



# Techno India NJR Institute of Technology

Academic Administration of Techno NJR Institute

## Syllabus Deployment

Name of Faculty	: Mrs. Nisha Patel	Subject Code: 6ME4-22
Subject	: Vibration Engineering	Sem: VI
Department	: Mechanical Engineering	
Total No. of Hours Planned:	25 Hrs	Max. Marks: 75(IA: 45, ETE: 30)

### COURSE OUTCOMES:

At the end of this course students will be able to:

- CO1: Design on experiment to measure the periodic time of free-vibrations of single degree and multi degree of freedom system
- CO2: Analyze the mechanical vibrations to determine the material properties of mechanical elements used
- CO3: Understand the fundamental of vibration measurement in the real world.

SN	Agenda	Exposure
1	<b>Single DOF System</b>	To verify relation $T = 2\pi (l/g)$ for a simple pendulum.
2	<b>Compound Pendulum</b>	To determine radius of gyration of compound pendulum.
3	<b>Bifilar Suspension</b>	To determine the radius of gyration of given bar by using bifilar suspension.
4	<b>Undamped 1 DOF System</b>	To determine natural frequency of a spring mass system.
5		Equivalent spring mass system.
6	<b>Free 1 DOF Torsional Vibration</b>	To determine natural frequency of free torsional vibrations of single rotor system. i. Horizontal rotor ii. Vertical rotor
7	<b>Multi DOF System</b>	To verify the Dunkerley's rule.
8	<b>Damped 1 DOF System</b>	Performing the experiment to find out damping coefficient in case of free damped torsional vibration
9	<b>Trifiler Suspension</b>	To conduct experiment of trifiler suspension.

10	<b>Forced Harmonic Excitation</b>	Harmonic excitation of cantilever beam using electro-dynamic shaker and determination of resonant frequencies
11	<b>Vibration Measurement</b>	Study of Vibration measuring instruments.
12	<b>Virtual Lab Tour</b>	Perform study of the following using Virtual Lab <a href="http://www.vlab.co.in/">http://www.vlab.co.in/</a>
13	<b>Forced Vibration of a Cantilever Beam</b>	Forced Vibration of a Cantilever Beam with a Lumped Mass at Free End: To calculate the natural freq and damping ratio for forced vibration of a single DOF cantilever beam system, experimentally; and compare the results with theoretical values.
14	<b>Harmonically Excited Forced Vibration of a Single DOF System</b>	: To analyze the forced vibration response of a single DOF system at diff damping ratio and frequency ratio.
15	<b>Virtual Lab Tour</b>	Perform study of the following using Virtual Lab <a href="http://www.vlab.co.in/">http://www.vlab.co.in/</a>
16	<b>Forced Vibration</b>	Forced Vibration of a Cantilever Beam with a Lumped Mass at Free End: To calculate the natural freq and damping ratio for forced vibration of a single DOF cantilever beam system, experimentally; and compare the results with theoretical values.
17	<b>Harmonically Excited Forced Vibration of a Single DOF System</b>	To analyze the forced vibration response of a single DOF system at diff damping ratio and frequency ratio.

### **TEXT/REFERENCE BOOKS**

1. RAO S.S., "MECHANICAL VIBRATIONS", PEARSON EDUCATION, 2ND INDIAN REPRINT
2. AMBEKAR A.G., "MECHANICAL VIBRATIONS AND NOISE ENGINEERING", PRENTICE-HALL OF INDIA PVT. LTD.