AMSV21 STRUCTURAL DYNAMICS AND EARTHQUAKE RESISTANT DESIGN

UNIT-1 INTRODUCTION TO STRUCTURAL DYNAMICS

- 1.1 Theory of vibrations- Lumped mass and continuous mass systems
- 1.2 Single Degree of Freedom (SDOF) Systems- Formulation of equations of motion
- 1.3 Un damped and damped free vibration- Damped- Force vibrations
- 1.4 Response to harmonic excitation- Concept of response spectrum.

UNIT-2 MULTI-DEGREES OF FREEDOM (MDOF) SYSTEMS (LIMITED TO 2 DOF)

- 2.1 Formulation of equations of motion- Free vibration
- 2.2 Determination of natural frequencies of vibration and mode shapes
- 2.3 Orthogonal properties of normal modes
- 2.4 Mode superposition method of obtaining response.

UNIT-3 EARTHQUAKE ENGINEERING

- 3.1 Engineering Seismology- Earthquake phenomenon- Causes and effects of earthquakes
- 3.2 Faults- Structure of earth- Plate Tectonics- Elastic Rebound Theory
- 3.3 Earthquake Terminology- Source, Focus, Epicenter etc.
- 3.4 Earthquake size-Magnitude and intensity of earthquakes, Classification of earthquakes
- 3.5 Seismic waves- Seismic zones- Seismic Zoning Map of India- Seismograms and Accelerate grams.

UNIT-4 CODAL DESIGN PROVISIONS

- 4.1 Review of the latest Indian seismic code IS:1893-2002 (Part-I) provisions for buildings
- 4.2 Earthquake design philosophy- Assumptions- Analysis by seismic coefficient and response spectrum methods
- 4.3 Displacements and drift requirements- Provisions for torsion
- 4.4 Analysis of a multistoried building using Seismic Coefficient method.

UNIT-5 SEISMIC PLANNING

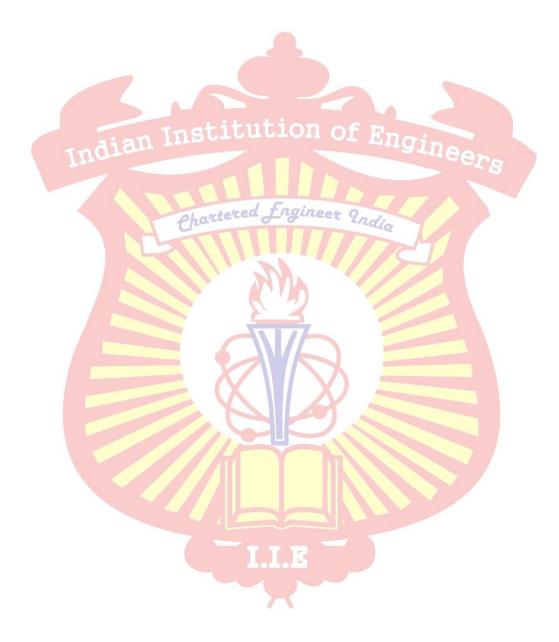
- 5.1 Plan Configurations- Torsion Irregularities- Re-entrant corners- Non-parallel systems
- 5.2 Diaphragm Discontinuity- Vertical Discontinuities in load path
- 5.3 Irregularity in strength and stiffnes Mass Irregularities- Vertical Geometric Irregularity
- 5.4 Proximity of Adjacent Buildings.

UNT-6 CODAL DETAILING PROVISIONS

- 6.1 Review of the latest Indian codes IS: 4326 and IS: 13920 Provisions for ductile detailing of R.C buildings Beam, column and joints.
- 6.2 SHEAR WALLS: Types- Design of Shear walls as per IS: 13920- Detailing of reinforcements.

Reference Books

- 1 Earthquake resistance design of structure by Duggal- Oxford University Press.
- 2 Earthquake Resistant Design by David J. Downik, John Wiley and Sons Publication



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