IV Year B.Tech. Civil Engg. I - Semester	L	T	P	To	C
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CE415 STRUCTURAL DYNAMICS
(Dept. Elective - II)

Objective of the Course:

The course is designed to make a detailed analysis of structures in case of earthquake, wind and other dynamic/impacts loads are considered.

UNIT - I

Difference between static loading and dynamic loading – Nature of dynamic loads – Wind, Earthquake and Impact Loads – Damping – Viscous and structural damping – single degree of freedom (SDOF) Systems – Formulation of equation of motion – Newton's Law and D'Alembert's principles – Examples of SDOF modeling.

UNIT - II

Free vibration response of SDOF system – Response of undamped and damped SDOF system to harmonic excitation – characteristic of resonance – Response to impulse and an arbitrary forcing function – Duhamel Integral formulation.

UNIT - III

MDOF systems – examples – Lumped parameter model – Formulation of equation of motion – Free vibration of MDOF systems as Eigen value problem – concept of mode shapes and natural frequencies –2 DOF examples – orthogonal properties of normal modes.

UNIT - IV

Harmonic excitation of 2 DOF system – Principle of mode superposition (principle only) for dynamic analysis – vibration isolation – vibration measuring instruments.

UNIT - V

Effect of wind and earthquake on structures – Principles of a seismic design – Methods of vibration control – codal provisions for design for wind and

earthquake (explanation of provisions only – no design).

TEXT BOOKS :

1. Mario Paz, “Structural Dynamics Theory and Computation”, 3rd ed., Van Nostrand Reinhold, 1992.
2. Anil K.Chopra, “Dynamics of Structures Theory and Applications to Earthquake Engineering”, 12th ed., Prentice Hall of India (P) Ltd., New Delhi, 1996.

REFERENCE BOOKS :

1. Thomson W.T., “Theory of Vibration and Applications”, 4th ed., Prentice Hall of India, 1992.
2. Clough R.W. and Penzien, J., “Dynamics of Structures”, 5th ed., McGraw-Hill, 1990.
3. Craig R.R. Jr., “Structural Dynamics – An Introduction to Computer Methods”, 4th ed., John Wiley and Sons, 1981.