

# GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 1

**Civil Engineering (Computer Aided Structural Analysis & Design)**

**Subject Name** Structural Dynamics & Earthquake Engineering

Sr. No	Course content
1.	Structural Dynamics: Response of SDOF to harmonic and general dynamic loading, Vibration of multiple degree of freedom systems, numerical techniques for finding natural frequencies & mode shapes, orthogonality relationship of principal modes, Rayleigh's & Dunkerley's principle, Evaluation of dynamic response by mode superposition method, Analysis by response spectrum theory and time history analysis.
2.	Earthquake Engineering: Causes of earthquake and their characteristic, earthquake parameters, seismic zoning of India, Lessons from past earthquake and remedial measures, Response spectra & Combined D-V-A plot,
3.	Behavior of floor diaphragms, effect of various structural irregularities, lateral force analysis of building - Torsionally uncoupled and coupled system
4.	Capacity design of various structural elements, various lateral load resisting structural systems – MR frame with shear wall & bracing, Provisions of IS 1893 & IS 13920
5.	Structural controls: Passive Controls – Base isolation, various dampers, Active controls
6.	Liquefaction: Causes, remedial measures
7.	Response of nonstructural components & structural considerations
8.	Modeling and response of structure to earthquake, dynamic analysis of high-rise buildings, structural system for low, medium and high rise building, water tank and bridges using professional software like STAAD, SAP, ETAB, MIDAS, ANSYS etc.

## **Reference Books:**

1. Dynamics of Structures - A.K.Chopra
2. Structural Vibrations - Theory and Computation - Mario Paz
3. Earthquake Resistant Design - Manish Shrikhande & Pankaj Agrawal
4. Vibrations of Structures Application in civil Engg - J.W.Smith
5. Design Structural Dynamics - Clough & Penzien
6. Introduction to Structural Dynamics - John M.Biggs
7. Dynamics and Vibration of Structures - Demeter G.Fertis
8. Elements of earthquake engineering - Jaikrishna & Chandrasekaran
9. IS 1893-2002
10. IS 13920- 1993