GOPAL KRISHNA COLLEGE OF ENGINEERING AND TECHNOLOGY

GOURAHARI VIHAR, PO: RANIPUT, JEYPORE – 764 005

LESSON PLAN

Name of the Subject: MECHANICAL VIBRATION
Name of the Faculty: TAPAN KUMAR NAYAK
Subject Code:MEPC3005
Course Structure:3-0-0
Semester: 6th Semester **Branch:Mechanical**
Semester From: December to April **No. of Weeks:** 15 Weeks

Week	Day	Theory Topics	Class
1st	1st	Introduction to vibration and its importance	1
	2nd	Classification of vibrations	1
	3rd	Basic elements: mass, stiffness, damping	1
2nd	1st	Undamped free vibration (SDOF systems)	1
	2nd	Equation of motion (equilibrium method)	1
	3rd	Energy method and Rayleigh's method	1
3rd	1st	Natural frequency and stiffness of spring elements	1
	2nd	Numerical problems (Module-I)	1
	3rd	Revision session	1
4th	1st	Viscous damping and damping laws	1
	2nd	Damped free vibration	1
	3rd	Logarithmic decrement	1
5th	1st	Underdamped, critically damped and overdamped systems	1

Week	Day	Theory Topics	Class
	2nd	Numerical problems (Module-II)	1
	3rd	Tutorial session	1
6th	1st	Forced vibration with harmonic excitation	1
	2nd	Steady-state solution with damping	1
	3rd	Complex algebra method	1
7th	1st	Resonance and sharpness of resonance	1
	2nd	Reciprocating and rotating unbalance	1
	3rd	Base excitation and vibration isolation	1
8th	1st	Air springs and damping	1
	2nd	Structural damping and energy dissipation	1
	3rd	Vibration measuring instruments	1
9th	1st	Whirling of shafts	1
	2nd	Numerical problems (Module-III)	1
	3rd	Revision session	1
10th	1st	Two degree of freedom systems	1
	2nd	Coordinate coupling	1
	3rd	Vibration absorber	1
11th	1st	Multi-degree freedom systems	1
	2nd	Influence coefficients and generalized coordinates	1
	3rd	Matrix method	1

Week	Day	Theory Topics	Class
12th	1st	Matrix iteration method	1
	2nd	Stodola method	1
	3rd	Holzer’s method and Dunkerley’s method	2
13th	1st	Numerical problems (Module-IV)	1
	2nd	Tutorial session	1
	3rd	Revision	1
14th	1st	Vibration of strings	1
	2nd	Longitudinal vibration of rods	1
	3rd	Torsional vibration of rods	2
15th	1st	Vibration of beams	1
	2nd	Applications of continuous systems	1
	3rd	Numerical problems	1
16th	1st	Comprehensive revision	1
	2nd	Problem-solving session	1
	3rd	Doubt clearing and exam preparation	1

Books Recommended

1. Mechanical Vibrations — **S. S. Rao**
2. Theory of Vibrations with Applications — **William T. Thomson and Marie Dillon Dahleh**
3. Mechanical Vibrations — **G. K. Grover**
4. Fundamentals of Vibrations — **Leonard Meirovitch**
5. Mechanical Vibrations — **V. P. Singh**

Teaching Methodology

- Chalk and board teaching
- PPT presentations and animations
- Numerical problem-solving sessions
- Tutorial classes
- Assignment and quiz discussions
- Case studies and practical applications

Assessment Strategy

- Internal assessment tests
- Class assignments and tutorials
- Numerical problem-solving evaluation
- Attendance and class interaction
- Semester end examination as per Biju Patnaik University of Technology guidelines