COURSE OVERVIEW ME0395
Mass Transfer and Heat Transfer

Course Title
Mass Transfer and Heat Transfer

Course Date/Venue
Session 1: July 07-11, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: December 14-18, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
ME0395

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 our state-of-the-art simulators

In engineering an understanding of Heat Transfer is becoming increasingly important, since the subject plays a very important role in the design, operation and maintenance in areas such as power plants, refrigeration, heating installations and chemical and industrial process engineering.

The course covers all aspects of the subject of Heat Transfer from a mechanical viewpoint using lots of examples of current practice with associated problems. Extensive discussions are given on thermal insulation and optimum thicknesses in industrial pipe installations due primarily to the widespread use of insulation and its importance in energy conservation. In addition, the topic of heat exchangers is covered in a very practical and detailed way due to the perceived inadequacy of current industrial practice.

The delegate should have no difficulty in understanding the course, since the principles of heat transfer are based very much on our everyday experiences and observations. The absence of mathematically intimidating material will help. The course employs a large number of worked examples in all of the technical areas.

Because of the general nature of the course it has been decided to allow time during the course for impromptu interactive workshops devoted to advanced technical problems raised by the delegates. This flexibility will, it is hoped, satisfy those delegates whose knowledge of the subject is already sufficiently advanced in the basic concepts, but who have individual topics that need solving.

Course Objectives

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

- Apply and gain an in-depth knowledge on heat transfer engineering
- Discuss heat transfer mechanism including conduction, convection and radiation
- Discuss Fourier's Law of Heat Conduction, radial steady conduction through the wall and electrical analogy to conduction process
- Recognize extend surfaces (Fins) and determine the difference between constant cross-section fins and long fins
- Explain internal energy generation including cylindrical geometrics
- Define unsteady heat transfer and identify lumped analysis of transient heat transfer problems
- Identify the Boit number and analyze interactive questions on heat transfer
- Explain heat transfer convection including worked example in external and internal convection as well as convection in external and internal flows
- Enumerate various types of heat exchanger
- Determine heat transfer through heat exchangers and heat transfer coefficient
- Select and design heat exchanger in a professional manner

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 heat transfer engineering for those who are practicing engineers from the mechanical, chemical and process industrial areas and who have an interest in understanding and improving their knowledge of the subject of heat transfer so as to facilitate an improvement in the efficiency of plant process. Plant engineers, designers, managers and other technical staff will find this course of crucial importance to their contribution to the conservation of both local and international energy resources.

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: -

- 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.

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 **Senior Mechanical & Maintenance Engineer** with over **30 years** of extensive industrial experience within the **Power & Water Utilities** and other **Energy Sectors**. His wide expertise includes **District Cooling Plant**, **District Cooling Plant Operations**, **HVAC** Basics, **HVAC&R**, **KOTZA**, **Refrigeration**, **Modern HVAC & Refrigeration Systems Design, Utilization, Operation & Effective Maintenance, Control Valve & Actuators**, **Fire Safe Valves**, **Piping & Pipeline**, Maintenance, Repair, **Shutdown**, **Turnaround & Outages**, **Maintenance & Reliability** Management, **Mechanical Maintenance** Planning, Scheduling & Work Control, Advanced Techniques in **Maintenance** Management, **Predictive & Preventive** Maintenance, **Maintenance & Operation Cost Reduction** Techniques, Reliability Centered Maintenance (**RCM**), **Machinery Failure** Analysis, **Rotating Equipment Reliability** Optimization & Continuous Improvement, **Material Cataloguing**, **Mechanical & Rotating Equipment** Troubleshooting & Maintenance, **Root Cause Analysis & Reliability** Improvement, **Condition** Monitoring, **Root Cause Failure Analysis** (RCFA), **Steam Generation**, **Steam Turbines**, **Power Generator Plants**, **Gas Turbines**, **Combined Cycle Plants**, **Boilers**, **Process Fired Heaters**, Air Preheaters, Induced Draft Fans, All Heaters Piping Work, Refractory Casting, Heater Fabrication, Thermal & Fired Heater Design, **Heat Exchangers**, Heat Transfer, Coolers, **Power Plant** Performance, Efficiency & Optimization, **Storage Tank** Design & Fabrication, **Thermal Power Plant** Management, **Boiler & Steam** System Management, **Pump** Operation & Maintenance, **Chiller & Chiller Plant** Design & Installation, **Pressure Vessel**, **Safety Relief Valve** Sizing & Selection, **Valve** Disassembling & Repair, Pressure Relief Devices (**PSV**), **Hydraulic & Pneumatic** Maintenance, Advanced **Valve** Technology, **Pressure Vessel** Design & Fabrication, **Pumps**, Turbo-Generator, Turbine **Shaft Alignment**, **Lubrication**, Mechanical **Seals**, Packing, **Blowers**, **Bearing** Installation, **Couplings**, **Clutches** and **Gears**. Further, he is also versed in **Wastewater Treatment** Technology, **Networking** System, **Water Network Design**, Industrial **Water Treatment** in Refineries & Petrochemical Plants, **Piping** System, Water Movement, Water Filtering, Mud Pumping, **Sludge Treatment** and **Drying**, **Aerobic Process** of **Water Treatment** that includes **Aeration**, **Sedimentation** and **Chlorination Tanks**. His strong background also includes **Design** and **Sizing** of all **Waste Water Treatment Plant Associated Equipment** such as **Sludge Pumps**, **Filters**, **Metering Pumps**, **Aerators** and **Sludge Decanters**.

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's** and **Bachelor's** degree 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**) a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, seminars, workshops and conferences worldwide.

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.

Accommodation

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

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 course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 – 0800	*Registration and Coffee*
0800 – 0815	*Welcome and Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Heat Transfer*** *Heat and Other Forms of Energy ● Worked Examples*
0930 – 0945	*Break*
0945 – 1100	***Heat Transfer Mechanisms: Conduction, Convection and Radiation*** *Worked Examples*
1100 – 1230	***Fourier's Law of Heat Conduction*** *One-dimensional Steady Conduction through a Plane Wall and a Composite Wall ● Worked Examples*
1230 – 1245	*Break*
1245 – 1330	***Radial Steady Conduction through the Wall of a Tube*** *Thermal Insulation ● Worked Examples*
1330 – 1420	***Electrical Analogy to Conduction Processes*** *Worked Examples*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Extended Surfaces (Fins): Constant Cross-Section Fins*** *Worked Examples*
0930 – 0945	*Break*
0945 – 1100	***Long Fins; Fin Effectiveness***
1100 – 1230	***Internal Energy Generation: Plane Geometries*** *Worked Examples*
1230 – 1245	*Break*
1245 – 1345	***Internal Energy Generation: Cylindrical Geometries*** *Worked Examples*
1345 – 1420	***Interactive Workshops and Worked Examples***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Introduction to Unsteady Heat Transfer*** *Worked Examples*
0930 – 0945	*Break*
0945 – 1100	***Lumped Analysis of Transient Heat Transfer Problems*** *Worked Examples*
1100 – 1230	***The Biot Number*** *Worked Examples*
1230 – 1245	*Break*
1245 – 1330	***Interactive Questions on Heat Transfer***
1330 – 1420	***Interactive Workshops and Worked Examples***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Introduction to Convective Heat Transfer***
0830 – 0930	***Worked Examples in Convection***
0930 – 0945	*Break*
0945 – 1100	***Convection in External Flows***
1100 – 1230	***Worked Examples in External Convection***
1230 – 1245	*Break*
1245 – 1315	***Convection in Internal Flows***
1315 – 1420	***Interactive Workshops and Worked Examples*** *Worked Examples in Internal Convection*
1420 – 1430	***Recap***
1430	*Lunch End of Day Four*

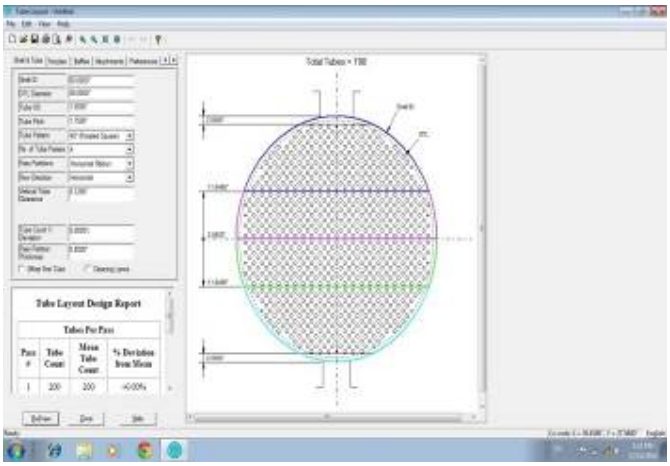
Day 5

0730 – 0930	***Introduction to Heat Exchangers*** *Types of Heat Exchanger*
0930 – 0945	*Break*
0945 – 1130	***Heat Transfer Determination Through Heat Exchangers*** *Worked Examples*
1130 – 1230	***Heat Transfer Coefficient*** *Worked Examples*

1230 – 1245	*Break*
1245 – 1345	***Selection and Design of Heat Exchangers*** *Industrial Problems and Solutions*
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 simulator "Heat Exchanger Tube Layout".



Heat Exchanger Tube Layout Simulator

Course Coordinator

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