

COURSE OVERVIEW IE0410

Introduction to Gas Turbine & Compressor Control

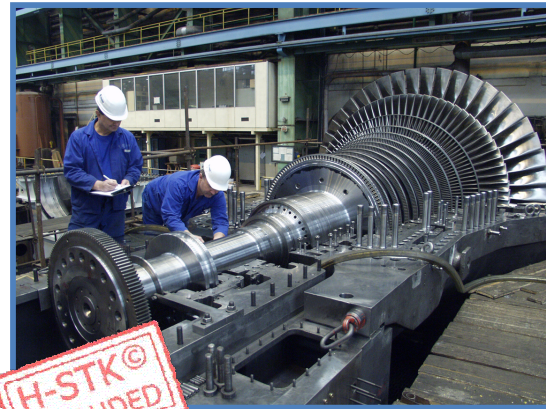
Course Title

Introduction to Gas Turbine & Compressor Control

Course Date/Venue

Session 1: April 06-10, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Session 2: September 08-12, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE



Course Reference

IE0410

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

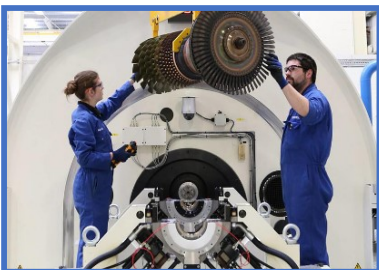


Course Description



This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of turbine and compressor controls. It will cover the compressor and turbine control solutions ranging from theoretical discussions of control algorithms to turbine mechanical retrofits. Dynamic simulations and application examples will be used to demonstrate problems and solutions.



Further, the course will also discuss the typical performance curve for a centrifugal compressor indicating the 'surge line'; the main parameters measured for the antisurge control; the basic schematic control scheme for the antisurge control of a centrifugal compressor; the requirements for load sharing of two compressors working in a parallel network t; the surge in a compressor, antisurge control and how it works; and the compressor load sharing and the main functions of a gas turbine control system.



During this interactive course, participants will learn the main control parameters for the protection of gas turbines; the schematic diagram of a governor control system and a gas turbine control; the protection scheme and starting of the sequence of a gas turbine; the system operation and the function of a servo valve used in gas turbines.

Course Objectives

Upon the successful completion of this course, participants will be able to:

- Apply and gain an in-depth knowledge on introduction to gas turbine and compressor control
- Draw a typical performance curve for a centrifugal compressor indicating the 'surge line'
- List down the main parameters measured for the antisurge control
- Apply the basic schematic control scheme for the antisurge control of a centrifugal compressor
- Identify the requirements for load sharing of two compressors working in a parallel network including reporting for a schematic diagram of the arrangement
- Define surge in a compressor as well as illustrate antisurge control and how it works
- Discuss compressor load sharing and the main functions of a gas turbine control system
- Recognize the main control parameters for the protection of gas turbines
- Draw a schematic diagram of a governor control system and a gas turbine control
- Employ the protection scheme and start the sequence of a gas turbine
- Operate the system and explain the function of a servo valve used in gas turbines

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 introduction to gas turbine and compressor control for process engineers, rotating equipment engineers, control engineers and operations supervisors.

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: -

- 
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.

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. Andrew Ladwig is a Senior Process & Mechanical Engineer with over 25 years of extensive experience within the Oil & Gas, Refinery, Petrochemical & Power industries. His expertise widely covers in the areas of Ammonia Manufacturing & Process Troubleshooting, Distillation Towers, Crude Oil Distillation, Fundamentals of Distillation for Engineers, Distillation Operation and Troubleshooting, Advanced Distillation Troubleshooting, Distillation Technology, Vacuum Distillation, Ammonia Storage & Loading Systems, Ammonia Plant Operation, Troubleshooting & Optimization, Ammonia Recovery, Ammonia Plant Safety, Hazard of Ammonia Handling, Storage & Shipping, Operational Excellence in Ammonia Plants, Fertilizer Storage Management

(Ammonia & Urea), Fertilizer Manufacturing Process Technology, Sulphur Recovery, Phenol Recovery & Extraction, Wax Sweating & Blending, Petrochemical & Fertilizer Plants, Nitrogen Fertilizer Production, Petroleum Industry Process Engineering, Refining Process & Petroleum Products, Refinery Planning & Economics, Safe Refinery Operations, Hydrotreating & Hydro-processing, Separators in Oil & Gas Industry, Gas Testing & Energy Isolations, Gas Liquor Separation, Industrial Liquid Mixing, Wax Bleachers, Extractors, Fractionation, Operation & Control of Distillation, Process of Crude ATM & Vacuum Distillation Unit, Water Purification, Water Transport & Distribution, Steam & Electricity, Flame Arrestors, Coal Processing, Environmental Emission Control, R&D of Wax Blending, Wax Molding/Slabbing, Industrial Drying, Principles, Selection & Design, Process Safety Design, Certified Process Plant Operations, Control & Troubleshooting, Operator Responsibilities, Storage Tanks Operations & Measurements, Tank Design, Construction, Inspection & Maintenance, Atmospheric Tanks, Process Plant Troubleshooting & Engineering Problem Solving, Process Plant Performance, Efficiency & Optimization, Continuous Improvement & Benchmarking, Process Troubleshooting Techniques, Oil & Gas Operation/Introduction to Surface Facilities, Pressure Vessel Operation, Plant & Equipment Integrity, Process Equipment Performance & Troubleshooting, Plant Startup & Shutdown, Startup & Shutdown the Plant While Handling Abnormal Conditions, Flare & Relief System, Process Gas Plant Start-up, Commissioning & Problem Solving, Process Liquid and Process Handling & Measuring Equipment. Further, he is also well-versed in Compressors & Turbines Operation, Maintenance & Troubleshooting, Heat Exchanger Overhaul & Testing Techniques, Balancing of Rotating Machinery (BRM), Pipe Stress Analysis, Valves & Actuators Technology, Inspect & Maintain Safeguarding Vent & Relief System, Certified Inspectors for Vehicle & Equipment, Optimizing Equipment Maintenance & Replacement Decisions, Certified Maintenance Planner (CMP), Certified Planning and Scheduling Professional (AACE-PSP), Material Cataloguing, Specifications, Handling & Storage, Steam Trap Design, Operation, Maintenance & Troubleshooting, Steam Trapping & Control, Column, Pump Technology, Pump Selection & Installation, Centrifugal Pumps Troubleshooting, Pumps Design, Selection & Operation, Pump & Exchangers, Troubleshooting & Design, Rotating Equipment Operation & Troubleshooting, Control & ESD System, Detailed Engineering Drawings, Codes & Standards, Budget Preparation, Allocation & Cost Control, Root Cause Analysis (RCA), Production Optimization, Permit to Work (PTW), Project Engineering, Data Analysis, Process Hazard Analysis (PHA), HAZOP Study, Sampling & Analysis, Training Analysis, Job Analysis Techniques, Storage & Handling of Toxic Chemicals & Hazardous Materials, Hazardous Material Classification & Storage/Disposal, Dangerous Goods, Environmental Management System (EMS), Supply Chain, Purchasing, Procurement, Logistics Management & Transport & Warehousing & Inventory, Risk Monitoring Authorized Gas Tester (AGT), Confined Space Entry (CSE), Personal Protective Equipment (PPE), Fire & Gas, First Aid and Occupational Health & Safety.

During his career life, Mr. Ladwig has gained his practical experience through his various significant positions and dedication as the **Mechanical Engineer, Project Engineer, Reliability & Maintenance Engineer, Maintenance Support Engineer, Process Engineer, HSE Supervisor, Warehouse Manager, Quality Manager, Business Analyst, Senior Process Controller, Process Controller, Safety Officer, Mechanical Technician, Senior Lecturer and Senior Consultant/Trainer** for various companies such as the Sasol Ltd., Sasol Wax, Sasol Synfuels, just to name a few.

Mr. Ladwig has a **Bachelor's** degree in **Chemical Engineering** and a **Diploma in Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)** and has delivered various trainings, workshops, seminars, courses and conferences internationally.





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

0730 - 0800	Registration & Coffee
0800 - 0815	Welcome & Introduction
0815 - 0830	PRE-TEST
0830 - 0930	Turbocompressor Control Control System Objectives
0930 - 0945	Break
0945- 1100	Turbocompressor Control (cont'd) Surge Control
1100 - 1230	Turbocompressor Control (cont'd) Compressors
1230 - 1245	Break
1245 - 1420	Turbocompressor Control (cont'd) Capacity Control
1420 - 1430	Recap
1430	Lunch & End of Day One

Day 2

0730 - 0930	Turbocompressor Control (cont'd) Integration of Capacity and Antisurge Control
0930 - 0945	Break
0945 - 1100	Compressor Control The Surge Parameter
1100 - 1230	Compressor Control (cont'd) Loadsharing Between Compressor
1230 - 1245	Break
1245 - 1420	Compressor Control (cont'd) Loadsharing Between Compressors (cont'd)
1420 - 1430	Recap
1430	Lunch & End of Day Two

Day 3

0730 - 0930	Steam Turbine Control Control Problems
0930 - 0945	Break
0945 - 1100	Steam Turbine Control (cont'd) Startup/Shutdown
1100 - 1230	Steam Turbine Control (cont'd) Overspeed Prevention



1230 - 1245	Break
1245 - 1420	Steam Turbine Control (cont'd) Mechanical Retrofits
1420 - 1430	Recap
1430	Lunch & End of Day Three

Day 4

0730 - 0930	Gas Turbine Control Control Problems
0930 - 0945	Break
0945 - 1100	Gas Turbine Control (cont'd) Startup/Shutdown
1100 - 1230	Gas Turbine Control (cont'd) Flame Out
1230 - 1245	Break
1245 - 1420	Gas Turbine Control (cont'd) Exhaust Gas Temperature Trips
1420 - 1430	Recap
1430	Lunch & End of Day Four

Day 5

0730 - 0930	Justifying Turbomachinery Control System Retrofits Reducing Trips
0930 - 0945	Break
0945 - 1100	Justifying Turbomachinery Control System Retrofits (cont'd) Increasing Production
1100 - 1230	Justifying Turbomachinery Control System Retrofits (cont'd) Reducing Energy Consumption
1230 - 1245	Break
1245 - 1330	Justifying Turbomachinery Control System Retrofits (cont'd) Reducing Energy Consumption (cont'd)
1330 - 1345	Open Forum & Final Discussion
1345 - 1400	Course Conclusion
1400 - 1415	POST-TEST
1415 - 1430	Presentation of Course Certificates
1430	Lunch & End of Course

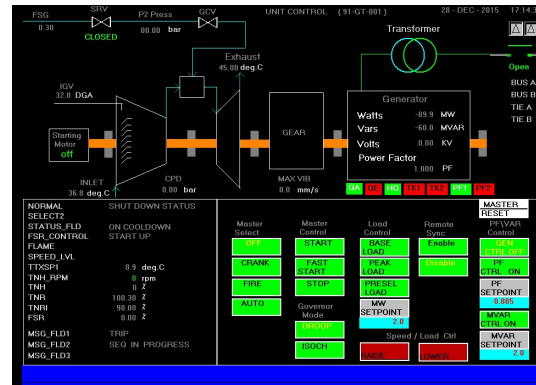
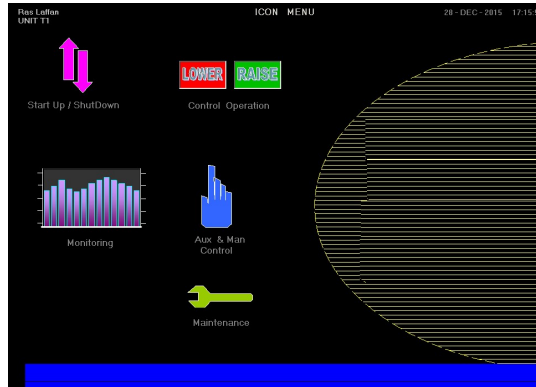


Simulator (Hands-on Practical Sessions)

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 our state-of-the-art simulators “SIM 3300 Centrifugal Compressor”, “CBT on Compressors” and “MARK V” video simulator.

SIM 3300 Centrifugal Compressor Simulator

CBT on Compressors



Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org

