Mechanical Vibrations

Course Code: ME-421	Credit Hrs: 3-0

Text Books & Reference Books:

1. W. T. Thomson and M. D. Dahleh, Theory of Vibration with Applications
2. S. S. Rao,Mechanical Vibrations
3. D. J. Inman,Engineering Vibration

Course Outline:

• Introduction: Fundamentals of Vibrations, Degrees of Freedom, Discrete and Continuous
Systems, SHM, Vibration Analysis Procedure

• Single Degree of Freedom Systems - Free Vibratory Systems: Newton's Method, Energy
Method, Viscously Damped Free Vibration & Logarithmic Decrement, Springs and dampers in
Combination.

• Single Degree of Freedom Systems – Forced Vibratory Systems: Forced Harmonic Vibration,
Rotating Unbalance, Base Excitation, Vibration Isolation, Energy Dissipation by Damping &
Whirling of Rotating shafts.

• Transient Vibration: Impulse Response Function, Response to an Arbitrary Input

• Systems with Two Degrees of Freedom: The Normal Mode Analysis, Free Vibration Analysis of
an Undamped Systems: Coordinate Coupling, Free Vibration Analysis of Damped systems:
Forced Harmonic Vibration of an Undamped Systems & Forced Harmonic Vibration of
Damped Systems

• Multi Degree of Freedom Systems: Eigen Values and Eigen Vectors, Dunkerley's Method,

Rayleigh’s Method, Influence co-efficient, Matrix Iteration Method & Stodola’s Method, Holzer’s
Method

Assessments:

Quizzes, Assignments, Mid Exam, Final Exam