COURSE OVERVIEW RE0131
Predictive Maintenance (PrdM) in an Age of AI/ML

Course Title
Predictive Maintenance (PrdM) in an Age of AI/ML

Course Date/Venue
July 28-August 01, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

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 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 hig
  her education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

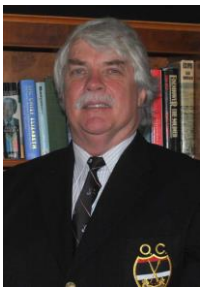
Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** 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. Den Bazley, PE, BSc, is a **Senior Mechanical Maintenance Engineer** with over **25 years** of industrial experience in **Oil**, **Gas**, **Refinery**, **Petrochemical**, **Power** and **Utilities** industries. His wide expertise includes **Condition Based Monitoring**, **Piping System**, **Process Equipment**, **Mechanical Integrity**, **Maintenance Management**, **Reliability Management**, **Reliability Centred Maintenance** (**RCM**), Total Plant Maintenance (**TPM**) and Reliability-Availability-Maintainability (**RAM**), **Engineering Drawings, Codes & Standards**, **P&ID Reading, Interpretation & Developing**. His experience covers **Design**, **Construction** and **Maintenance** of **Storage Tank**, **Hydraulic Control Valves**, **rotating and static equipment** including **Safety Relief Valves**, **Boilers**, **Pressure Vessels**, **Tanks**, **Heat Exchangers**, **Bearings**, **Compressors**, **Pumps**, **Pipelines**, **Motors**, **Turbines**, **Gears**, **Lubrication Technology** and **Mechanical Seals**. Further, he has experience in Waste Water Treatment, **Water Treatment**, **Welding**, **NDT**, Vehicle Fleet and Budgeting & Cost Control. He is well-versed in **CMMS** and various International Standards including ISO 14001.

During his career life, Mr. Bazley has gained his practical and field experience through his various significant positions and dedication as the **Engineering Manager**, **Maintenance Manager**, **Construction Manager**, **Project Engineer**, **Mechanical Engineer**, **Mechanical Services Superintendent**, **Quality Coordinator** and **Planning Manager** for numerous international companies like **ESSO**, **FFS Refinery**, Dorbyl Heavy Engineering (VECOR), Vandenbergh Foods (Unilever), **Engen Petroleum**, Royle Trust and **Pepsi-Cola**.

Mr. Bazley is a **Registered Professional Engineer** and has a **Bachelor** degree in **Mechanical Engineering**. Further, he is a **Certified Engineer** (Government Certificate of Competency GCC Mechanical Pretoria), a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), an active member of the **Institute of Mechanical Engineers** (**IMechE**) and has delivered numerous trainings, courses, seminars and workshops 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.

Accommodation

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

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 workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Monday, 28th of July 2025***

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: ***Tuesday, 29th of July 2025***

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: ***Wednesday, 30th of July 2025***

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: ***Thursday, 31st of July 2025***

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: ***Friday, 01st of August 2025***

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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