SCHEME OF COURSE WORK

Course Details:

Course Title	**STRUCTURAL DYNAMICS**		
Course Code	**: 15CE2203**	**L P C**	**: 4 0 3**
Program:	**: M. Tech.**		
Branch:	**: Civil Engineering**		
Semester	**: I**		
Prerequisites	**: Mathematics,Engineering Mechanics, Structural Analysis - I**		
Courses to which it is a prerequisite	**: EARTHQUAKE RESISTANT DESIGN**		

Course Outcomes (COs):

At the end of the course, the student will be able to:

1	Analyse a single degree of freedom system
2	Analyse the structural response to external forces
3	Discuss Coulomb's damping and viscous damping and their differences
4	Estimate the natural frequency and characteristics shapes of multi degree freedom system
5	Describe the mode superposition adopting various approaches

Program Outcomes (POs):

Post graduates will be able to:

1	Synthesize existing and new knowledge in various sub areas of structural engineering
2	Analyse complex engineering problems critically with adequate theoretical background for practical applications.
3	Evaluate a wide range of feasible and optimal solutions after considering safety and environmental factors.
4	Demonstate the ability to pursue research by conducting experiments and extract the relevant information through literature surveys.
5	Use state –of- the- art of modern tools for interpeting the behaviour and modeling of complex engineering structures.
6	Attain the capability to work in multi disciplinary teams to achieve common goals.
7	Demonstrate the knowledge to perform the projects efficiently in multi disciplinary environments after consideration of economical and financial matters.
8	Communicate effectively on complex engineering activities to prepare reports and make presentations.
9	Engage in life-long learning independently to improve knowledge.
10	Understand the responsibility of carrying out professional practices ethically for sustainable development of society.
11	Examine critically and independently one's actions and take corrective measures by learning from mistakes.

Course Outcome versus Program Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	S	S	S									M
CO-2	S	S	S									M
CO-3	S	M	M									M
CO-4	S	S	S	M								M
CO-5	S	S	S									M

S - Strongly correlated, M - Moderately correlated, *Blank - No correlation*

Assessment Methods:	Assignment / Seminar / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week No.	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Single Degree of freedom system: Natural Vibration, Time period, Aplitude, Various functions	CO-1	1. Write the various force functions considered in the dynamic analysis of structures.	▫ Lecture/LCD projector	
2	Response to Damped System	CO-1	1. . Derive the response to a single degree damped free vibration system.	▫ Lecture ▫ Problem solving	
3	Response to Undamped system	CO-1	1. Derive the response to a single degree undamped free vibration system.	▫ Lecture ▫ Problem solving	
4	**Single Degree of freedom system:** Forced Vibration, Response to Damped system	CO-1 CO-1	1. Distinguish between damped and undamped frequency. 2. Derive the response to a single degree damped forced vibration system.	▫ Lecture ▫ Lecture Problem solving	
5	Response to Undamped system	CO-1	1.Derive the response to a single degree damped free vibration system.	▫ Lecture ▫ Problem solving	Assignment
6	Response to Pulsating force, support motion (Transmissibility)	CO-2 CO-2 CO-2	1. Derive the response to a pulsating force for a damped free vibrating system. 2.Explain Transmissibility Write the effect of ground motion on the response of a structure	▫ Lecture ▫ Problem solving ▫ Lecture ▫ Lecture Problem solving	
7	Single Degree of freedom system: Coloumb Damping,	CO-3	1. Deduce an expression for the response of a single degree freedom free vibration system with Coloumb damping.	▫ Lecture ▫ Lecture ▫ Problem solving	

8	Viscous Damping for harmonic vibration	CO-3	1. Deduce an expression for the response of a single degree freedom free vibration system with viscous damping.	▫ Lecture ▫ Problem solving	Assignment
9	**MID TEST – I**			▫	
10	Frequency Response curve	CO-2	1.Draw various frequency response curves.	▫ Lecture	
11	**Single Degree of freedom system:** Determination of natural frequency	CO-4	For any given system write the frequency equation in terms of M_1 , M_2 , EI & K_S neglecting the mass of the beam/frame?	▫ Lecture ▫ Problem solving	Assignment
12	Characteristics shapes for undamped system	CO-4	1.Define Characteristic shape.	▫ Lecture ▫ Problem solving	
13	Orthogonality of natural modes and normal coordinates	CO-4 CO-4	1.Write about Orthogonality of modes. 2.Define Normal Coordinates.	▫ Lecture ▫ Lecture	
14	**Methods of Combining Modes:** Mode Superposition method	CO-5	1.Explain the procedure involved in Mode Superposition Method	▫ Lecture	
15	Modal Truncation Errors-Modal Acceleration method	CO-5	1.What is Modal Truncation and in which case they are significant.	▫ Lecture	
16	Direct Integration Method, Explicit and Implicit Methods	CO-5	Write about integration methods.	▫ Lecture ▫ Problem solving	
17	**MID TEST – II**			▫	
18	**END EXAM**			▫	