



COURSE OVERVIEW RE0804
ISO Vibration Certification Level III (CAT III-ISO 18436)
Training, Exam & Certification (Mobius Institute)

Course Title

ISO Vibration Certification Level III (CAT III-ISO 18436) Training, Exam & Certification (Mobius Institute)

Course Date/Venue

Option 1: January 12-16, 2025 or,
Option 2: January 19-23, 2025
Venue: Business Meeting, Crowne Plaza Al Khobar , Al Khobar, KSA

Course Reference

RE0804

Course Duration/Credits

Five days/30 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.

Condition monitoring has evolved as a significant opportunity to increase profits within a wide variety of industries. Vibration Analysis is one of the most powerful condition-based maintenance technologies, and the cornerstone of many predictive maintenance programs. It is also widely utilized for troubleshooting and fault diagnosis of machinery and structures. In recent years, much emphasis has been given to on-line or permanently installed vibration monitoring for machinery that is inaccessible, critical to process, and/or very expensive.

This course is designed to provide participants with a detailed and up-to-date overview of ISO Vibration Level III in accordance with ISO 18436. It covers the low pass, band pass, high pass and band stop filters include sampling, aliasing, dynamic range and signal-to-noise ratio; the resolution, Fmax, data collection time, averaging, windowing and leakage and order tracking; the cross-channel measurements, correlation and coherence, collecting data and time waveform analysis; diagnosing unbalance, misalignment, bent shaft, eccentricity, cocked bearing, resonance, looseness, and other conditions; the phase analysis covering collecting data and bubble diagrams; and the natural frequencies and resonances dynamics, mass, stiffness, and damping as well as SDOF and MDOF.

During this interactive course, participants will learn the systematic testing for natural frequencies, operating deflection shape (ODS) analysis, modal analysis, finite element analysis (FEA) and correcting resonances; the rolling element bearing fault detection, journal bearing fault detection and electric motor testing; the unique fault conditions, flow turbulence, recirculation and cavitation of pumps, fans, and compressors; and the gearbox fault detection, corrective action, running a successful condition monitoring program, acceptance testing and ISO standards.

Course Objectives

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

- Get certified as a “*Vibration Analyst: Category III*” in accordance with ISO 18436 standards from Mobius Institute
- Discuss low pass, band pass, high pass and band stop filters include sampling, aliasing, dynamic range and signal-to-noise ratio
- Illustrate resolution, Fmax, data collection time, averaging, windowing and leakage and order tracking
- Apply cross-channel measurements, correlation and coherence, collecting data and time waveform analysis
- Diagnose unbalance, misalignment, bent shaft, eccentricity, cocked bearing, resonance, looseness and other conditions
- Carryout phase analysis covering collecting data and bubble diagrams
- Interpret natural frequencies and resonances dynamics, mass, stiffness and damping as well as SDOF and MDOF
- Employ systematic testing for natural frequencies, operating deflection shape (ODS) analysis, modal analysis, finite element analysis (FEA) and correcting resonances
- Apply rolling element bearing fault detection, journal bearing fault detection and electric motor testing
- Discuss the unique fault conditions, flow turbulence, recirculation and cavitation of pumps, fans and compressors
- Carryout gearbox fault detection, corrective action, running a successful condition monitoring program, acceptance testing and review of ISO standards

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 ISO vibration analysis for those who are confident with spectrum analysis but wishes to push on and learn more about signal processing, time waveform and phase analysis, cross-channel testing, machine dynamics and fault correction. This includes maintenance, reliability, rotating equipment, process, control and instrumentation personnel, engineers, maintenance supervisors, mechanical foremen, specialists and other technical staff.



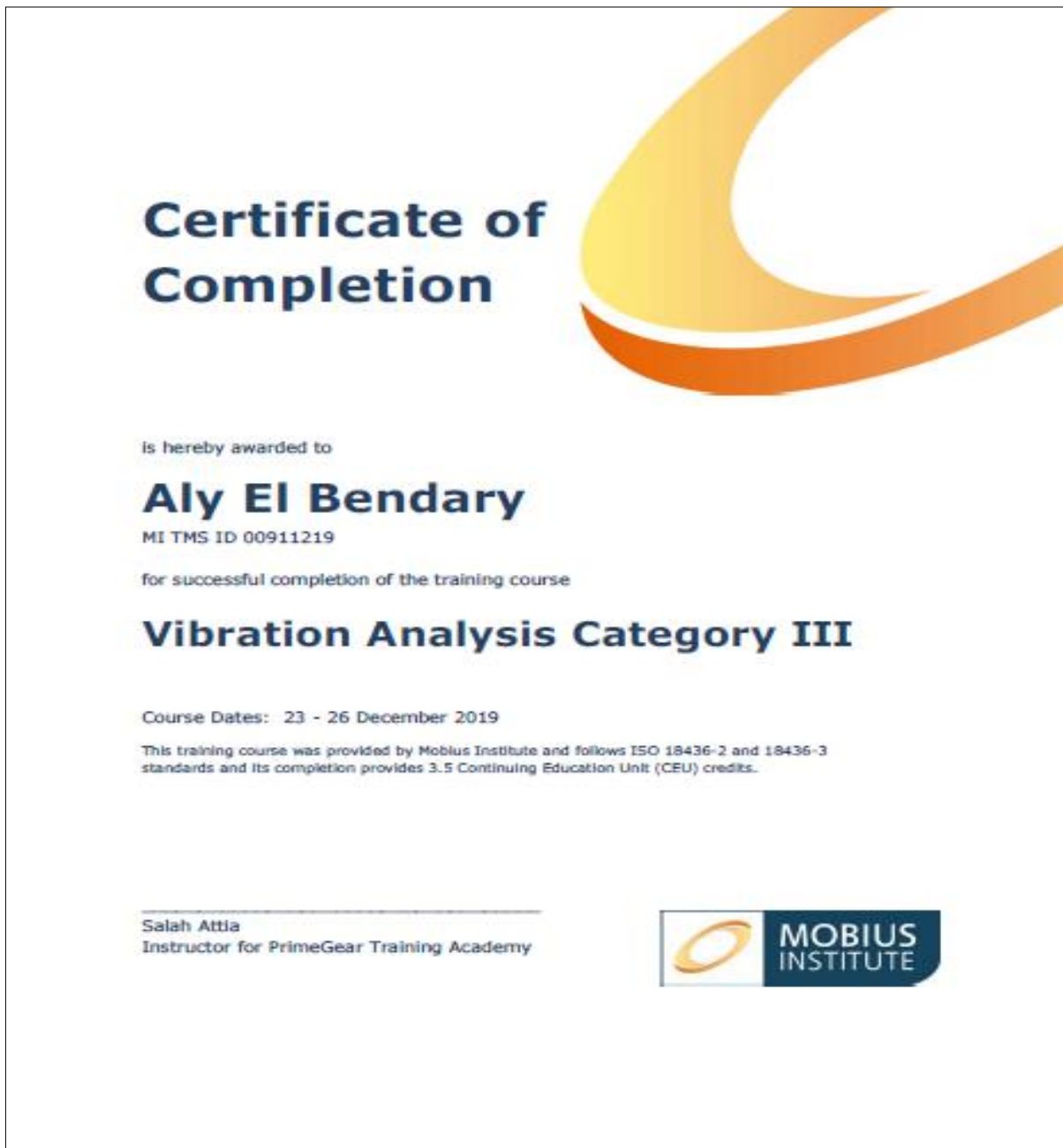
Exam Eligibility & Structure

Exam candidates shall have the following minimum prerequisites:-

- 38 hours Training course completed
- 36-months of vibration analysis experience, verified by an independent person
- Have previously been certified to VCAT-II by a MIBoC approved certification body
- Pass the exam

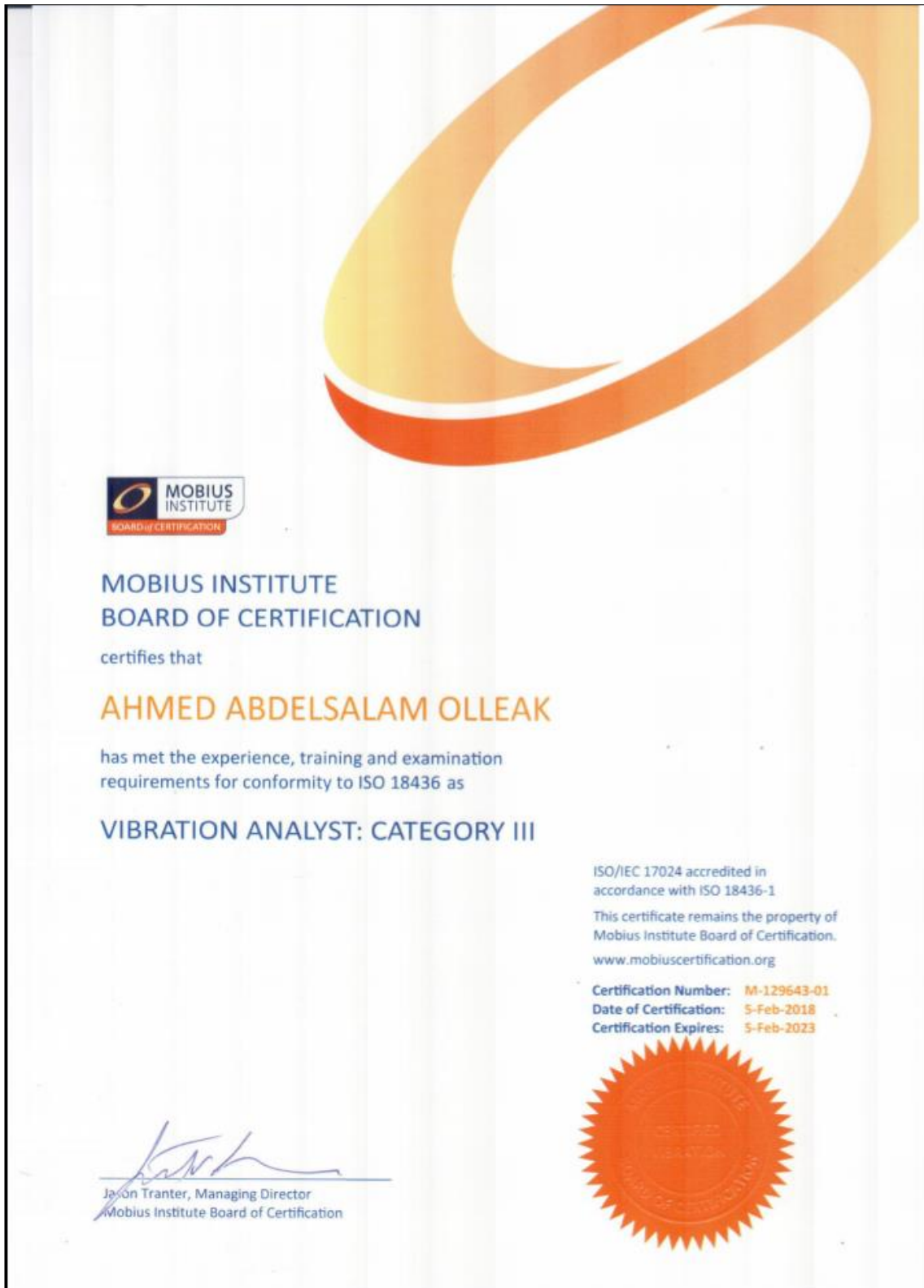
Course Certificate(s)

(1) Internationally recognized certificates will be issued to all participants of the course.





- (2) Mobius Institute will certify the participants who will pass the examination for **Vibration Analyst: Category III.**



- (3) 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.

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Haward Technology Middle East
Continuing Professional Development (HTME-CPD)

CEUs

CEU Official Transcript of Records

TOR Issuance Date: 15-Nov-23
HTME No. 74851
Participant Name: Waleed Al Habeeb

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
RE0804	ISO Vibration Certification Level III (CAT III-ISO 18436) Training, Exam & Certification (Mobius Institute)	November 11-15, 2023	30	3.0

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

TRUE COPY

Jaryl Castillo
 Academic Director

Haward Technology has been approved as an Accredited Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2018 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 1-2018 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




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Certificate Accreditations

Certificates are accreditation 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.

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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.

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Mobius Institute Board of Certification (MIBoC) Scheme

Mobius Institute Board of Certification (**MIBoC**) is ISO/IEC 17024 and ISO 18436-1 accredited and provides globally recognised certification for Vibration Analysis, Infrared Thermography, Ultrasound and Asset Reliability. MIBoC is an impartial and independent entity that is directed by scheme and technical committees to ensure that its certification meets or exceeds the requirements defined by the applicable ISO standards. Haward Technology is a partner of various Mobius Training Partners.



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. Riyadh Biso, MBA, BSc, ISO-VA, ARP-I, ADNT-NDT, LEEA, is a **Senior Mechanical Engineer** with extensive years of industrial experience within the **Oil & Gas, Refinery** and **Petrochemical** industries. His expertise widely covers in the areas of **Machine Reliability, Rotating Equipment Faults & Malfunctions Troubleshooting, Diagnostic Techniques, Vibration Analysis, Oil Analysis, Boroscopy & Corrective Actions, Machinery Balancing, Machinery Alignment, Vibration Isolation, Resonance Control, Structural Analysis, Modal Testing Techniques, ODS Testing, Torsional Vibration Measurements, Condition Monitoring Systems, Machinery Fault Diagnostics, Bearing Technology, Mounting & Dismounting of Roller Element Bearings** and Machine Diagnostic. He is also well versed in MS Office (Word, Excel, Power Point), AutoCAD, Mechanical Desktop & AutoDesk, Matlab, Ansys, Simulink, Vibration Analysis & Machinery Diagnostics Software - SPM Instruments, GE Scouts, SPM Intellinova, FAG Bearing Analyzer III, Detector III, FAG DetectX1s, FAG ProCheck, FAG Pro Torq, Bearinx - Bearing Calculation Software, ADRETM software (GE Bentley Nevada PL), VB8 – Commtest, and ERP (CRM, Salesforce, Service & Sales Management Modules).

During his career life, Mr. Riyadh has gained his practical and field experience through his various significant positions and dedication as the **Asset Management Specialist, Technical Manager, Sales & Services Manager, Managing Partner, Technical/Business Development Manager, Mechanical Engineer - Condition Monitoring & Machine Diagnostic, Condition Monitoring Engineer** and **Certified Trainer/Instructor** for UPDS, Samir Odeh Engineering Solutions and Schaeffler, just to name a few.

Mr. Riyadh has a **Master's** degree in **Business Administration** (Quality & Innovation Management) from the **University of Leicester, UK**, a **Bachelor's** degree in **Mechanical Engineering (Mechatronics)** and a **Diploma** in **IAM Engineering Services, Roller Bearing Maintenance & Application Engineering**. Further, he is a **Certified Mobius ISO Category I-IV Instructor/Examiner, Certified Asset Reliability Practitioner (ARP-I)** and has delivered numerous trainings, courses, seminars, conferences and workshops internationally.

Course Fee

US\$ 8,000 per Delegate + **VAT**. This rate includes H-STK® (Howard 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.



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 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: Sunday, 22nd of December 2024

0730 - 0800	Registration & Coffee
0800 - 0815	Welcome & Introduction
0815 - 0830	PRE-TEST
0830 - 1030	Signal Processing Filters: Low Pass, Band Pass, High Pass, Band Stop • Sampling, Aliasing, Dynamic Range • Signal-to-Noise Ratio • Resolution, Fmax, Data Collection Time • Averaging: Linear, Overlap, Peak Hold, Time Synchronous • Windowing and Leakage • Order Tracking • Cross-Channel Measurements • Correlation and Coherence
1030 - 1045	Break
1045 - 1130	Time Waveform Analysis Collecting Data - Ensuring You Have the Correct Setup • When should You Use Time Waveform Analysis? • Diagnosing Unbalance, Misalignment, Bent Shaft, Eccentricity, Cocked Bearing, Resonance, Looseness, and Other Conditions
1130 - 1330	Phase Analysis Collecting Data • Bubble Diagrams • Diagnosing Unbalance, Misalignment, Bent Shaft, Eccentricity, Cocked Bearing, Resonance, Looseness, and Other Conditions
1330 - 1345	Break
1345 - 1420	Dynamics (Natural Frequencies & Resonance) Natural Frequencies and Resonances • Mass, Stiffness and Damping • SDOF and MDOF
1420 - 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	End of Day One



Day 2: Monday, 23rd of December 2024

0730 – 0930	Testing for Natural Frequencies <i>Run-up Coast Down Tests • Bode Plots and Nyquist (Polar) Plots • Impact and Bump Tests</i>
0930 – 0945	<i>Break</i>
0945 – 1230	Operating Deflection Shape (ODS) Analysis <i>Can We Prove the Existence of a Natural Frequency? • Visualizing Vibration • Setting up the Job • Collecting Phase Readings Correctly • Interpreting the Deflection shape • Using Motion Amplification</i>
1230 – 1245	Modal Analysis & Introduction to FEA <i>How does Modal Analysis Differ from ODS? • How does Finite Element Analysis (FEA) Differ from Modal Analysis • A Quick Review of the Modal Testing Process</i>
1245 – 1300	<i>Break</i>
1300 – 1420	Correcting Resonances <i>the Effect of Mass and Stiffness • Beware of Nodal Points • Adding Damping • A 'Trial and Error' Approach • A 'Scientific' Approach • Isolation • Tuned Absorbers and Tuned Mass Dampers</i>
1420 – 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow</i>
1430	<i>End of Day Two</i>

Day 3: Tuesday, 24th of December 2024

0730 – 0930	Rolling Element Bearing Fault Detection <i>Why do Bearings Fail? • Cocked Bearing, Sliding on the Shaft or Inside the Housing, Looseness • EDM and DC Motors and VFDs • Bearing Frequencies and What to do When you Don't Have All the Details • The Four Stages of Bearing Degradation • Ultrasound • High-Frequency Detection Techniques • Shock Pulse, Spike Energy, Peak Flue and Other Techniques • Demodulation/Enveloping • Selecting the Correct Filter Settings • Spectrum Analysis • Time Waveform Analysis • Low-Speed Bearings</i>
0930 – 0945	<i>Break</i>
0945 – 1230	Journal Bearing Fault Detection <i>What are Journal Bearings? • Measuring Displacement • Introduction to Orbit Plots • Using Your Analyzer to Acquire Orbit Plots • Introduction to Centerline Diagrams • Eccentricity Ratio • Glitch Removal • How the Orbit Changes with Pre-Load, Unbalance, Misalignment, Instabilities, Oil Whirl and Whip</i>
1230 – 1245	Electric Motor Testing <i>How do Motors Work? • Diagnosing a Range of Fault Conditions: Eccentric Rotor, Eccentric Stator, Soft Foot, Phasing, Broken Rotor Bars, Rotor Bar and Stator Slot Pass Frequencies • Motor Current Analysis</i>
1245 – 1300	<i>Break</i>
1300 – 1420	Pumps, Fans & Compressors <i>Unique Fault Conditions • Flow Turbulence, Recirculation, Cavitation</i>
1420 – 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow</i>
1430	<i>End of Day Three</i>



Day 4: Wednesday, 25th of December 2024

0730 – 0930	Gearbox Fault Detection <i>Spectrum Analysis versus Time Waveform Analysis • Wear Particle Analysis • Gearmesh, Gear Assembly Phase Frequency (and Common Factors) • Tooth Load, Broken Teeth, Gear Eccentricity and Misalignment, Backlash and More</i>
0930 – 0945	<i>Break</i>
0945 – 1230	Corrective Action <i>General Maintenance Repair Activities • Review of the Balancing Process and ISO Balance Grades • Review of Shaft Alignment Procedures</i>
1230 – 1245	Running a Successful Condition Monitoring Program <i>Defining the Program • Setting Baselines • Setting Alarms: Band, Envelope/Mask, Statistical • Setting Goals and Expectations (Avoiding Common Problems) • Report Generation • Reporting Success Stories</i>
1245 – 1300	<i>Break</i>
1300 – 1330	Acceptance Testing
1330 – 1420	Review ISO Standards
1420 – 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow</i>
1430	<i>End of Day Four</i>

Day 5: Thursday, 26th of December 2024

0730 – 0930	Review & & MOCK EXAM
0930 – 0945	<i>Break</i>
0945 – 1345	Vibration Institute Category III Exam (4 Hours)
1345 – 1400	Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
1400 – 1415	POST-TEST
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>End of Course</i>

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”.



Course Coordinator

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