

(CE504) EARTHQUAKE RESISTANT DESIGN OF STRUCTURES

Objective of the Course:

This course integrates information from various engineering and scientific disciplines in order to provide a rational basis for the design of earthquake-resistant structures.

UNIT-I:

Design forces for buildings

Introduction; Equivalent static method; Mode superposition technique; Dynamic inelastic-time history analysis; Advantages and disadvantages of these methods; Determination of lateral forces as per IS1893(Part 1) – Equivalent static method, Model analysis using response spectrum.

UNIT-II:

Earthquake resistant design of a long two-storey , two-bay RCC building

Determination of lateral forces on an intermediate plane frame using Equivalent static methods and Model analysis using response spectrum; Analysis of the intermediate frame for various load combinations as per IS1893(Part 1); Identification of design forces and moments in the members; Design and detailing of typical flexural members ,typical column, footing and detailing of a exterior joint as per IS13920.

UNIT-III:

Steel Buildings

Behavior of steel; Materials and workmanship; Steel frames – unbraced, braced; Ductile design of frame members; Flexural members; Frame members subjected to axial compression and bending; Connection design and joint behaviour ; Steel Panel zones; Bracing members

UNIT-IV:

Seismic protection of structures

Introduction; Considerations for seismic isolation; Basic elements of seismic isolation; seismic-isolation design principle; Feasibility of seismic isolation; Seismicisolation configurations- Seismic dampers - Types of Dampers: Viscous, Friction, Yielding dampers – Seismic vibration control-Seismic Strengthening Measures.

UNIT-V:

Ductility considerations in earthquake resistant design of RCC buildings

Introduction; Impact of ductility; Requirements for ductility; Assessment of ductility– Member/element ductility, Structural ductility; Factor affecting ductility; Ductility factors; Ductility considerations as per IS13920.

TEXT BOOKS :

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.

REFERENCE BOOKS:

1. Earthquake resistant design of structures by SK Duggal , Oxford University Press.2007
2. The seismic design handbook, Edited by F.Naeim, Kluwer Academic publishers,2001