass Transfer Concepts including Diffusion, Convection & Phase Equilibrium • Exploration of the Significance of Mass Transfer in Industrial Processes*
0930 – 0945	*Break*
0945 – 1030	***Mass Transfer Mechanisms:*** *The Mechanisms of Mass Transfer including Molecular Diffusion & Convective Mass Transfer & their Implications in Separation Processes*
1030 – 1130	***Mass Transfer Coefficients:*** *The Concept of Mass Transfer Coefficients, Methods for their Determination & their Role in Designing Separation Equipment*
1130 – 1215	***Distillation Principles:*** *Fundamentals of Distillation as a Mass Transfer Operation including Binary & Multicomponent Distillation*
1215 – 1230	*Break*
1230 – 1330	***Koch-Glitsch Equipment:*** *Overview of Koch-Glitsch's Mass Transfer Equipment Offerings including Trays, Packings & Internals*
1330 – 1420	***Phase Equilibria:*** *The Phase Equilibria & its Importance in the Design & Analysis of Separation Processes*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: ***Monday, 09th of December 2024***

0730 – 0830	***Tray Design & Operation:*** *Examination of Tray Designs Commonly Used in Distillation including Sieve, Valve & Bubble Cap Trays Focusing on Operation, Efficiency & Selection Criteria*
0830 – 0930	***Packed Columns:*** *Packed Column Design & Operation including Random & Structured Packings & their Applications in Distillation & Absorption Processes*

0930 – 0945	Break
0945 – 1100	***Column Internals:*** *The Function & Design of Column Internals including Liquid Distributors, Collectors & Supports Emphasizing Koch-Glitsch Products*
1100 – 1215	***Hydraulic Design:*** *Fundamentals of Hydraulic Design of Distillation Columns including Pressure Drop Considerations, Flooding & Weeping*
1215 – 1230	Break
1230 – 1330	***Process Control in Distillation:*** *Control Strategies for Distillation Processes including Composition & Temperature Control Schemes*
1330 – 1420	***Case Studies on Distillation Equipment:*** *Review of Case Studies Highlighting the Application of Koch-Glitsch Equipment in Distillation Processes Focusing on Problem-Solving & Optimization*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: ***Tuesday, 10th of December 2024***

0730 – 0830	***Absorption & Stripping:*** *Fundamentals of Absorption & Stripping Operations including Equipment Design & Operation Considerations*
0830 – 0930	***Liquid-Liquid Extraction:*** *Overview of Liquid-Liquid Extraction Processes & Equipment including Mixer-Settlers, Columns & Centrifugal Extractors*
0930 – 0945	Break
0945 – 1100	***Reactive Distillation:*** *The Principles & Applications of Reactive Distillation including Process Design & Catalyst Considerations*
1100 – 1215	***Membrane Separation:*** *Membrane Separation Processes & their Integration with Traditional Separation Technologies*
1215 – 1230	Break
1230 – 1330	***Process Intensification:*** *Exploration of Process Intensification Strategies in Mass Transfer Operations including the Use of Advanced Packings & Internals*
1330 – 1420	***Troubleshooting Mass Transfer Equipment:*** *Common Issues Encountered in Mass Transfer Operations & Strategies for Troubleshooting & Optimization*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: ***Wednesday, 11th of December 2024***

0730 – 0830	***Process Simulation Tools:*** *Introduction to Process Simulation Tools for Designing & Optimizing Mass Transfer Operations including Software Commonly Used in the Industry*
0830 – 0930	***Energy Efficiency in Mass Transfer Operations:*** *Strategies for Improving Energy Efficiency in Distillation & Other Mass Transfer Processes*
0930 – 0945	Break
0945 – 1100	***Retrofitting & Revamping:*** *Approaches to Retrofitting & Revamping Existing Mass Transfer Equipment for Capacity Increase or Efficiency Improvement*
1100 – 1215	***Optimization Techniques:*** *Application of Optimization Techniques in the Design & Operation of Mass Transfer Equipment Focusing on Cost Reduction & Performance Enhancement*
1215 – 1230	Break
1230 – 1420	***Environmental Considerations:*** *Environmental Considerations in Mass Transfer Operations including Emission Control & Waste Reduction*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5:	Thursday, 12th of December 2024
0730 – 0930	***Advancements in Mass Transfer Equipment:*** *Latest Advancements in Mass Transfer Equipment Design & Materials, Highlighting Koch-Glitsch Innovations*
0930 – 0945	*Break*
0945 – 1100	***Sustainable Separation Technologies:*** *Sustainable Technologies & Practices in Separation Processes including Green Solvents & Renewable Energy Applications*
1100 – 1230	***Future Challenges in Mass Transfer:*** *Future Challenges in Mass Transfer including Resource Scarcity, Regulatory Changes & the Need for Energy-Efficient Processes*
1230 – 1245	*Break*
1245 – 1345	***Case Studies on Advanced Applications:*** *Review of Case Studies Showcasing Advanced Applications of Mass Transfer Technologies in Complex Separations*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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