Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NCEC514	Structural Dynamics	3	1	0	4

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	Contact Hours	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.	7L+3T	Concept of time-varying loading. Behaviour of structure under such loading.
2	**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.	13L+4T	Modeling and analysis of SDOF systems.
3	**Response Spectra:** Concept of Response spectrum, Tripartite Spectrum for analysis.	6L+2T	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.	10L+4T	Modeling and analysis of MDOF systems.
5	**Approximate Method of Analysis and Random Vibration:** Approximate Methods for Vibration Analysis, Rayleigh quotient, Rayleigh Ritz method. Introduction to Random Vibration. Dynamic behaviour of continuous system.	6L+1T	Different approximate methods of analysis and response of structure under random vibration
	Total Contact Hours	**42 L+14 T**	

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 & Sons.