COURSE OVERVIEW FE0890

Technical Integrity & Engineered Safety in Process Plant

Course Title

Technical Integrity & Engineered Safety in Process Plant

Course Reference

FE0890

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

Course Date/Venue

Session(s)	Date	Venue
1	August 18-22, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
2	November 18-22, 2024	Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

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.

The aim of the course is to give the participants a comprehensive understanding of the various aspects of Technical Integrity and Engineered Safety in Process Plant. The course combines current industry practices with engineering methods and applicable codes and standards. The course will cover the development and implementation of facility integrity and technical audits; the scope and key elements of mechanical integrity, reliability and engineered safety in process plants; and the causes and implications of industrial failures.

Further, the course will also cover the consequences of pressure and storage equipment failures in vessels, exchangers, heaters, storage tanks and piping; the codes, standards and specifications used in safety design and the integration of the operability and maintainability in design; the types and various applications used in engineering material and ensure that the guidelines in the selection methodology are being met; and the methodology and design considerations of piping system in pressure and mechanical integrity.

Moreover, the course will discuss the principles, guidelines and best practices in safeguarding systems and its safety systems key design considerations; investigating the various failures in piping, rotating equipment, pressure vessels, piping and boilers and its causes, reliability improvement and prevention; and the correct procedures involved in the inspection, testing, repair and monitoring of piping systems and equipment in refineries, petrochemical and process plants.

Participants of the course will be able to identify and assess hazards; carryout risk analysis and HAZOP studies; integrate the safety management plan using the various risk analysis processes; implement the principles of fitness-for-service and engineering critical assessment; employ the best maintenance strategies and programs; rerate piping and pressure vessels; ensure the correct application of the various methods of troubleshooting plant equipment and piping system; and carryout integrity audits.

At the completion of the course, the participants will gain enough knowledge that will help them to improve their efficiency in managing facility integrity in a professional manner. The course will help delegates to develop and implement a mechanical integrity program for critical process equipment. The course manual will be valuable for future reference.

Course Objectives

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

- Get certified as a *"Certified Technical Integrity Auditor"*
- Develop and implement a facility integrity and technical audits
- Apply the scope and key elements of mechanical integrity, reliability and engineered safety in process plants and find the causes and implications of industrial failures
- Estimate the consequences of pressure and storage equipment failures in vessels, exchangers, heaters, storage tanks and piping
- Implement the codes, standards and specifications used in safety design and integrate the operability and maintainability in design
- Determine the types and the various application used in engineering material and ensure that the guidelines in the selection methodology are being met
- Employ the methodology and design considerations of piping system in pressure and mechanical integrity
- Apply the principles, guidelines and best practices in safeguarding systems and discuss its safety systems key design considerations
- Investigate the various failures in piping, rotating equipment, pressure vessels, piping and boilers and be able to explain its causes, reliability improvement and prevention
- Apply the correct procedures involved in the inspection, testing, repair and monitoring of piping systems and equipments in refineries, petrochemical and process plants
- Identify and assess hazards and carryout risk analysis and HAZOP studies and integrate the safety management plan using the various risk analysis processes

- Implement the principles of fitness-for-service and engineering critical assessment including fracture mechanics, flaw characterization, stability, etc
- Employ the best maintenance strategies and programs and rerate piping and pressure vessels
- Ensure the correct application of the various methods of troubleshooting plant equipment and piping system and carry out integrity audits

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 course provides a wide understanding and deeper appreciation of technical integrity and engineered safety in process plant for facility integrity engineers, inspection engineers, corrosion engineers, facility engineers, reliability engineers, design engineers, maintenance engineers, safety engineers, loss prevention engineers and those engaged in the development and implementation of mechanical integrity programs for critical process equipment.

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$ 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.

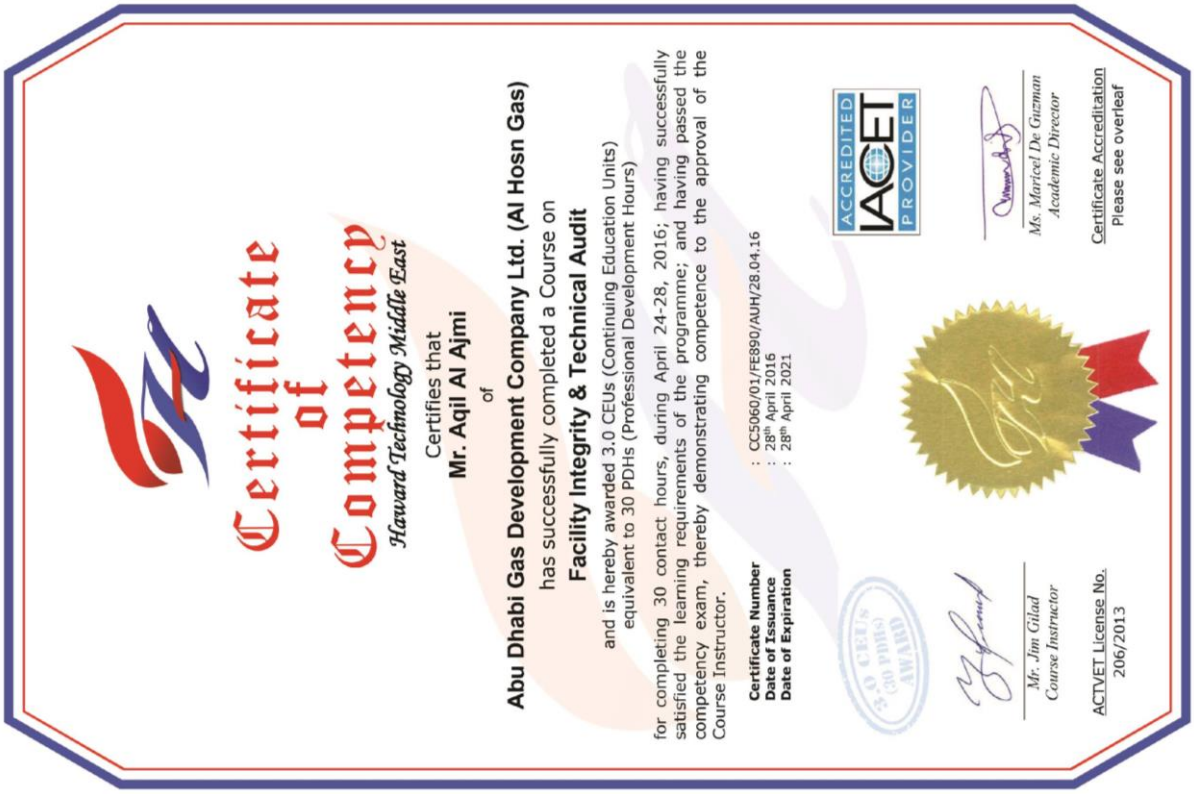
Course Certificate(s)

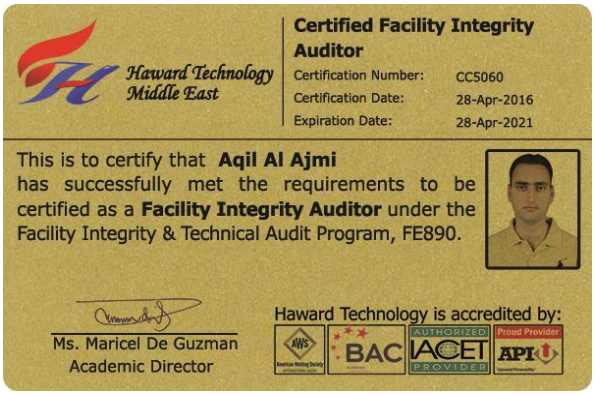
(1) Internationally recognized Competency Certificates and Plastic Wallet Cards will be issued to participants who completed a minimum of 80% of the total tuition hours and successfully passed the exam at the end of the course. Successful candidate will be certified as a *"Certified Technical Integrity Auditor"*. Certificates are valid for 5 years.

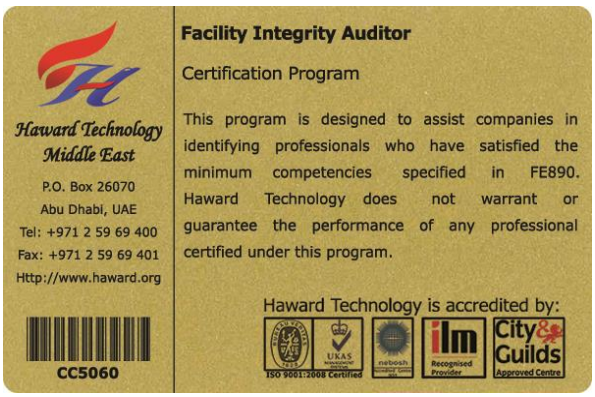
Recertification is FOC for a Lifetime.

Sample Certificates

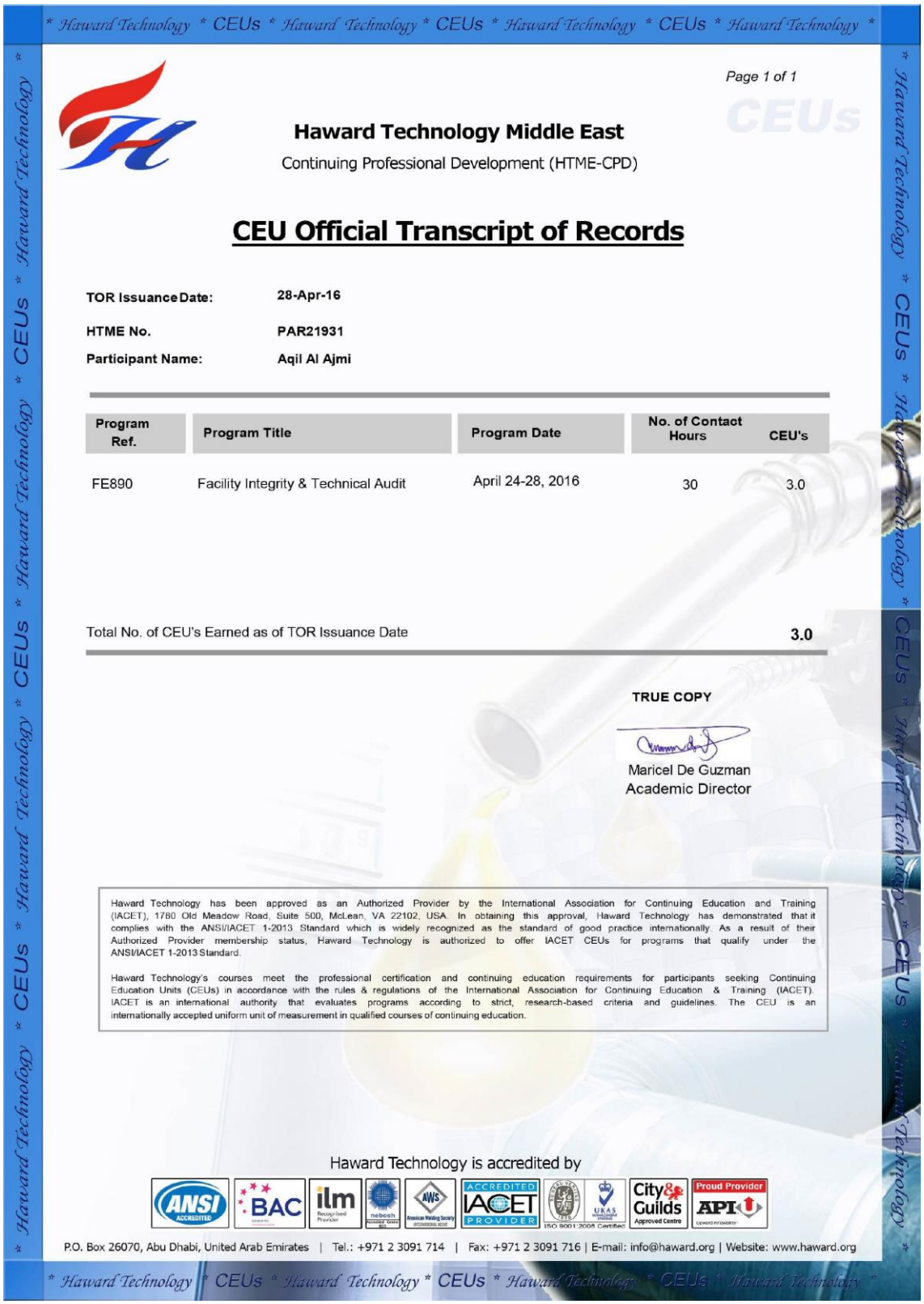
The following are samples of the certificates that will be awarded to course participants:-







(2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.



* Haward Technology * CEUs * Haward Technology * CEUs * Haward Technology * CEUs * Haward Technology *

Page 1 of 1

Haward Technology Middle East

Continuing Professional Development (HTME-CPD)

CEU Official Transcript of Records

TOR Issuance Date: 28-Apr-16

HTME No. PAR21931

Participant Name: Aqil Al Ajmi

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
FE890	Facility Integrity & Technical Audit	April 24-28, 2016	30	3.0

Total No. of CEU's Earned as of TOR Issuance Date **3.0**

TRUE COPY

Maricel De Guzman
Academic Director

Haward Technology has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2013 Standard which is widely recognized as the standard of good practice internationally. As a result of their Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2013 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 Association 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 is accredited by

P.O. Box 26070, Abu Dhabi, United Arab Emirates | Tel.: +971 2 3091 714 | Fax: +971 2 3091 716 | E-mail: info@haward.org | Website: www.haward.org

* Haward Technology * CEUs * Haward Technology * CEUs * Haward Technology * CEUs * Haward Technology *

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.

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. Brett Heuchert is a **Certified API/AWS/ASNT Inspector & Senior Inspection Engineer** with extensive industrial experience in the **Oil & Gas**, **Refineries**, **Petrochemical** and **Power** industries. His expertise lies extensively in the areas of construction, installation fabrication, erection, inspection, maintenance, operation, rating, repair, alteration, reconstruction, pigging, integrity assessment, flaw evaluation, fitness-for-service (**FFS**) of **Piping**, **Piping Inspection**, **Pipelines**, **Damage Mechanisms**, **Mechanical & Metallurgical Failure Mechanisms**, **Pressure Vessels**, **Pressure & Leak Testing**, **Storage Tank**, **Welding Technology**, **Metallurgy**, **Corrosion**, **Mechanical Integrity Assessment**, **Vibration Analysis**, Positive Material Identification (**PMI**), **Hydro-Testing**, Non Destructive Testing (**NDT**), **Refractory Inspection**. He is an **international expert** in several **codes** and **standards** relating to pipelines, piping, pressure vessel, tanks, welding and corrosion such as **API**, **ASME**, **ASNT**, **AWS**, **CWB**, **CGSB**, **ABSA** and **NACE**. He is currently the **Senior Inspector** of CNRL Horizon Crude Facility wherein he is responsible for the inspection of all exchanger related components and supervise repairs as per API 510, CNRL specs and relevant codes.

Throughout his career life, Mr. Heuchert has provided significant contributions to the industries by acquiring **key positions** such as being the **Senior Inspector**, **Quality Control Manager**, **Engineering Manager**, **QA Supervisor**, **Plant Inspector**, **Technical Mentor**, **Quality Control Inspector**, **Quality Assurance Supervisor**, **Lead QC Inspector**, **QA Inspector**, **QA Integrity Inspector**, **QC Inspector**, **Foreman**, **Pipe Fitter**, **Welder**, **Technician** and **Apprentice** for international companies such as **CNRL Horizon Crude Facility**, **Capital Power Corporation**, **ADNOC Technical Institute**, **Nexen**, **Edmonton Exchanger**, **Conpac Construction Ltd.**, **Shell Canada Ltd.**, **Acuren Group Inc.-Irving Oil Refinery**, **Gas Inspection Inc.**, **Stinger Welding Inc.-Husky Oil Refinery**, **PML Inspection Services Inc.**, **Carber Testing Inc.** and **UA Local 488 PipeFitter & Welder Union**.

Mr. Heuchert is a **Certified Instructor/Trainer**, **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), Certified Welding Inspector (**AWS**), Certified Corrosion & Materials Professional (**API 571**), Certified Pressure Vessel Inspector (**API 510**), Certified Piping Inspector (**API 570**), Certified Aboveground Storage Tank Inspector (**API 653**), Certified Welding Inspection & Metallurgy Professional (**API 577**), Certified Refractory Installation Quality Control (**API 936**), **Certified Level II Inspector** by the Canadian Welding Bureau (**CWB**) as well as a **Certified Level II Technician** in **Magnetic Particle**, **Liquid Penetrant** and **X-Ray Florescence** by the Canadian General Standards Board (**CGSB**).

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	***Overview of Technical Integrity*** *Definition, Spcope, & Key Elements-Hardware & Software Issues, Peopleware-Sound People Management • Potential Threats to Technical Integrity in a Hazardous Environment • Regulatory Requirements–SH&E, OSHA, SEVESO II • Life Cycle Implications–Design/ Operation/Maintenance, Regulatory/Industrial Interface, Training/Staff Development, Networking*
0900 – 0930	***Industrial Failures–Catastrophic Failures Do Happen*** *Statistics • Typical Examples • Causes & Implications • Learning*
0930 – 0945	*Break*
0945 – 1115	***Estimation of Consequences of Pressure & Storage Equipment Failures – Vessels, Exchangers, Heaters, Storage Tanks, & Piping*** *Types of Hazards – Release of Hazardous Substances, Bleves, Fractures, Explosions, Vapor Cloud Explosions • Guidelines & Procedures for Quantifying Consequences*
1115 – 1230	***Safety in Design I*** *Project Development & Design Bases • Appropriate Codes, Standards, Specifications, Industrial Practices • Safeguarding Premises • Calculation Methods, Heuristics*
1230 – 1245	*Break*
1245 – 1315	***Safety in Design II*** *Quality Control in Design • Inherent Safety • Reliability & Availability Premises*
1315 – 1345	***Integration of Operability & Maintainability in Design*** *Health, Safety & Environmental Considerations • Roles & Responsibilities of Engineering/Operation/Maintenance • Operating Strategies – Run Length, Shifts • Startup, Shutdown, Emergency Operating Procedures • Steam-Out & Flushing Procedures • Isolation, Blanking, Vents & Drains • Human Factor: Training Modules, Operator Training*
1345 – 1420	***Workshop I–Failure Consequences*** *Case Studies & Worked Examples*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Design Codes, Standards, Specifications, & Best Practices*** *Fit-For-Purpose Facilities • Business-Focused Facilities • Liability & Due Diligence*
0830 – 0930	***Engineering Materials I*** *Types & Application • Imperfections & Defects • Specifications & Standards*
0930 – 0945	*Break*
0945 – 1030	***Engineering Materials II*** *Behaviour of Metals Under Stress • Degradation Processes • Selection Methodology & Guidelines*

1030 – 1115	***Design of Major Plant Equipment–Methodology & Key Considerations*** *Pressure Vessels • Heat Exchangers • Fired Heaters & Boilers*
1115 – 1230	***Design of Piping Systems I–Pressure Integrity*** *Methodology & Key Considerations*
1230 – 1245	*Break*
1245 – 1330	***Design of Piping Systems II–Mechanical Integrity*** *Special Design Considerations–Dynamic & Transients Loadings • Piping Flexibility & Supports*
1330 – 1420	***Workshop II–Failures Due to Design Deficiencies*** *Case Studies*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Safeguarding Systems I-Guidelines & Best Practices*** *Principles • Guidelines & Best Practices • Documentation • Safeguarding Systems Integrity–Design*
0830 – 0930	***Safeguarding Systems II–Safety Systems Key Design Considerations*** *Safeguarding Safety Systems–SIL • Relief & Depressuring Systems • Safeguarding Systems Integrity & Effectiveness*
0930 – 0945	*Break*
0945 – 1030	***Failures In Piping & Equipment Pressure Vessels, Piping & Boilers*** *Degradation Processes • Failures in Pressure Equipment • Piping System Vibration & Failure*
1030 – 1115	***Failures In Rotating Equipment*** *Causes • Monitoring & Analysis • Reliability Improvement*
1115 – 1230	***Failure Prevention*** *FMEA • Causal Analysis*
1230 – 1245	*Break*
1245 – 1330	***Testing & Monitoring*** *NDT Methods • Inspection, Testing & Repair Regulations, Codes, & Practices • Evaluation of Inspection Data*
1330 – 1420	***Workshop III–Failures Due to Improper Operation & Maintenance*** *Case Studies*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Hazard Identification & Assessment***
0830 – 0930	***Risk Analysis, Assessment & Management*** *Probability Basics • Probabilistic Risk Assessment Concepts & Methodology • Fault Tree & Event Tree Analysis • Quantitative Risk Assessment Concepts & Methodology*
0930 – 0945	*Break*
0945 – 1100	***Integrated Safety Management Plan*** *Hazard & Effect Management Plan • Bow-Tie Process • Risk Matrix • Determining Acceptability of Risk*

1100 – 1230	***Hazard & Operability (HAZOP) Reviews*** *Process & Guidelines*
1230 – 1245	*Break*
1245 – 1315	***Management of Change*** *Change Control Policy & Procedures • Process Changes • Plant Changes • Assessment & Authorization • Documentation • Illustrative Change Control Procedure*
1315 – 1345	***Workshop IV*** *Case Studies - Failures Due to Improper Management of Change System*
1345 – 1420	***Workshop IV (cont'd)*** *Examples of HAZOP Reviews*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0830	***Fitness-For-Service/Engineering Critical Assessments*** *API RP 579 Fitness-For-Service • Fracture Mechanics & Mode of Failure of Material • Flaw Characterization, Growth, Stability • Factors of Safety • Disposition versus Repair*
0830 – 0930	***Maintenance Strategies & Programs*** *Risk-Based Inspection • Reliability-Centered Maintenance*
0930 – 0945	*Break*
0945 – 1030	***Rerating Piping & Pressure Vessels***
1030 – 1115	***Engineering Information & Systems Management***
1115 – 1200	***Troubleshooting Plant Equipment & Piping Systems*** *Guidelines & Best Practices • Resonance & Vibration • Excessive Thrusts & Moments on Connected Equipment • Leakage at Joints • Excessive Piping Sag, Disengagement of Piping from Supports • Interference with Expansion & Contraction*
1200 – 1215	*Break*
1215 – 1245	***Technical Integrity Audits*** *Guidelines & Procedures • Checklists • Implementation Plans*
1245 – 1300	***Workshop IV–Examples of HAZOP Reviews***
1300 – 1315	***Course Conclusion***
1315 – 1415	***COMPETENCY EXAM***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes the following real-life case studies and exercise:-

Course Coordinator

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