COURSE OVERVIEW ME0390
Heavy Duty Gas Turbine Major Inspections

Course Title
Heavy Duty Gas Turbine Major Inspections

Course Reference
ME0390

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

Course Date/Venue

Session(s)	Date	Venue
1	April 13-17, 2025	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
2	July 20-24, 2025	Al Khobar Meeting Room, Hilton Garden Inn, Al Khobar, KSA
	October 19-23, 2025	Oryx Meeting Room, Double Tree by Hilton Al Saad, Doha, Qatar
3	December 15-19, 2025	Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

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.

This course is designed to provide participants with a detailed and up-to-date overview of Heavy Duty Gas Turbine Major Inspections. It covers the fundamentals, components, operation principles and types of gas turbine; the different level of maintenance including PM, CM & PDM; the safety standards, personal protective equipment (PPE) and procedures for site preparation; the specialized tools and equipment used during major inspections; the OEM (original equipment manufacturer) and OMM (operation and maintenance manual); the purpose, frequency and scope of major inspections and others like limits of DR according to GE standard; and the replacement of selected external components including variable geometry actuators, control unit, VG pump, VBV doors and rigging of system if applicable.

Further, the course will also discuss the replacement of lubrication and scavenge pump, pressure and temperature sensors, fuel nozzles and vibration accelerometers; the replacement of ignition components, starter, speed sensors, carbon seals, and external pipes and hoses; the removal of low- and high-pressure turbine, stage 1 nozzle module, combustor module and bearing inner race; the stage 2 high pressure turbine nozzle replacement as well as the installation of stage 1 nozzle module and high-pressure and low-pressure turbine module; and the removable of variable inlet guide vane (VIGV), stage 0 blade replacement, removable and installation of LP compressor and replacement of #1 air/oil seal.

During this interactive course, participants will learn the LP compressor stage 1-3 blade replacement and LP compressor stage 0-3 vane replacement; the auxiliary gear box check and techniques for ensuring proper alignment; the calibration of turbine components; the steps for safely commissioning and turbine post-inspection; the performance tests to verify turbine functionality; and the techniques for analyzing turbine vibrations to identify issues.

Course Objectives

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

- Apply and gain a comprehensive knowledge on heavy duty gas turbine major inspections
- Discuss the fundamentals, components, operation principles and types of gas turbine
- Identify different level of maintenance including PM, CM and PDM
- Apply the safety standards, personal protective equipment (PPE) and procedures for site preparation
- Recognize the specialized tools and equipment used during major inspections
- Use OEM (original equipment manufacturer) and OMM (operation and maintenance manual)
- Discuss the purpose, frequency and scope of major inspections and others like limits of DR according to GE standard
- Replace selected external components including variable geometry actuators, control unit, VG pump, VBV doors and rigging of system if applicable
- Replace lubrication and scavenge pump, pressure and temperature sensors, fuel nozzles and vibration accelerometers
- Replace ignition components, starter, speed sensors, carbon seals and external pipes and hoses
- Illustrate the removal of low and high-pressure turbine, stage 1 nozzle module, combustor module and bearing inner race
- Apply stage 2 high pressure turbine nozzle replacement as well as the installation of stage 1 nozzle module and high-pressure and low-pressure turbine module
- Carryout removable of variable inlet guide vane (VIGV), stage 0 blade replacement, removable and installation of LP compressor and replacement of #1 air/oil seal
- Apply LP compressor stage 1-3 blade replacement and LP compressor stage 0-3 vane replacement
- Identify auxiliary gear box check and apply techniques for proper alignment and calibration of turbine components
- Illustrate steps for safely commissioning the turbine post-inspection
- Conduct performance tests to verify turbine functionality and techniques for analyzing turbine vibrations to identify issues

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 heavy-duty gas turbine major inspections for inspection engineers, inspectors, supervisors and managers, operations managers, asset managers, maintenance engineers, reliability engineers, gas turbine technicians, maintenance planners/schedulers: personnel, safety and compliance personnel, engineers and technicians from gas turbine OEMS, quality assurance/quality control personnel.

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

Dubai Abu Dhabi	**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.
Doha	**US$ 6,000** per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Al Khobar	**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 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.

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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 **45 years** of extensive industrial experience. His wide expertise includes **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 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 & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Gas Turbine Fundamentals**: Introduction to Gas Turbine Components, Operation Principles & Types*
0900 - 0930	***Overview of Different Level of Maintenance Including PM, CM & PDM***
0930 – 0945	*Break*
0945 – 1100	***Safety Procedures & Preparations**: Safety Standards, Personal Protective Equipment (PPE) & Site Preparation*
1100 – 1200	***Tools & Equipment for Inspection**: Overview of the Specialized Tools & Equipment Used During Major Inspections and Rigging Principals*
1200 – 1215	*Break*
1215 – 1420	***Using OEM (Original Equipment Manufacturer) OMM (Operation and Maintenance Manual)***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Overview of Major Inspections with DR in Case of Delayed Maintenance**: Purpose, Frequency & Scope of Major Inspections and others Like Limits of DR According to GE Standard*
0830 - 0930	***Replacement of Selected External Components Including Variable Geometry Actuators***
0930 – 0945	*Break*
0945 – 1100	***Replacement of Hydraulic Control Unit, VG Pump, VBV Doors & Rigging of System if Applicable***
1100 – 1200	***Replacement of Lubrication & Scavenge Pump, Pressure & Temperature Sensors, Fuel Nozzles, Vibration Accelerometers***
1200 – 1215	*Break*
1215 – 1420	***Replacement of Ignition Components, Starter, Speed Sensors, Carbon Seals, & External Pipes & Hoses***
1420 - 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Removal Low Pressure Turbine***
0830 - 0930	***Removal High Pressure Turbine Module*** ***Removal Stage 1 Nozzle Module*** ***Removal Combustor Module***
0930 – 0945	*Break*
0945 – 1100	***Remove No.5 Bearing Inner Race*** ***Remove No.5 Bearing*** ***Stage 2 High Pressure Turbine Nozzle Replacement***

1100 – 1200	***Installation Combustor Module (DLN Fundamental & Combustion Theory)*** ***Installation Stage 1 Nozzle Module***
1200 – 1215	*Break*
1215 – 1420	***Installation High Pressure Turbine Module***
1420 - 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

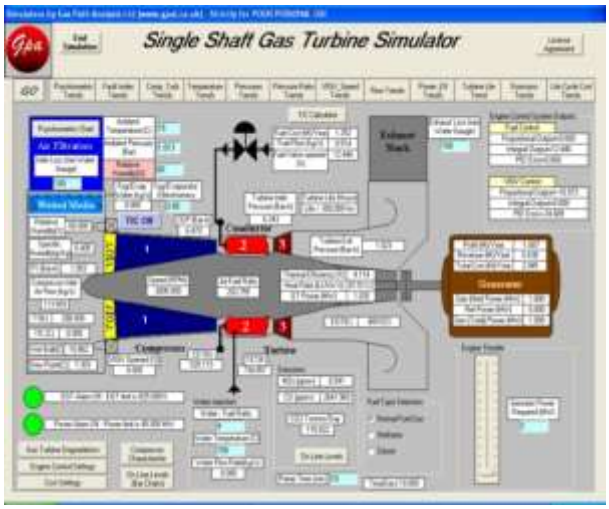
0730 – 0830	***Installation of Low-Pressure Turbine Module***
0830 - 1930	***Removable of Variable Inlet Guide Vane (VIGV)*** ***Stage 0 Blade Replacement***
0930 – 0945	*Break*
0945 – 1100	***Removable & Installation of LP Compressor*** ***Replacement of #1 Air/Oil Seal***
1100 – 1200	***LP Compressor Stage 1-3 Blade Replacement*** ***LP Compressor Stage 0-3 Vane Replacement***
1200 – 1215	*Break*
1215 – 1420	***AGB (Auxiliary Gear Box Check)***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

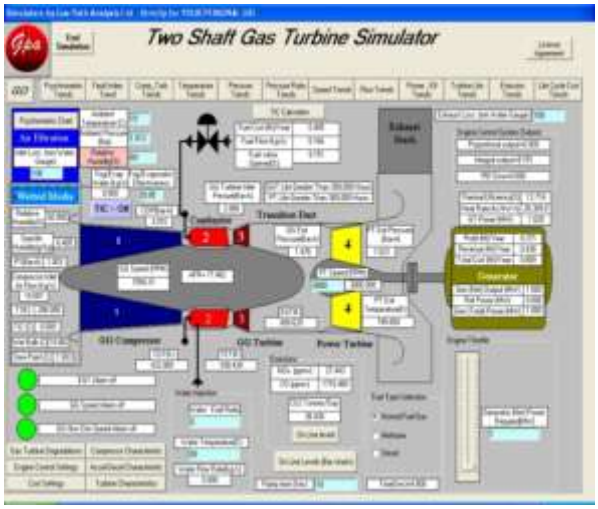
0730 – 0830	***Alignment & Calibration****: Techniques for Ensuring Proper Alignment & Calibration of Turbine Components*
0830 - 0930	***Commissioning Steps****: Steps for Safely Commissioning the Turbine Post-Inspection*
0930 – 0945	*Break*
0945 - 1100	***Performance Testing****: Procedures for Conducting Performance Tests to Verify Turbine Functionality*
1100 – 1230	***Vibration Analysis and Rotor Dynamics****: Techniques for Analyzing Turbine Vibrations to Identify Issues*
1230 – 1245	*Break*
1245 – 1345	***Group Project****: Teams Work on a Simulated Reassembly & Commissioning Exercise, Applying Learned Techniques*
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 session 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 "Single Shaft Gas Turbine Simulator" and "Two Shaft Gas Turbine Simulator".



Single Shaft Gas Turbine Simulator



Two Shaft Gas Turbine Simulator

Course Coordinator

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