COURSE OVERVIEW RE0131
AI-Enhanced Predictive Maintenance Professional

Course Title
AI-Enhanced Predictive Maintenance Professional

Course Date/Venue
Please refer to page 3

Course Reference
RE00131

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 AI-Enhanced Predictive Maintenance Professional. It covers the traditional versus predictive maintenance and the artificial intelligence (AI) and machine learning (ML); the types of machine learning covering supervised, unsupervised and reinforcement learning; the data science for predictive maintenance, basic data storage concepts and data pipeline concepts; the sensor technologies and data acquisition in industrial settings including data quality and data integrity; the data cleaning and transformation techniques and extracting relevant features from sensor data; and the data visualization.

Further, the course will also discuss the regression models for predicting remaining useful life (RUL), classification models for failure prediction, time-series analysis for anomaly detection and model selection and evaluation metrics; the model persistence and model deployment basics, real-time data streaming and processing; the anomaly detection and alerting systems; and integrating with CMMS and other maintenance systems.

During this interactive course, participants will learn the deployment strategies for predictive maintenance models, cloud based predictive maintenance and calculating ROI and other key performance indicators (KPIs); the economic impact assessment of predictive maintenance and ethical considerations in AI-powered predictive maintenance; the security challenges and best practices; and the future trends in AI-enhanced predictive maintenance.

Course Objectives

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

- Apply and gain an in-depth knowledge on AI-enhanced predictive maintenance
- Differentiate traditional versus predictive maintenance and discuss the basics of artificial intelligence (AI) and machine learning (ML)
- Identify the types of machine learning covering supervised, unsupervised and reinforcement learning
- Discuss data science for predictive maintenance, basic data storage concepts and data pipeline concepts
- Recognize sensor technologies and data acquisition in industrial settings including data quality and data integrity
- Carryout data cleaning and transformation techniques, extracting relevant features from sensor data and data visualization
- Illustrate regression models for predicting remaining useful life (RUL), classification models for failure prediction, time-series analysis for anomaly detection and model selection and evaluation metrics
- Describe model persistence and model deployment basics, real-time data streaming and processing
- Apply anomaly detection and alerting systems and integrate with CMMS and other maintenance systems
- Employ deployment strategies for predictive maintenance models, cloud based predictive maintenance and calculating ROI and other key performance indicators (KPIs)
- Recognize economic impact assessment of predictive maintenance and ethical considerations in AI-powered predictive maintenance
- Discuss the security challenges and best practices and future trends in AI-enhanced predictive maintenance

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 AI-enhanced predictive maintenance for maintenance engineers and technicians, reliability engineers, operations managers and supervisors, data scientists and analysts interested in industrial applications, IT professionals supporting maintenance systems, plant managers and those who are interested in applying AI to improve asset reliability.

Course Date/Venue

Session(s)	Date	Venue
1	April 27-may 01, 2005	Meeting Plus 9, City Centre Rotana, Doha Qatar
2	July 07-11, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
3	October 12-16, 2025	Crowne Meeting Room, Crowne Plaza Al Khobar, KSA
4	December 07-11, 2025	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

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.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Fee

Abu Dhabi Al Khobar Dubai	**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.

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.

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. Manuel Dalas, MSc, BSc, is a **Senior Mechanical & Maintenance Engineer** with over **25 years** of industrial experience in **Oil**, **Gas**, **Refinery**, **Petrochemical**, **Power** and **Nuclear** industries. His wide expertise includes **Root Cause Failure Analysis**, Rotating Equipment Maintenance & **Failure Analysis**, **Failure Analysis Methodologies** for Mechanical Engineers, **Reliability Centered Maintenance & Root Cause Failure Analysis**, **Machinery Failure Analysis**, Prevention & Troubleshooting, **Machinery** Failure Analysis, Machinery Root Cause Failure Analysis **(RCFA)**, **Machinery Diagnostics & Root Cause Failure** Analysis, **Water Well**, **Transfer & Network Systems** Operation, **Water Network Systems & Pumping** Stations, **Instrument**, **Control & Protection** Systems, Plumbing **Network Systems** & Building, **Water Distribution & Pump** Station, **Boiler** Operation & Water Treatment, **Pipeline** Simulations, **Pipe Stress Analysis** using **CAESAR II**, **CAESAR II** Application, **Piping Dynamic**, **Static & Other Special Analysis** using **CAESAR II**, **Expansion Joints** Design & Analysis, **Impact Load** Analysis, **Piping** Systems, **Piping Codes** Used in **CAESAR II**, **RFP Pipe** Maintenance & Repair, **Relief Valve** Analysis, Safety **Relief Valve**, **Tanks & Tank Farms**, **Atmospheric Tanks**, **Seismic Loads**, **Tank Shell**, **Tank Failure**, **Vacuum Tanks**, **Tank Design & Engineering**, **Tank Contractions**, **Material Cataloguing**, **Maintenance Planning & Scheduling**, Reliability Centered Maintenance (**RCM**), **Reliability Maintenance**, **Condition Based Maintenance & Condition Monitoring**, **Asset & Risk** Management, **Vibration Condition Monitoring & Diagnostics** of Machines, **Vibration & Predictive** Maintenance, Reliability Improvement & Vibration Analysis for Rotating Machinery, Effective Maintenance **Shutdown & Turnaround** Management, **Engineering Codes & Standards**, **Rotating Equipment** Maintenance, **Mechanical** Troubleshooting, **Static Mechanical Equipment** Maintenance, **Plant Reliability & Maintenance** Strategies, **Centrifugal Pumps** Maintenance & Troubleshooting, **Fans**, **Blowers & Compressors**, **Process Control Valves**, Piping Systems & Process Equipment, **Gas Turbines & Compressors** Troubleshooting, Advanced **Valve** Technology, **Pressure Vessel** Design & Analysis, **Steam & Gas Turbine**, **High Pressure Boiler** Operation, **FRP Pipe** Maintenance & Repair, **Centrifugal & Positive Displacement Pump** Technology Troubleshooting & Maintenance, **Rotating Machinery** Best Practices, **Diesel Engine** Operations, Maintenance & Troubleshooting, **PD Compressor & Gas Engine** Operation & Troubleshooting, **Hydraulic Tools & Fitting**, **Mass & Material BalanceTank Farm & Tank Termin**al Safety & Integrity Management, **Process Piping** Design, Construction & **Mechanical Integrity**, **Stack & Noise** Monitoring, **HVAC & Refrigeration** Systems, BPV Code, Section VIII, Division 2, **Facility Planning & Energy** Management, Hoist - Remote & Basic **Rigging & Slinging**, **Mobile Equipment** Operation & Inspection, **Heat Exchanger**, **Safety Relief Valve**, **PRV & POPRV/PORV**, **Bearing & Lubrication**, **Voith Coupling** Overhaul, **Pump & Valve** Technology, **Lubrication** Inspection, **Process Plant** Optimization, Rehabilitation, Revamping & Debottlenecking, Engineering Problem Solving and **Process Plant** Performance & Efficiency. Currently, he is the **Technical Consultant** of the **Association of Local Authorities of Greater Thessaloniki** where he is in charge of the mechanical engineering services for piping, pressure vessels fabrications and ironwork.

During his career life, Mr. Dalas has gained his practical and field experience through his various significant positions and dedication as the **Technical Manager**, **Project Engineer**, **Safety Engineer**, **Deputy Officer**, **Instructor**, **Construction Manager**, **Construction Engineer**, **Consultant Engineer**, **Water Network Systems Engineer**, **Maintenance Engineer** and **Mechanical Engineer** and **CAESAR II Application Consultant** for numerous multi-billion companies including the **Biological Recycling Unit** and the **Department of Supplies** of **Greece**, **Alpha Bank Group**, **EMKE S.A**, **ASTE LLC** and **Polytechnic College of Evosmos**.

Mr. Dalas has a **Master's** degree in **Energy System** from the **International Hellenic University, School of Science & Technology** and a **Bachelor's** degree in **Mechanical Engineering** from the **Mechanical Engineering Technical University of Greece** along with a **Diploma** in **Management & Production Engineering** from the **Technical University of Crete**. Further, he is a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), a **Certified Project Manager Professional** (**PMI-PMP**), a **Certified Instructor/Trainer**, a **Certified Energy Auditor** for **Buildings**, **Heating & Climate Systems**, a **Member** of the **Hellenic Valuation Institute** and the **Association of Greek Valuers** and a **Licensed Expert Valuer Consultant** of the **Ministry of Development and Competitiveness**. He has further delivered numerous trainings, courses, seminars, conferences and workshops internationally.

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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Introduction to Predictive Maintenance: Concepts, Benefits & Challenges***
0900 – 0930	***Traditional versus Predictive Maintenance: A Comparative Analysis***
0930 – 0945	*Break*
0945 – 1015	***Basics of Artificial Intelligence (AI) & Machine Learning (ML): Key Concepts***
1015 – 1045	***Types of Machine Learning: Supervised, Unsupervised & Reinforcement Learning***
1045 – 1130	***Data Science for Predictive Maintenance***
1130 – 1215	***Basic Data Storage Concepts***
1215 – 1230	*Break*
1230 – 1330	***Data Pipeline Concepts***
1330 – 1420	***Case Studies: Successful Predictive Maintenance Implementations***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Sensor Technologies & Data Acquisition in Industrial Settings***
0830 – 0930	***Data Quality & Data Integrity: Importance & Challenges***
0930 – 0945	*Break*
0945 – 1100	***Data Cleaning & Transformation Techniques***
1100 – 1215	***Feature Engineering: Extracting Relevant Features from Sensor Data***
1215 – 1230	*Break*
1230 – 1330	***Data Visualization: Techniques for Exploring & Understanding Data***
1330 – 1420	***Hands-on Lab: Data Preprocessing Using Python (e.g., Pandas, NumPy)***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Regression Models for Predicting Remaining Useful Life (RUL)***
0830 – 0930	***Classification Models for Failure Prediction***
0930 – 0945	*Break*
0945 – 1100	***Time-Series Analysis for Anomaly Detection***
1100 – 1215	***Model Selection & Evaluation Metrics***
1215 – 1230	*Break*
1230 – 1330	***Hands-on Lab: Building Predictive Maintenance Models using Python (e.g., Scikit-learn)***
1330 – 1420	***Model Persistence & Model Deployment Basics***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

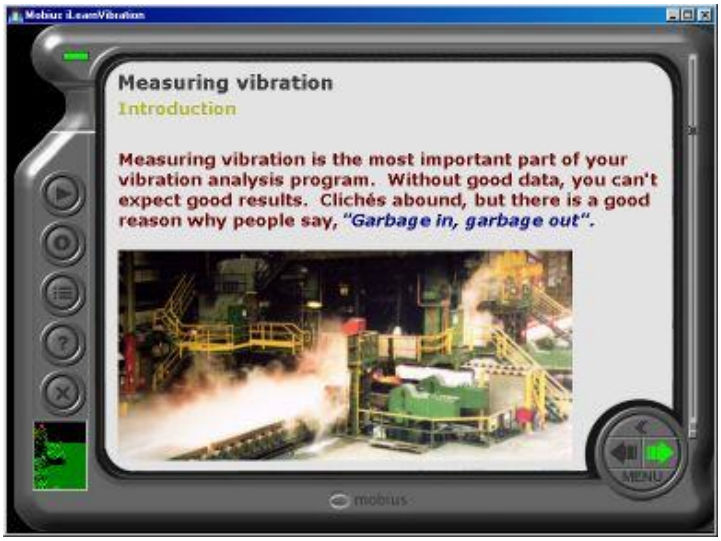
0730 – 0830	***Real-Time Data Streaming & Processing***
0830 – 0930	***Anomaly Detection & Alerting Systems***
0930 – 0945	*Break*
0945 – 1100	***Integration with CMMS & Other Maintenance Systems***
1100 – 1215	***Deployment Strategies for Predictive Maintenance Models***
1215 – 1230	*Break*
1230 – 1330	***Hands-on Lab: Implementing a Real-Time Monitoring System***
1330 – 1420	***Cloud Based Predictive Maintenance Concepts***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0830	***Calculating ROI & other Key Performance Indicators (KPIs)***
0830 – 0930	***Economic Impact Assessment of Predictive Maintenance***
0930 – 0945	*Break*
0945 – 1100	***Ethical Considerations in AI-Powered Predictive Maintenance***
1100 – 1215	***Security Challenges & Best Practices***
1215 – 1230	*Break*
1230 – 1300	***Future Trends in AI-Enhanced Predictive Maintenance (e.g., Edge AI, Digital Twins)***
1300 – 1345	***Group Project: Developing a Predictive Maintenance Implementation Plan***
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 sessions 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 state-of-the-art simulator "iLearnVibration".



iLearnVibration Simulator

Course Coordinator

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