CE6740 - Advanced analysis and design for wind and earthquake effects

Credit Distribution: C:9 L:3 T:0 P:0 E:0 O:6 TH:0

Course Type: Theory

Description: To facilitate develop understanding of the concepts and issues in analysis, design and detailing of structures to resist wind and earthquake effects.

Course Content: 1. Wind Effects: characteristics of wind storms, design wind speeds and risk coefficients, design wind pressure, pressure and force coefficients, gust factors, along- and cross-wind excitations, design impact and counter measures, wind behavior of line-like structures; wind tunnel testing. 2. Earthquake effects, earthquake ground motions, design philosophy, equivalent static and dynamic response analysis of regular and irregular structures, response and design spectra, ductility and energy dissipation capacity, force and displacement based design, pushover analysis, capacity design and detailing of reinforced concrete (RC) and steel members, joints, connections, bare and in-filled building frames, evaluation of deficiency and retrofit techniques for RC and steel buildings. 3. Special Topics: behavior of elevated water tanks and bridges under earthquakes.

Text Books

- Chopra, A.K., Dynamics of Structures: Theory and Applications to Earthquake Engineering, Prentice Hall, 2001.
- Taranath, B.S., Wind and Earthquake Resistant Buildings, CRC Press, 2005.

Reference Books:

- IS 800, IS 875, IS 1893, IS 4326, IS 13920, Bureau of Indian Standards.
- Duggal, S. K., Earthquake Resistant Design of Structures, Oxford University Press, 2007.
- Agarwal, P. and Shrikhande, M., Earthquake Resistant Design of Structures, PHI Learning Pvt. Ltd., 2006.
- Arnold, C. and Reitherman R, Building Configuration and Seismic Design, John Wiley & Sons Inc., 1982.
- Holmes, J.D., Wind Loading on Structures, 2nd Ed., Taylor & Francis, 2007.
- Seismic Resistant Steel Structures, Edited by Mazzolani, F.M. and Victor, G., Springer-Verlag Wien, 2000.
- The Seismic Design Handbook, 2nd Ed., Edited by Naeim F ,Springer (India) Pvt. Ltd., 2001.
- Paulay, T., and Priestley, MJN, Seismic Design of Reinforced Concrete and Masonry Buildings, John Wiley & Sons, Inc., 1992.
- 9.Penelis, G.G., and Kappos, A.J., Earthquake-resistant Concrete Structures, E & FN Spon, 1997.
- 10. Priestley, MJN, Seible, and Calvi, G.M., Seismic Design and Retrofit of Bridges, John Wiley & Sons Inc., 1996.

Prerequisite: NIL