

AT8007 NOISE, VIBRATION AND MEASUREMENTS

DETAILED SYLLABUS

UNIT I FUNDAMENTALS OF ACOUSTICS AND NOISE, VIBRATION

Theory of Sound—Predictions and Measurement, Sound Sources, Sound Propagation in the Atmosphere, Sound Radiation from Structures and Their Response to Sound, General Introduction to Vibration, Vibration of Simple Discrete and Continuous Systems, Random Vibration, Response of Systems to Shock, Passive Damping

UNIT II EFFECTS OF NOISE, BLAST, VIBRATION, AND SHOCK ON PEOPLE

General Introduction to Noise and Vibration Effects on People and Hearing Conservation, Sleep Disturbance due to Transportation Noise Exposure, Noise-Induced Annoyance, Effects of Infrasound, Low-Frequency Noise, and Ultrasound on People, Auditory Hazards of Impulse and Impact Noise, Effects of Intense Noise on People and Hearing Loss, Effects of Vibration on People, Effects of Mechanical Shock on People, Rating Measures, Descriptors, Criteria, and Procedures for Determining Human Response to Noise.

UNIT III TRANSPORTATION NOISE AND VIBRATION—SOURCES, PREDICTION, AND CONTROL

Introduction to Transportation Noise and Vibration Sources, Internal Combustion Engine Noise Prediction and Control—Diesel, Exhaust and Intake Noise and Acoustical Design of Mufflers, Tire/Road Noise—Generation, Measurement, and Abatement, Aerodynamic Sound Sources in Vehicles—Prediction and Control, Transmission and Gearbox Noise and Vibration Prediction and Control, Brake Noise Prediction and Control.

UNIT IV INTERIOR TRANSPORTATION NOISE AND VIBRATION SOURCES - PREDICTION AND CONTROL

Introduction to Interior Transportation Noise and Vibration Sources, Automobile, Bus, and Truck Interior Noise and Vibration Prediction and Control, Noise and Vibration in Off-Road Vehicle Interiors-Prediction and Control,

UNIT V NOISE AND VIBRATION TRANSDUCERS, ANALYSIS EQUIPMENT, SIGNAL PROCESSING, AND MEASURING TECHNIQUES

General Introduction to Noise and Vibration Transducers, Measuring Equipment, Measurements, Signal Acquisition, and Processing, Acoustical Transducer Principles and Types of Microphones, Vibration Transducer Principles and Types of Vibration Transducers, Sound Level Meters, Noise Dosimeters, Analyzers and Signal Generators, Equipment for Data Acquisition, Noise and Vibration Measurements, Determination of Sound Power Level and Emission Sound Pressure Level, Sound Intensity Measurements, Noise and Vibration Data Analysis, Calibration of Measurement Microphones, Calibration of Shock and Vibration Transducers, Metrology and Traceability of Vibration and Shock Measurements.

OBJECTIVES:

- knowledge in basic of vibration and noise

- Understanding the effect of noise on human comfort and environment
- Knowing the methods of vibration and noise measurement.

TEXT BOOKS:

1. Clarence W. de Silva, "Vibration Monitoring, Testing, and Instrumentation" CRC Press, 2007
2. David A. Bies and Colin H. Hansen "Engineering Noise Control: Theory and Practice" Spon Press, London, 2009

REFERENCES:

1. Allan G. Piersol, Thomas L. Paez "Harris' Shock and Vibration Handbook", McGraw-Hill, New Delhi, 2010
2. Colin H Hansen "Understanding Active Noise Cancellation", Spon Press, London 2003
3. Matthew Harrison "Vehicle Refinement: Controlling Noise and Vibration in Road Vehicles", Elsevier Butterworth-Heinemann, Burlington, 2004