SCHEME OF COURSE WORK

Course Details:

Course Title	: **STRUCTURAL DYNAMICS**		
Course Code	: **19CE2202**	**L T P C**	**: 3 0 0 3**
Program:	**:M. Tech.**		
Specialization:	**: Structural Engineering**		
Semester	**: I**		
Prerequisites	**: -**		
Courses to which it is a prerequisite	**:**		

Course Outcomes (COs):
At the end of the course, the student will be able to:

1	Describe the basic terminology involved in structural dynamics and free vibration concepts.
2	Describe the cause and response of SDOF force vibration.
3	Analyze the response for pulse excitation .
4	Analyze the behavior for multi-degree of freedom system.
5	Analyze the beams for dynamic loads.

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	Demonstrate 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 interpreting the behavior 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
CO-1	S	S									
CO-2	S	S	M								
CO-3	S	S			S						M
CO-4	S	S									M
CO-5	S	S		S							M

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

Assessment Methods:	Assignment / Seminar/ Quiz / Mid-Test / End Exam		
	√	√	√
Marks	**10**	**30**	**60**

Teaching-Learning and Evaluation

Week No.	TOPIC / CONTENTS	Course Outcomes	Sample questions	Teaching-Learning Strategy	Assessment Method & Schedule
1	Types of Analysis/Static and Dynamic load Degrees of Freedom Dynamic Equilibrium Equation	CO1 CO1 CO1	Differentiate between static and dynamic? Explain degree of freedom? Derive dynamic equilibrium equation?	▫ Lecture/ Discussion Problem solving	Assignment
2	Solution of Equilibrium Equation Undamped free Vibration and Solution	CO1 CO1	What is meant by solution of equilibrium equation? Find the response of SDOF undamped system?	▫ Lecture Problem solving	
3	Damped Free Vibration Logarithmic decrement	CO1 CO1	Explain the damped system? Find logarithmic decrement for a damped system?	▫ Lecture	Assignment
4	Undamped Forced vibration Amplitude & Phase Angle	CO2 CO2	What is forced vibration? Derive the response for undamped forced vibration?	▫ Lecture Problem solving	Assignment
5	Damped Forced vibration Resonant frequency and Half power band width	CO2	Explain the methods top find the frequency ?	▫ Lecture	Assignment
6	Force Transmission and Isolation Response to Unit Impulse	CO2 CO3	What is the force transmitted to foundation from machine for a SDOF ? Derive response for unit impulse?	▫ Lecture ▫ Lecture	

7	Response to Arbitrary Force Response to Step and Ramp Forces	CO3 CO3 CO3	Derive response for arbitrary force? Derive response for step and ramp pulse force?	▫ Lecture ▫ Problem solving	Assignment
8	**MID TEST-I**				
9	Response to Rectangular Pulse	CO3	Derive rectangular pulse forcet?	▫ Lecture	Assignment
10	Response to Half Sinusoidal wave	CO3	Derive response for half sine pulse force?	Problem solving	Assignment
11	Equation of Motion for MDOF System	CO4	Write the equation of motion for MDOF system?	▫ Lecture	Assignment
12	Response of Multi-Degree of Freedom Systems	CO4	Derive the response to MDOF undamped system?	▫ Lecture	Assignment
13	Natural Frequencies and mode Shapes Modal Orthogonality Response Spectrum Analysis	CO4 CO4	Find the natural frequency and modeshape for MDOF system ? Explain the RSA for lateral load?	Problem solving Problem solving	
14	Vibration of Continuous systems Shear behavior and bending behavior of beams	CO5 CO5	Find the natural frequency for simply supported beams? Explain the shear behavior for beams ?	▫ Problem solving Problem solving Problem solving	Assignment
15	Base Excitation, response to base excitation	CO5	What is base excitation and its response to EQ loads?	▫ Problem solving	Assignment
16	Transmissibility	CO5	What is transmissibility and its importance in the building?	Problem solving	
17	**MID TEST - II**				
	END EXAM				