COURSE OVERVIEW RE0132
Predictive Maintenance with MATLAB

Course Title
Predictive Maintenance with MATLAB

Course Date/Venue
Please refer to page 2

Course Reference
RE0132

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 Predictive Maintenance with MATLAB. It covers the concepts, benefits and challenges of predictive maintenance; the MATLAB environment and interface including data types, variables, and basic operations in MATLAB; the data import, export and data visualization in MATLAB and basic scripting and functions in MATLAB; the MATLAB toolboxes relevant to predictive maintenance; the data cleaning and handling missing values, data transformation and normalization and signal processing concepts; the time-domain analysis in MATLAB and frequency-domain analysis in MATLAB; and the feature extraction from signals using MATLAB's signal processing toolbox.

During this interactive course, participants will learn the machine learning concepts and algorithms, regression models in MATLAB and classification models in MATLAB; the time-series analysis and forecasting in MATLAB and model evaluation and performance metrics; the fault detection and anomaly detection in MATLAB, fault diagnostics and root cause analysis and generating synthetic data for training models; deploying MATLAB models for real-time monitoring and integrating MATLAB with external systems; and creating dashboards and reports in MATLAB.

Course Objectives

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

- Apply and gain an in-depth knowledge on predictive maintenance with MATLAB
- Discuss the concepts, benefits and challenges of predictive maintenance
- Explain MATLAB environment and interface including data types, variables, and basic operations in MATLAB
- Employ data import, export and data visualization in MATLAB and identify basic scripting and functions in MATLAB
- Recognize MATLAB toolboxes relevant to predictive maintenance and apply data cleaning and handling missing values, data transformation and normalization and signal processing concepts
- Carryout time-domain analysis in MATLAB, frequency-domain analysis in MATLAB and feature extraction from signals using MATLAB's signal processing toolbox
- Explain machine learning concepts and algorithms, regression models in MATLAB and classification models in MATLAB
- Apply time-series analysis and forecasting in MATLAB and model evaluation and performance metrics
- Carryout fault detection and anomaly detection in MATLAB, fault diagnostics and root cause analysis and generate synthetic data for training models
- Deploy MATLAB models for real-time monitoring, integrate MATLAB with external systems and create dashboards and reports in MATLAB

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 predictive maintenance with MATLAB for maintenance engineers, reliability engineers, mechanical engineers, electrical engineers, data analysts and those who are interested in using MATLAB for predictive maintenance applications.

Course Date/Venue

Session(s)	Date	Venue
1	February 02-06, 2026	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
2	May 03-07, 2026	Crowne Meeting Room, Crowne Plaza Al Khobar, KSA
3	August 09-13, 2026	Safir Meeting Room, Divan Istanbul, Turkey
4	November 15-19, 2026	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

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.

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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Introduction to Predictive Maintenance: Concepts, Benefits & Challenges***
0900 – 0930	***MATLAB Environment & Interface***
0930 – 0945	*Break*
0945 – 1030	***Data Types, Variables & Basic Operations in MATLAB***
1030 – 1130	***Data Import & Export in MATLAB (e.g., from CSV, Excel, Databases)***
1130 – 1215	***Data Visualization in MATLAB (Plots, Graphs)***
1215 – 1230	*Break*
1230 – 1330	***Basic Scripting & Functions in MATLAB***
1330 – 1420	***MATLAB Toolboxes Relevant to Predictive Maintenance***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Data Cleaning & Handling Missing Values in MATLAB***
0830 – 0930	***Data Transformation & Normalization***
0930 – 0945	*Break*
0945 – 1030	***Signal Processing Concepts***
1030 – 1130	***Time-Domain Analysis in MATLAB (e.g., Statistical Features)***
1130 – 1215	***Frequency-Domain Analysis in MATLAB (e.g., FFT, Spectrograms)***

1215 – 1230	Break
1230 – 1330	***Feature Extraction from Signals using MATLAB's Signal Processing Toolbox***
1330 – 1420	***Hands-on Lab: Data Preprocessing & Signal Analysis.***
1420 – 1430	***Recap***
1430	Lunch & End of Day Two

Day 3

0730 – 0830	***Machine Learning Concepts & Algorithms***
0830 – 0930	***Regression Models in MATLAB (e.g., Linear Regression, Support Vector Regression)***
0930 – 0945	Break
0945 – 1100	***Classification Models in MATLAB (e.g., Decision Trees, Support Vector Machines)***
1100 – 1215	***Time-Series Analysis & Forecasting in MATLAB***
1215 – 1230	Break
1230 – 1330	***Model Evaluation & Performance Metrics***
1330 – 1420	***Hands-on Lab: Building & Evaluating Machine Learning Models***
1420 – 1430	***Recap***
1430	Lunch & End of Day Three

Day 4

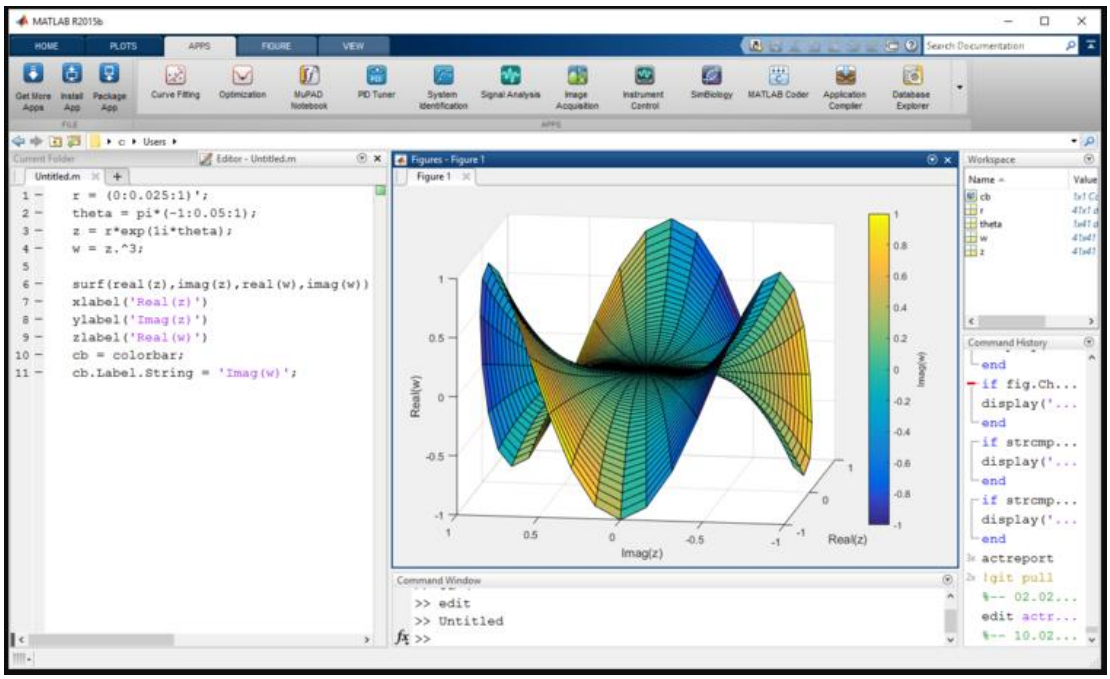
0730 – 0830	***Fault Detection & Anomaly Detection in MATLAB***
0830 – 0930	***Fault Diagnostics & Root Cause Analysis***
0930 – 0945	Break
0945 – 1100	***Simscape/Simulink for System Simulation***
1100 – 1215	***Building Simulation Models for Predictive Maintenance***
1215 – 1230	Break
1230 – 1330	***Generating Synthetic Data for Training Models***
1330 – 1420	***Hands-on Lab: Fault Detection & Simulation***
1420 – 1430	***Recap***
1430	Lunch & End of Day Four

Day 5

0730 – 0830	***Deploying MATLAB Models for Real-Time Monitoring***
0830 – 0930	***Integrating MATLAB with External Systems (e.g., Databases, Sensors)***
0930 – 0945	Break
0945 – 1100	***Creating Dashboards & Reports in MATLAB***
1100 – 1215	***Advanced Topics: Deep Learning for Predictive Maintenance (if applicable)***
1215 – 1230	Break
1230 – 1300	***Case Studies: Real-World Applications of MATLAB in Predictive Maintenance***
1300 – 1345	***Group Project: Developing a Predictive Maintenance Solution***
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 "MATLAB" Simulator".



MATLAB Simulator

Course Coordinator

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