

COURSE OVERVIEW FE0430-4D
Welding Engineering: Welding, Fabrication & Inspection
(AWS, ASME and API Codes)

Course Title

Welding Engineering: Welding, Fabrication & Inspection (AWS, ASME and API Codes)

Course Date/Venue

December 16-19, 2024/Al Aziziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA

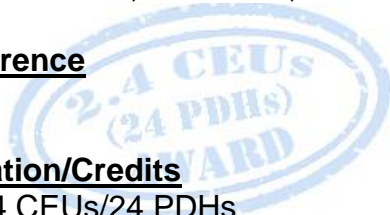
Course Reference

FE0430-4D

Course Duration/Credits

Four days/2.4 CEUs/24 PDHs

Course Description



This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt in the class will be applied using the following practical methods:-

(1) Industrial Facility Visit: Course participants will be taken to an industrial facility where they will practice welding, fabrication and inspection. In case that this course is organized inside client premises (In-House), then client shall provide access to its welding and fabrication workshop for practical sessions.

(2) Welding Simulator: Participants will use in the class the welding & fabrication software and AWS Tool Kit & Structural Weld Replica Kit to practice some of the skills learnt.

Welding Technology plays a major role in all maintenance and fabrication activities in the industry. Production equipment, a highly sophisticated welding technique and qualified personnel allow processing or production of steel products for different applications within short periods. This course provides a much needed source of authoritative information on the complex subject of welding- processes, selection of power sources, weld metallurgy, weldability of metals, testing and inspection techniques.

The course will cover welding processes (GTAW, SMAW, MIG, FCAW, SAW, OAW), welding consumables, design of welded joints, applied welding metallurgy and heat treating, welding quality control, non-destructive testing and major International Welding Codes and Standards such as AWS and API.

Each session will be conducted in a lecture/discussion format and videos designed to provide intensive instruction and guidance. The director will be available following each day's session to provide participants with further opportunity for discussion and consideration of specific problems.

The course includes detailed discussions about welding of pipelines and related facilities in accordance with API 1104, AWS D1.1, ASME IX and API 577 codes and standards.

Course Objectives

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

- Apply and gain an in-depth knowledge on welding technology including welding, fabrication and inspection in accordance with AWS, ASME and API codes and standards
- Differentiate the various welding process such as SMAW, GTAW, GMAW, FCAW and OAW
- Identify the arc welding consumables including welding wires, coated electrodes, sub arc wires and fluxes, neutral and active fluxes and shielding gases
- Describe the properties and strength of materials and carryout destructive testing
- Analyze the fatigue of welded structures, joint design as well as dissimilar welds and weld overlays
- Characterize the metallurgical properties of steel and heat treatment and implement welding quality control
- Practice the latest standards and procedure for welding pipeline and employ related facilities
- Discuss the history and structure of API 1104, AWS D1.1 and ASME code
- Explain the standards and specification of ASME Sec IX and practice the correct welding procedures as well as supplemental variables and special consideration for notch toughness
- Implement welding safety with proper procedure and specification
- Inspect welding in accordance with API 577 standard

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 welding engineers, inspection engineers, facility integrity engineers, fabrication engineers, mechanical engineers, NDT personnel, quality assurance personnel, testing laboratory personnel, and maintenance personnel. Further, this course is a must for anyone involved in inspection of welding construction, qualifying welders, brazers and operators; or involved in writing and qualifying welding and brazing procedure specifications; those responsible for reviewing supplier procedures, auditing or reviewing in-house procedures and qualifications; and those who estimate jobs in compliance of ASME code.

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\$ 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

Haward Technology is accredited by the following international accreditation organizations: -

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American Welding Society (AWS)

Haward Technology is the **International Agent** of the **American Welding Society (AWS)** and the Authorized Provider of AWS international certification examinations outside the USA. Haward Technology exhibits compliance and adherence to **AWS Quality Control Standards** in the development, conduct and delivery of certification courses and exams for welding and inspection professionals on behalf of the American Welding Society.

The American Welding Society's certification programs are internationally recognized and are used as a benchmark of quality workmanship and skills within the welding industry around the world.

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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.

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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. Tony Dimitry, PhD, MSc, BSc, is a **Senior Welding Engineer** with over **30 years** of industrial experience. His expertise includes **Welding Technology, Welding Machine Safety, Welding Machine Calibrations, Welding Machine Inspection & Maintenance, Welding Machine Operational Tests, Inspection Maintenance, Diesel Engine, Control Diagrams, Electrical Wiring Diagrams, GFCI Testing & Resetting Procedures, Battery Maintenance, Air Compressors Operation, Air Compressors Maintenance, Air Compressors Operational Tests, Air Compressors Inspection Lists, Generator Testing, Maintenance & Troubleshooting, Generator Operational Tests, Voltage Regulator, Generator Inspection Lists, Non Destructive Test, Metallurgical Failure Analysis & Prevention, Piping & Pipeline Systems, ASME B31.8, Gas Transportation Piping Code, Mechanical Integrity, Fittings, Pressure Vessels, Dry Gas Seal, Process Equipment, Diesel Engine & Crane Maintenance, Reliability Management, Electric Arc Furnace (EAF), Vibration Analysis, Heat Exchanger, Boiler, Gas Turbine, Siemens Steam Turbine Maintenance, Failure Analysis, FMEA, Corrosion, Metallurgy, Preventive and Predictive Maintenance**. Currently, he is in charge of the **metallurgical failure analysis** and the usage of fracture mechanics for determining crack propagation in impellers of turbines.

During his career life, Dr. Dimitry was a **Senior Engineer** in **Chloride Silent (UK)** wherein he was responsible for the mechanical, thermal and electrical modelling of battery problems for electric vehicles and satellites as well as an **Operations Engineer** of the **National Nuclear Corporation (UK)** wherein he was responsible for the optimization of the plant. Prior to this, he was a **Professor** at the **Technical University of Crete** and an Assistant **Professor** of the **University of Manchester (UK)**. Dr. Dimitry also held significant positions such as the **Operations Engineers, Technical Trainer, HSE Contracts Engineer, Boilers Section Engineer, Trainee Mechanical Engineer, Engineer, Turbines Section Head** and **Lecturer/Instructor** and from various multinational companies like **National Nuclear Corporation, UMIST Aliveri Power Station** and **HFO Fired Power Station**.

Dr. Dimitry has a **PhD, Master's** and **Bachelor's** degree in **Mechanical Engineering** from the **Victory University of Manchester** and the **University of Newcastle, UK** respectively. Further, he is a **Certified Instructor/Trainer, a Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)** and an associate member of the American Society of Mechanical Engineers (**ASME**) and Institution of Mechanical Engineers (**IMechE**). He has further delivered various trainings, seminars, courses, workshops 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: Monday, 16th of December 2024

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Welding Processes Fundamentals • SMAW (Shielded Metal Arc) • GTAW (Gas Tungsten Arc) • GMAW (or MIG) (Gas Metal Arc) • FCAW (Flux Cored Arc)
0930 – 0945	Break
0945 – 1030	Welding Processes (cont'd) SAW (Submerged Arc) • Stud Welding • OAW (Oxy Acetylene) • High Energy, Special & Hybrid Welding Processes • Power Sources for Arc Welding • Brazing & Cutting Processes
1030 – 1130	Classification of Arc Welding Consumables Coated Electrodes • GMAW & GTAW Wires • FCAW Wires • Sub Arc Wires & Fluxes • Neutral & Active Fluxes • Shielding Gases
1130 – 1230	Properties & Strength of Materials Material Properties • Destructive Testing
1230 – 1245	Break
1245 – 1420	Fatigue of Welded Structures Fatigue Mechanisms • Weld Finish Classifications
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day One

Day 2: Tuesday, 17th of December 2024

0730 – 0830	Joint Designs Joints • Symbols • Preparation • Design for Productivity
0830 – 0930	Dissimilar Welds & Weld Overlays
0930 – 0945	Break
0945 – 1045	Metallurgical Properties of Steel & Heat Treatment Metallurgical Properties of Steel • Preheating • Post Weld Heat Treatment (PWHT) • Field Heat Treating Equipment • Plans for PWHT
1045 – 1215	Welding Quality Control Planning for QC • Welding Problems & Defects • Visual Inspection • Employment of NDT • Welder Training & Qualification • CSWIP vs. ASNT Qualification
1215 – 1230	Break
1230 – 1330	Welding of Pipelines & Related Facilities (API 1104) General • Referenced Publications • Definition of Terms • Specifications • Qualification of Welding Procedures for Welds Containing Filler-Metal Additives • Qualification of Welders • Design & Preparation of a Joint for Production Welding • Inspection & Testing of Production Welds



1330 - 1420	Welding of Pipelines & Related Facilities (API 1104) (cont'd) Acceptance Standards for Nondestructive Testing • Repair & Removal of Defects • Alternative Acceptance Standards for Girth Welds • In-Service Welding • Procedures for Nondestructive Testing • Automatic Welding • Automatic Welding without Filler-Metal Additions
1420 - 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Two

Day 3: Wednesday, 18th of December 2024

0730 - 0845	API 1104 & AWS D1.1: History & Structure Historical Development of AWS D1.1 & API 1104 • Pre-Qualification & Qualification of Welding Procedures • The Use of Pre-qualified Procedures • Base Metal Classifications to AWS & API
0845 - 0945	ASME Code, History & Structure Historical Development of Section IX • of Section IX to Other Codes (ASME V111 & B31.3) • Organization, Structure & Mechanics of Using Section IX-Essential, Non-Essential & Supplemental Essential Variables
0945 - 1000	Break
1000 - 1115	ASME Section IX: Base & Filler Metal Specifications P numbers & Base Metal Classifications • F-numbers • A-Numbers • SFA & Non-SFA Filler Metal Specifications • The Use of Standard Welding Procedures
1115 - 1230	ASME Section IX: Selecting & Preparing the Test Coupon for Both Procedure & Welder Qualifications Obtaining Maximum Cost-Effectiveness from Test Coupons • Preparation & Welding of the Test Coupon • Recording Both Necessary & Worthwhile Data • Demonstrating Code Compliance
1230 - 1245	Break
1245 - 1420	ASME Section IX: Writing Welding Procedure Specification Meeting Code Requirements • Addressing Customer Requirements • Providing Direction to the Welder • Sources of Information for Preparing Intelligent & Meaningful Welding Procedure Specifications
1420 - 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Three





Day 4: Thursday, 19th of December 2024

0730 – 0900	ASME Supplemental Variables – Special Consideration for Notch-Toughness <i>How Welding Influences Toughness • Toughness Requirements of Construction Codes • Measuring & Recording Heat Input Data • Translating Heat Input Data Into Useful Directions for a Welder • Typical Construction Code Requirements</i>
0900 – 0915	Break
0915 – 1100	Welding Safety <i>Electric Shock • Radiation • Fire & Explosions • Eye Injuries • Fume • Hearing Impairment</i>
1100 – 1230	Procedure Specification <i>Use of Section IX Form • Other Formats • Procedure Qualification Record Forms • Revisions to Records & Procedures • Take-Home Test</i>
1230 – 1245	Break
1245 – 1345	API 577 Welding Inspection <i>Welding Inspection Procedure • NDT • Metallurgy • Refinery & Petrochemical Plant Welding Issues</i>
1345 – 1400	Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
1400 – 1415	POST-TEST
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>



Practical Sessions

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



Simulator (Hands-on Practical Sessions)

Welding & Fabrication

Advanced E-Learning Programme

Aligned to National Occupational Standards







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3. The non-exclusive licence to use the Product is granted to one institution per Product and without

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6: MIG Welding, 3: The Welding Process

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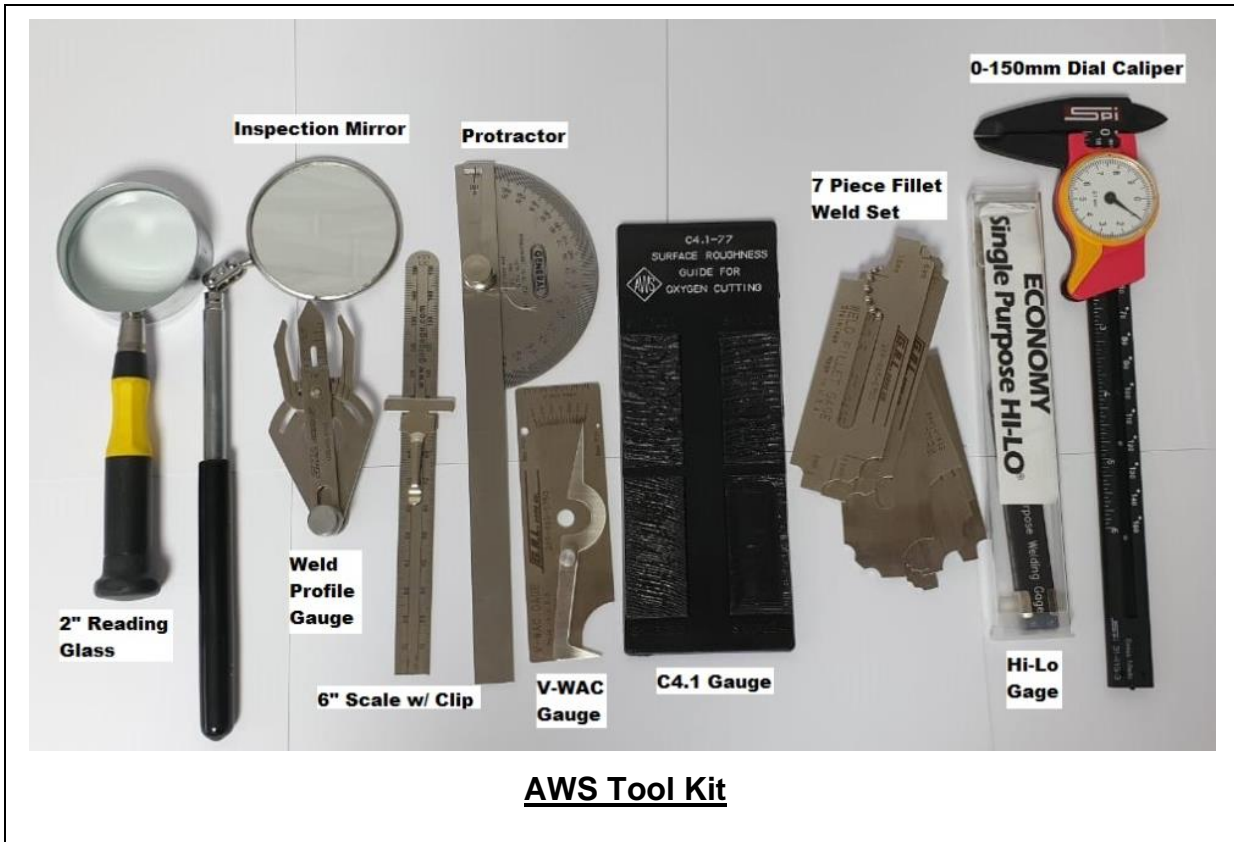
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E-Welding & Fabrication



Course Coordinator

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