COURSE OVERVIEW FE0330
Metallurgy for the Non-Metallurgist

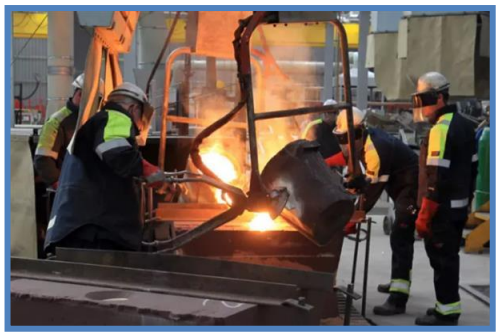
Course Title
Metallurgy for the Non-Metallurgist

Course Date/Venue
November 11-15, 2024/TBA Meeting Room, The Tower Plaza Hotel, Dubai, UAE

Course Reference
FE0330

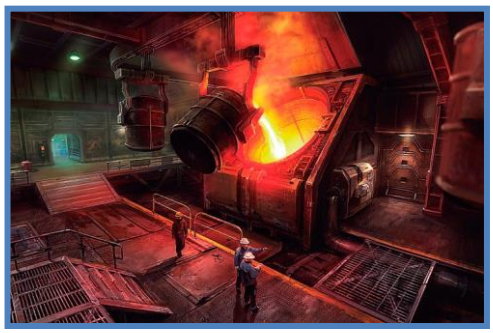
Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description



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

This course is designed to provide delegates with a detailed and up-to-date overview of metallurgy for the non-metallurgist. It covers the unique physical characteristics of metals including the reasons that metals behave differently from non-metals such as plastics, glass, wood, etc.; the selection of different metals for specific engineering applications; how metals are alloyed to achieve desired properties; how steel is heat-treated to achieve various combinations of strength and ductility; and how metals are formed into the components that are used in our most important engineered machines and structures.



During this interactive course, participants will learn on how to test metals to determine critical properties such as strength, ductility and toughness; and why metals corrode, why different metals behave differently in corrosive environments and how the corrosion of metals can be controlled.

Course Objectives

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

- Gain a good knowledge in metallurgy science and use the terminologies and expressions of professional metallurgists
- Recognize the unique physical characteristics of metals including the reasons that metals behave differently from non-metals such as plastics, glass, wood, etc.
- Select different metals for specific engineering applications
- Explain how metals are alloyed to achieve desired properties
- Identify how steel is heat-treated to achieve various combinations of strength and ductility
- Distinguish how metals are formed into the components that are used in our most important engineered machines and structures
- Test metals to determine critical properties such as strength, ductility and toughness
- Illustrate why metals corrode, why different metals behave differently in corrosive environments and how the corrosion of metals can be controlled

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 is an ideal first course for those who need a working understanding of metals and their applications. It has been designed for those with no previous training in metallurgy, such as technical, laboratory, and sales personnel; engineers from other disciplines; management and administrative staff; and non-technical support staff such as purchasing and receiving agents who order and inspect incoming material.

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 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.

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. George Poulos, MBA, MSc, BSc, CEng, is a **Senior Corrosion & Metallurgical Engineer** with over **45 years** of extensive experience within the **Oil & Gas, Petrochemical, Refinery, Construction, Aircraft & Shipbuilding** Industry. His wide experiences cover in the areas of Corrosion and **Metallurgy**, **Metallurgical** Failure, **Metallurgy & Metallurgical Processes, Metallurgical** Lab, **Steel Metallurgy**, **Corrosion in Urea & Ammonia Plants,** Analysis & Prevention, **Corrosion** Fabrication & Inspection, **Fabrication** & **Repair**, **Corrosion** Prevention, **Corrosion** Engineering, **Corrosion Control**, **Corrosion Inhibition**, **Corrosion** Management in Process Operations, **Corrosion** & Prevention of Failures, **Pressure Vessels**, **Piping Inspection**, **Risk-Based Inspection**, **Fitness-for-Service** (**FFS**), **Material** Selection, **Cathodic Protection** Systems, **Steel** Structure Welding, **Steelmaking** Slag, **Steel** Making Application, **Steel Making** Process, **Steel** Manufacturing, **Steel Forging**, **Steel** Manufacturing & Process Troubleshooting, **Hot Rolling** Process, **Hot Strip Mill**, **Mill** Operations, **Roll Mill**, **Electric Arc Furnace** (**EAF**), **Slit Rolling**, **Carbon Steel Pipe** Wall Thickness & Grade Selection, **Ferro-Alloys**, **Heat Treatment** & **Prevention Techniques** and **Post Weld Heat Treatment**. Further, he is also well-versed in **Welding** Inspection, **Welding** & **Machine** Techniques, **TIG** & **Arc Welding**, **Shielded Metal Arc Welding**, **Gas Tungsten** & **Gas Metal Arc Welding**, **Welding** Procedure Specifications & Qualifications, **Aluminium Welding**, **Hot Work-Safety**, **SMAW**, **GTAW**, **Welding** Techniques, **Pipeline Welding** Practices, **Welding** Engineering, **Welding** Fatigue & Fracture Mechanics, **Welding Inspection Technology**, **Welding Safety**, **Welding** Defects Analysis, **Welding Technology**, **Welding Problems**, **Welding & Non Destructive** Testing and **Metallurgy Techniques**.

During his career life, Mr. Poulos has gained his practical and field experience through his various significant positions and dedication as the **Chief Executive**, **Head of Technical Studies**, **Manager**, **Senior Consultant**, **Lead Welding Engineer**, **Senior Welding Engineer**, **Design Engineer**, **Sales Engineer**, **Author**, **Welding Instructor**, **Visiting Lecturer** and **Technical Proposal Research Evaluator** from various international companies such as Greek Welding Institute, Hellenic Quality Forum and International Construction Companies such as Shipbuilding, Aircraft Industry and Oil and Gas Industry.

Mr. Poulos is a **Registered Chartered Engineer** and has a **Master's** degree in **Naval Architecture**, a **Bachelor's** degree in **Welding Engineering** and a Master of Business Administration (**MBA**) from the **Sunderland University**, **Aston University** and **Open University**, **UK**, respectively. Further, he is a **Certified Trainer/Instructor**, an active Member of Chartered Quality Institute (**CQI**), The British Welding Institute (**TWI**), The Royal Institution of Naval Architects (**RINA**) and American Welding Society (**AWS**), a Registered **EWF/IW** (European Welding Federation-International Welding Institute W/E) and an **IRCA** Accredited External Quality Systems Auditor through BVQI. He is an **Author** of Technical Book dealing with Protection/Health/Safety in the Welding/Cutting domain and delivered various trainings, seminars, conferences, workshops and courses globally.

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: Monday, 11th of November 2024

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction & History of Metals*** *Course Overview • What is Metallurgy? • History of Metallurgy • Discovery of Metals & Alloys*
0930 – 0945	*Break*
0945 – 1100	***Introduction & History of Metals (cont'd)*** *First Primitive Refining Techniques • Cultural Significance of Metals • Profile & Behavior of Atoms • Upgrading Pure Metals*
1100 – 1215	***Mechanical Properties & Their Measurement*** *Definitions of Mechanical Properties • Testing Procedures*
1215 – 1230	*Break*
1230 – 1420	***Mechanical Properties & Their Measurement (cont'd)*** *Introduction to Concepts of Standardization & Quality Control.*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: Tuesday, 12th of November 2024

0730 – 0930	***Steels & Cast Irons*** *A Closer Look at Properties • Profile of Steel • Mechanical Properties of Steel • Physical Properties of Steel • Steel Mill Products*
0930 – 0945	*Break*
0945 – 1100	***Steels & Cast Irons (cont'd)*** *Selected Applications of Steels & Cast Irons • Profile of Cast Irons • Wear Resistance of Irons & Steels • Producing Castings from Iron & Steel*
1100 – 1215	***Getting Metals into Usable Form: Hot Working*** *Forging • Rolling • Extrusion • Swaging • Other Techniques Employed to form Metals at Elevated Temperatures*
1215 – 1230	*Break*
1230 – 1420	***Getting Metals into Usable Form: Cold Working*** *Rolling • Stamping • Coining • Spinning • Other Techniques to form Metals at Ambient Temperatures*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: Wednesday, 13th of November 2024

0730 – 0930	***Joining*** *Welding • Brazing • Soldering*
0930 – 0945	*Break*

0945 – 1100	***Joining (cont'd)*** *Applications*
1100 – 1215	***Heat Treatment of Steel*** *Hardness • Hardenability • Specific Processes & their Applications*
1215 – 1230	*Break*
1230 – 1420	***Heat Treatment of Steel (cont'd)*** *Heat Treating Procedures • Heat Treating Equipment • Quenchants • Hardness Measurements*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: ***Thursday, 14th of November 2024***

0730 – 0930	***Nonferrous Metals & Alloys: Industrial Applications & Properties*** *Light Metals • Copper & its Alloys • Lead, Tin, & Zinc • Precious Metals*
0930 – 0945	*Break*
0945 – 1100	***Nonferrous Metals & Alloys: Strengthening Mechanisms*** *Techniques to Harden Nonferrous Metals • Age Hardening • Strain Hardening • Related Concepts*
1100 – 1215	***Corrosion & Corrosion Prevention*** *Causes of Corrosion • Environmental Factors • Temperature-Induced Failures*
1215 – 1230	*Break*
1230 – 1420	***Corrosion & Corrosion Prevention (cont'd)*** *Techniques for Minimizing Corrosion*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5: ***Friday, 15th of November 2024***

0730 – 0930	***Quality Control & Failure Analysis*** *Procedures for Predicting & / or Evaluating the Performance of Metals in Service • Failure Mechanisms*
0930 – 0945	*Break*
0945 – 1100	***Quality Control & Failure Analysis (cont'd)*** *Testing & Inspection*
1100 – 1215	***Materials Characterization & the Selection Process*** *Designation Systems for Classes of Metals and Alloys • Standards & Specifications • Selection Factors*
1215 – 1230	*Break*
1230 – 1345	***Materials Characterization & the Selection Process (cont'd)*** *Comparison of Polymers & Ceramics Related to Metals • Case Studies of Material Selection Problems*
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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