

K L UNIVERSITY
EARTHQUAKE RESISTANT DESIGN OF STRUCTURES (11 CE 340)

SYLLABUS

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Dynamics of Structures and Seismic Response: Equation of motion, single degree of free system, dynamic response of single storey structure (SDOF), , seismic response of SDOF structure, concept of response spectrum, dynamic response of spectrum representation for elastic systems. **Systems with multi degree of freedom (MDOF):** periods and mode of vibration, elastic response, restoring force, damping, damping values for buildings. **Earthquake and ground Motion:** Causes of earthquake, nature and occurrences, seismic waves, effects, consequences, measurements, strong ground motion, seismic zones. **Seismo-resistant building architecture:** Lateral load resisting systems- moment resisting frame, Building with shear wall or bearing wall system, building with dual system; Building configuration – Problems and solutions; Building characteristics – Mode shape and fundamental period, building frequency and ground period, damping, ductility, seismic weight, hyper-staticity/redundancy, non-structural elements, foundation soil/ liquefaction. Foundations; Quality of construction and materials – quality of concrete, construction joints, general detailing requirements. **Design forces for buildings:** Equivalent static method, Determination of lateral forces as per IS 1893(Part 1), Modal analysis using response spectrum. **Ductility considerations in earthquake resistant design of RCC buildings:** Impact of ductility; Requirements for ductility; Assessment of ductility– Member/element ductility, Structural ductility; Factor affecting ductility; Ductility factors; Ductility considerations as per IS13920. **Earthquake resistant design of a long two-storey, two-bay RCC building:** Determination of lateral forces on an intermediate plane frame using Equivalent static method and Modal analysis using response spectrum; various load combinations as per IS1893(Part 1); Identification of design forces and moments in the members; Design and detailing of typical flexural member ,typical column, footing and detailing of a exterior joint as per IS13920. **Masonry building:** categories, plain and reinforced masonry walls, box action and bands, infill walls, improving seismic behavior of masonry building, load combinations and permissible stress, seismic design of masonry building.

References:

1. Earthquake resistant design of structures by Pankaj Agarwal and Manish Shrikhande, Prentice-Hall of India, 2006.
2. Seismic design of reinforced concrete and masonry buildings by T. Paulay and M.J.N. Priestley, John Wiley & Sons, 1991.
3. The seismic design handbook, Edited by F. Naeim, Kluwer Academic publishers, 2001.