COURSE OVERVIEW IE0816
General Calibration for Electrical & Mechanical Instrumentation & Equipment

Course Title
General Calibration for Electrical & Mechanical Instrumentation & Equipment

Course Date/Venue
July 19-23, 2026/TBA Meeting Room, Aloft Dharan Hotel, Al Khobar, KSA

Course Reference
IE0816

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 participants with a detailed and up-to-date overview of General Calibration for Electrical & Mechanical Instrumentation & Equipment. It covers the importance and purpose of calibration including calibration terminology and standards; the measurement science and metrology, calibration standards and compliance, calibration errors and uncertainty; the safety practices in calibration work, calibration documentation and reporting; the fundamentals of electrical measurements and calibration of multimeters; the electrical test instruments, process electrical instruments and pressure and temperature instrume nts; and the loop calibration, troubleshooting and electrical calibration equipment.

During this interactive course, participants will learn the fundamentals of mechanical measurement and calibration of dimensional measuring tools, pressure and force equipment including torque and speed instruments; the vibration and alignment instruments, mechanical calibration best practices and advanced calibration methods; the calibration quality assurance and environmental effects on calibration, instrument drift and stability; troubleshooting calibration problems through diagnosing inaccurate readings, identifying faulty reference standards, corrective action procedures and root cause analysis techniques; the calibration schedules, critical equipment identification and reliability-centered maintenance concepts; and the equipment lifecycle considerations and calibration impact on reliability.

Course Objectives/Outcomes & Benefits for the Participants

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

- Apply and gain an in-depth knowledge on general calibration for electrical and mechanical instrumentation and equipment
- Discuss the importance and purpose of calibration including calibration terminology and standards
- Identify measurement science and metrology, calibration standards and compliance as well as calibration errors and uncertainty
- Apply safety practices in calibration work as well as calibration documentation and reporting
- Explain the fundamentals of electrical measurements and carryout calibration of multimeters and electrical test instruments, process electrical instruments and pressure and temperature instruments
- Carryout loop calibration and troubleshooting and recognize the use of electrical calibration equipment
- Discuss the fundamentals of mechanical measurement and apply calibration of dimensional measuring tools, pressure and force equipment including torque and speed instruments
- Carryout vibration and alignment instruments, mechanical calibration best practices and advanced calibration methods
- Employ calibration quality assurance and identify environmental effects on calibration and instrument drift and stability
- Troubleshoot calibration problems through diagnosing inaccurate readings, identifying faulty reference standards, corrective action procedures and root cause analysis techniques
- Develop calibration schedules, apply critical equipment identification and discuss reliability-centered maintenance concepts, equipment lifecycle considerations and calibration impact on reliability

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 general calibration for electrical and mechanical instrumentation and equipment for electrical and instrumentation personnel, mechanical and maintenance personnel, quality and inspection personnel, operations personnel 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

Haward's 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**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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. Dimitry Rovas, CEng, MSc, PMI-PMP, SMRP-CMRP is a **Senior Mechanical & Maintenance Engineer** with extensive industrial experience in **Oil**, **Gas**, **Power** and **Utilities** industries. His expertise includes **Calibration** Principles, **Calibration** Standards & Compliance, Safety Practices in **Calibration Work**, **Calibration** of Multimeters & Electrical Test Instruments, Fundamentals of **Electrical Measurements**, Fundamentals of **Mechanical Measurement**, **Boiler** Troubleshooting & Safety, **Boiler** Emissions & Pollution Control, **Combustion** Analysis & Tuning Procedures, **Water Treatment** Technology, Heat Recovery Steam Generating (**HRSG**), **Impulse Tube** Installation & Inspection, **Parker Compression Fittings**, **Pipes & Fittings**, **PSV Inspection**, **Root Cause Failure Analysis**, **Tank** Design & Engineering, **Tank Shell**, **Tanks & Tank Farms**, **Vacuum Tanks**, **Gas Turbine** Operating & Maintenance, **Diesel Engine**, **Engine Cycles**, **Governors & Maintenance**, **Crankshafts** & Maintenance, **Lubrication** System Troubleshooting & Maintenance, **Engines/Drivers**, **Motor** Failure Analysis & Testing, **Motor** Predictive Maintenance, **Engine** Construction & Maintenance, **HP Fuel Pumps & Maintenance**, **Fired Equipment** Maintenance, Combustion **Techniques**, **Process Heaters**, Glass Reinforced Epoxy (**GRE**), Glass Reinforced Pipes (**GRP**), Glass Reinforced Vent (**GRV**), **Mechanical Pipe Fittings**, **Flange Joint Assembly**, Adhesive Bond Lamination, **Butt Jointing**, **Joint & Spool Production**, **Isometric Drawings**, **Flange Assembly** Method, **Fabrication & Jointing**, Jointing & Spool Fabrication, **CAESAR**, **Pipe Stress Analysis**, **Pipe Cuttings**, **Flange Bolt Tightening** Sequence, **Hydro Testing**, **Pump** Technology, Fundamentals of **Pumps**, **Pump** Selection & Installation, **Centrifugal Pumps & Troubleshooting**, **Reciprocating & Centrifugal Compressors**, **Screw Compressor**, **Compressor** Control & Protection, **Gas & Steam Turbines**, **Turbine** Operations, **Gas Turbine** Technology, **Valves**, **Process Control Valves**, **Bearings & Lubrication**, Advanced **Machinery Dynamics**, **Rubber Compounding**, **Elastomers**, **Thermoplastic**, **Industrial Rubber Products**, **Rubber** Manufacturing Systems, **Heat Transfer**, **Vulcanization Methods**, **Process Plant Shutdown & Turnaround**, **Professional Maintenance Planner**, Advanced **Maintenance Management**, **Maintenance Optimization & Best Practices**, **Maintenance Auditing & Benchmarking**, **Material Cataloguing**, **Reliability** Management, **Rotating Equipment**, **Energy Conservation**, **Energy Loss Management** in Electricity Distribution Systems, **Energy Saving**, **Thermal Power Plant** Management, **Thermal Power Plant** Operation & Maintenance, **Heat Transfer**, **Machine Design**, **Fluid Mechanics**, **Heating & Cooling Systems**, **Heat Insulation Systems**, **Heat Exchanger & Cooling Towers**, **Mechanical Erection**, **Heavy Rotating Equipment**, Material Unloading & Storage, Commissioning & Start-Up. He is currently the **Project Manager** wherein he is managing, directing and controlling all activities and functions associated with the domestic heating/cooling facilities projects.

During his life career, Mr. Rovas has gained his practical and field experience through his various significant positions and dedication as the **EPC Project Manager**, **Maintenance Manager**, **Mechanical Engineer**, **Field Engineer**, **Preventive Maintenance Engineer**, **Lead Rotating Equipment Commissioning Engineer**, **Construction Commissioning Engineer**, **Offshore Lead Maintenance Engineer**, **Researcher**, **Instructor/Trainer**, **Telecom Consultant** and **Consultant** from various companies such as the Mytilineos Aluminium Group, Podaras Engineering Studies, Metka and Diadikasia, S.A., **Hellenic Petroleum Oil Refinery** and COSMOTE.

Mr. Rovas has **Master's** degrees in **Energy Production & Management** and **Mechanical Engineering** from the **National Technical University of Athens** (**NTUA**), **Greece**. Further, he is a **Certified Instructor/Trainer**, a **Certified Maintenance and Reliability Professional** (**CMRP**) from the Society of Maintenance & Reliability Professionals (**SMRP**), **Certified Project Management Professional** (**PMI-PMP**), **Certified Six Sigma Black Belt**, **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), **Certified Construction Projects Contractor**, **Certified Energy Auditor** and a **Chartered Engineer**. Moreover, he is an active member of **American Society for Quality**, Project Management Institute (**PMI**), **Body of Certified Energy Auditors** and **Technical Chamber of Greece**. He has further received various recognition and awards and delivered numerous trainings, seminars, courses, workshops and conferences internationally.

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.

Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

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.

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, 19th of July 2026***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Calibration Principles*** *Definition & Purpose of Calibration • Importance of Calibration in Industry • Calibration Terminology & Standards • Relationship Between Accuracy, Precision & Tolerance*
0930 – 0945	*Break*
0945 – 1030	***Measurement Science & Metrology*** *Fundamentals of Metrology • SI Units & Measurement Systems • Traceability & Measurement Hierarchy • National & International Metrology Institutes*
1030 – 1130	***Calibration Standards & Compliance*** *ISO/IEC 17025 Requirements • Industry-Specific Calibration Standards • Documentation & Certification Requirements • Regulatory Compliance & Audits*
1130 – 1215	***Calibration Errors & Uncertainty*** *Types of Measurement Errors • Sources of Uncertainty in Calibration • Methods for Minimizing Errors • Uncertainty Calculation Basics*
1215 – 1230	*Break*

1230 – 1330	***Safety Practices in Calibration Work*** *Electrical Safety Precautions • Mechanical Equipment Safety Procedures • Lockout/Tagout Practices • PPE Requirements During Calibration*
1330 – 1420	***Calibration Documentation & Reporting*** *Calibration Certificates & Reports • Recording Measurement Data • Asset Identification & Tagging • Maintaining Calibration History Records*
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: Monday, 20th of July 2026

0730 – 0830	***Fundamentals of Electrical Measurements*** *Voltage, Current, Resistance & Power • AC & DC Measurement Principles • Electrical Signal Characteristics • Measurement Ranges & Limitations*
0830 – 0930	***Calibration of Multimeters & Electrical Test Instruments*** *Digital Multimeter Calibration Procedures • Clamp Meter Verification Methods • Insulation Tester Calibration • Oscilloscope Basic Verification*
0930 – 0945	*Break*
0945 – 1100	***Calibration of Process Electrical Instruments*** *Transmitters & Signal Converters • Temperature Controllers & Indicators • Signal Isolators & Conditioners • Loop-Powered Instrument Calibration*
1100 – 1215	***Calibration of Pressure & Temperature Instruments*** *RTD & Thermocouple Calibration • Pressure Transmitter Calibration Methods • Temperature Simulator Usage • Dead Weight Tester Fundamentals*
1215 – 1230	*Break*
1230 – 1330	***Loop Calibration & Troubleshooting*** *4–20 mA Loop Calibration • Signal Tracing Techniques • Common Electrical Faults Diagnosis • Troubleshooting Communication Errors*
1330 – 1420	***Use of Electrical Calibration Equipment*** *Multifunction Process Calibrators • Precision Voltage & Current Sources • Decade Resistance Boxes • Calibration Software Interfaces*
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: Tuesday, 21sr of July 2026

0730 – 0830	***Fundamentals of Mechanical Measurement*** *Linear & Angular Measurement Principles • Dimensional Measurement Concepts • Mechanical Tolerances & Fits • Surface Measurement Basics*
0830 – 0930	***Calibration of Dimensional Measuring Tools*** *Vernier Caliper Calibration • Micrometer Calibration Techniques • Dial Indicator Verification • Height & Depth Gauge Calibration*
0930 – 0945	*Break*
0945 – 1100	***Calibration of Pressure & Force Equipment*** *Pressure Gauge Calibration • Force Gauge Verification Methods • Hydraulic & Pneumatic Systems • Use of Reference Standards*
1100 – 1215	***Calibration of Torque & Speed Instruments*** *Torque Wrench Calibration • Tachometer Verification Procedures • Rotational Speed Measurement • Mechanical Load Testing Basics*

1215 – 1230	*Break*
1230 – 1330	***Vibration & Alignment Instruments*** *Vibration Meter Calibration • Shaft Alignment Verification • Balancing Instrument Basics • Condition Monitoring Concepts*
1330 – 1420	***Mechanical Calibration Best Practices*** *Environmental Control Requirements • Preventive Maintenance for Instruments • Storage & Handling of Standards • Reducing Mechanical Wear Effects*
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: Wednesday, 22nd of July 2026

0730 – 0830	***Advanced Calibration Methods*** *Automated Calibration Systems • Multi-Point Calibration Techniques • Dynamic Calibration Methods • In-Situ versus Laboratory Calibration*
0830 – 0930	***Calibration Quality Assurance*** *Quality Control Procedures • Inter-Laboratory Comparison Methods • Proficiency Testing Concepts • Internal Calibration Audits*
0930 – 0945	*Break*
0945 – 1100	***Environmental Effects on Calibration*** *Temperature Influence on Measurements • Humidity & Contamination Effects • Electromagnetic Interference Impacts • Vibration & Mechanical Disturbance Effects*
1100 – 1215	***Instrument Drift & Stability*** *Causes of Instrument Drift • Stability Analysis Methods • Drift Compensation Techniques • Establishing Recalibration Intervals*
1215 – 1230	*Break*
1230 – 1330	***Calibration Software & Digital Systems*** *Calibration Management Software • Data Acquisition Systems • Digital Recordkeeping Methods • Integration with Maintenance Systems*
1330 – 1420	***Troubleshooting Calibration Problems*** *Diagnosing Inaccurate Readings • Identifying Faulty Reference Standards • Corrective Action Procedures • Root Cause Analysis Techniques*
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 Four*

Day 5: Thursday, 23thrd of July 2026

0730 – 0830	***Practical Electrical Calibration Workshop*** *Voltage Source Calibration Exercise • Current Loop Simulation Practice • Temperature Transmitter Calibration • Documentation of Calibration Results*
0830 – 0930	***Practical Mechanical Calibration Workshop*** *Micrometer Calibration Practice • Pressure Gauge Verification Exercise • Torque Wrench Adjustment Procedures • Mechanical Measurement Reporting*
0930 – 0945	*Break*

0945 – 1100	***Calibration Planning & Scheduling*** *Developing Calibration Schedules • Critical Equipment Identification • Risk-Based Calibration Planning • Resource & Manpower Allocation*
1100 – 1230	***Equipment Maintenance & Reliability*** *Preventive Maintenance Integration • Reliability-Centered Maintenance Concepts • Equipment Lifecycle Considerations • Calibration Impact on Reliability*
1230 – 1245	*Break*
1245 – 1345	***Case Studies & Industrial Applications*** *Calibration in Oil & Gas Industry • Power Plant Instrumentation Calibration • Manufacturing Process Calibration Examples • Common Field Calibration Challenges*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
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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