Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NCED507	Structural Dynamics	3	0	0	3

Course Objective
The course focuses on the behavior of structure under time-varying loading.
Learning Outcomes
Upon successful completion of this course, the students should be able to: • analyse the structural systems subjected to time-varying loading. • develop requisite basic knowledge for earthquake resistant design philosophy.

Unit No.	Topics to be Covered	Lectures	Learning Outcome
1	**Introduction to Dynamics:** Vibrations and the nature of time dependent phenomena, inertia, dynamic equilibrium and mathematical models of physical systems; Energy storing and dissipation mechanisms.	[5L]	Concept of time-varying loading. Behaviour of structure under such loading.
2	**SDOF System:** Dynamics of Single Degree of Freedom Systems: Undamped and damped, free and forced vibrations; Steady-state and transient response, impulse response. Harmonic response and applications to vibration isolation.	[12L]	Modeling and analysis of SDOF systems.
3	**Response Spectra:** Concept of Response spectrum, Tripartite Spectrum for analysis.	[5L]	Concept of response spectra, design response spectra.
4	**Dynamics of Multi Degree of Freedom Systems:** Modal Analysis; Eigenvalue problem; Mode Shape; Orthogonality of mode shape. Shear Building model.	[9L]	Modeling and analysis of MDOF systems.
5	**Approximate Method of Analysis and Random Vibration, Dynamic behaviors of continuous system:** Approximate Methods for Vibration Analysis, Rayleigh quotient, Rayleigh Ritz method. Introduction to Random Vibration.	[11L]	Different approximate methods of analysis and response of structure under random vibration
	Total	42	

Text Books:

1. Chopra, A. K. "Dynamics of Structures", PHI Learning.
2. Paz, M. "Structural Dynamics Theory and Computation", Springer.

Reference Books:

1. Clough, R. W. and Penzien., J., "Dynamics of Structures", 2nd edition, Mc-Graw Hill Book Company.
2. Craig, R. R., Jr. and Kurdila, A., "Fundamentals of Structural Dynamics", 2nd edition, John Wiley & Son.