

Course Name

Measuring Mechanical Vibrations and Methods of Measurement

Sector Name

Mechanical Engineering

Document Type

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Measuring Mechanical Vibrations and Methods of Measurement

Course Introduction

Measuring Mechanical Vibrations and Methods of Measurement is a fundamental discipline for ensuring the reliability and longevity of industrial machinery. In modern manufacturing, understanding Vibration Characteristics is the key to effective Condition Monitoring and preventing catastrophic structural failure. This course provides a technical deep dive into how we quantify oscillatory motion and the specialized instrumentation used to capture high-accuracy data.

Throughout the Measuring Mechanical Vibrations program, you will explore the physical principles of Frequency, Amplitude, and Phase. We cover the primary Methods of Measurement, including the use of Piezoelectric Accelerometers, Laser Doppler Vibrometers, and Eddy Current Proximity Probes.

Whether you are performing Rotational Balance checks on turbines or analyzing Resonance in civil structures, this course equips you with the expertise to interpret Time-Domain and Frequency-Domain (FFT) signals for advanced Predictive Maintenance and Fault Diagnosis.



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Measuring Mechanical Vibrations and Methods of Measurement

Target Audience

- ✓ Automotive Engineer
- ✓ Boiler Engineer
- ✓ Ceramics Engineer
- ✓ Equipment Engineer
- ✓ High-Pressure Engineer
- ✓ Marine Engineer
- ✓ Mechanical Design Engineer
- ✓ Mechanical Engineer
- ✓ Naval Architect
- ✓ Pipeline Engineer
- ✓ Power Engineer
- ✓ Rotating Equipment Engineer
- ✓ Senior Mechanical Engineer
- ✓ Turbine Engineer
- ✓ Validation Engineer

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Measuring Mechanical Vibrations and Methods of Measurement

Learning Objectives

- ✓ Familiarizing with the concepts of mechanical vibrations
- ✓ Understanding vibration measurement systems
- ✓ Being able to interpret the mechanical vibrations test requirements
- ✓ Studying the response of discrete and distributed systems to various inputs
- ✓ Learning how to design systems for vibration suppression and machine condition monitoring

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Measuring Mechanical Vibrations and Methods of Measurement

Course Outline

✓ 01 DAY ONE

Introduction to Mechanical Vibrations

- ✓ Sources of Vibratory Energy In Machines, Vehicles, and Structures
- ✓ Effects of Vibration and Noise
- ✓ Rigid Body Motion vs. Structural Response
- ✓ Single Degree of Freedom System
- ✓ Free and Forced Vibration

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Course Outline

✓ 02 DAY TWO

Free Vibration and Natural Frequency

- ✓ Response to Forced Vibration
- ✓ Transmissibility Ratio
- ✓ Single Degree of Freedom System – Resonance
- ✓ Single Degree of Freedom System – Isolation
- ✓ Damping
- ✓ Multiple (Mechanical) Degrees of Freedom
- ✓ Continuous Systems
- ✓ Single Frequency Excitation
- ✓ Multi-Frequency Excitation
- ✓ Critical Frequencies
- ✓ Continuous Systems
- ✓ The Specialized Language of Vibration
- ✓ Terms, Definitions, and Equations of Motion
- ✓ Peak vs. RMS Values
- ✓ A Helpful Vibration Calculator
- ✓ Random Vibration

Measuring Mechanical Vibrations and Methods of Measurement

Course Outline

✓ **03 DAY THREE**

Introduction To Non-Periodic Motion

- ✓ Narrow Band Response
- ✓ Measurement and Analysis of Random Vibration
- ✓ Vibration measurement
- ✓ Optical and Fixed Reference Measurements
- ✓ Seismic Transducers Measuring Vibratory Displacement
- ✓ Optical Methods
- ✓ Eyeball Estimating
- ✓ Optical Wedge
- ✓ Parallel Limits
- ✓ Measuring Microscopes
- ✓ Displacement Sensors
- ✓ Non-Contacting Sensors

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Course Outline

✓ **04 DAY FOUR**

Displacement Meters

- ✓ Measuring Vibratory Velocity
- ✓ Velocity Pickups
- ✓ Integration of Acceleration Signals
- ✓ Differentiation of Displacement Signals
- ✓ Laser Doppler Vibrometers
- ✓ Measuring Vibratory Acceleration
- ✓ Servo Accelerometers

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✓ 05 DAY FIVE

Wire Strain Gage Accelerometers

- ✓ Piezoresistive (PR) Accelerometers
- ✓ Piezoelectric (PE) Accelerometers
- ✓ Isotron (IEPE) Accelerometers
- ✓ Variable Capacitance (VC) Accelerometers
- ✓ Measuring Vibratory Force

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
July 5, 2027	July 9, 2027	5 days	4250.00 \$	UAE , Dubai
Oct. 4, 2027	Oct. 8, 2027	5 days	4950.00 \$	France , Paris
Jan. 4, 2027	Jan. 8, 2027	5 days	4250.00 \$	UAE , Dubai
Jan. 11, 2027	Jan. 15, 2027	5 days	4250.00 \$	UAE , Abu Dhabi

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