RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, VII-Semester

Departmental Elective CE 702(C) Structural Dynamics

Course Objective

The objective of the course is to understand the behavior of structure to various dynamic loads.

Course Contents

Unit 1

Undamped Single Degree of Freedom System

Degree of freedom, undamped system, Force displacement relation, damping force, Equation of motion, mass-spring damper system, D'Alembert's Principle, Solution of differential equation of motion, frequency, period and amplitude of motion.

Unit-2

Damped Single Degree of Freedom System

Viscous damping, equation of motion, critically damped systems, over and under damped systems, logarithmic decrement.

Unit-3

Response to harmonic and periodic vibrations

Harmonic vibration of undamped and viscously damped systems, natural frequency and damping, force transmission and vibration isolation, Fourier series representation, response to periodic force.

Unit-4

Response to Arbitrary, Step, and Pulse Excitation

Response to unit impulse, arbitrary force, Duhamel's Integral, step force, rectangular pulse force, half cycle sinusoidal pulse force, triangular pulse force.

Unit-5

Multi Degree of Freedom System:

Matrix formulation, stiffness and flexibility influence coefficients, eigen value problem, normal modes and their properties. Matrix iteration technique for eigen value, and eigen vectors, Free and forced vibration by modal analysis.

Course Outcome

The students will learn the effect of dynamic loading on the structure and its analysis.

Evaluation: Evaluation will be continuous and integral part of the class followed by final examination. **Reference Books:**

1. Chopra A. K., Dynamics of Structures, Prentice Hall of India, NewDelhi,
2. Clough R.W., Penzien J., Dynamics of structures,McGraw-Hill
3. Biggs J M, Introduction to StructuralDynamics
4. Mario Paz, Structural Dynamics, CBS publishers NewDelhi