

Course syllabus

Department of Civil Engineering, Indian Institute of Technology Madras

CE7022 - SEISMIC analysis and design of masonry structures

Credit Distribution: C:6 L:2 T:0 P:0 E:0 O:4 TH:0

Course Type: Theory

Description: To identify/determine the elements of seismic behavior of masonry components and systems; - To identify methods of modelling, analysis and assessment of masonry structures (particularly non-linear equivalent frame approach); - To identify appropriate techniques for seismic strengthening and retrofit of masonry structures and procedure for retrofit design.

Course Content: 1. Properties of Masonry Materials: brick, block, mortar, grout and reinforcement; 2. Mechanics of Masonry in Compression: failure theories, compressive strength, elastic modulus; 3. Behavior of Masonry Walls: subjected to lateral forces, their role in building structural systems excited by earthquake motions; 4. Unreinforced Masonry Walls: vertical and transverse loadings, shear walls; 5. Reinforced Masonry Walls: axial force, flexure and shear design, detailing of reinforcement; 6. Building systems: floor diaphragms, lateral-force distribution to shear walls; 7. Assessment and Rehabilitation of Existing Masonry Buildings: sources of vulnerability, knowledge and survey of the structure, methods of analysis, performance criteria; and Strategies for seismic rehabilitation/retrofitting.

Text Books

NIL

Reference Books

- Drysdale, R.G., Hamid, A.A., and Baker, L.R., Masonry Structures: Behavior and Design, Prentice Hall, 1994.
- Tomaževic, M., Earthquake resistant Design of Masonry Buildings, Imperial College Press, 1999.
- Priestley, M.J.N. and Paulay, T., Seismic Design and Assessment of Reinforced Concrete and Masonry Buildings, John Wiley and Sons, 1997.
- 1996 EC-6: Design of Masonry Structures, European Committee for Standardization, 2005.
- 1998 EC-8: Design of Structures for Earthquake Resistance, European Committee for Standardization, 2005.
- NTC 2008 Norme tecniche per le costruzioni, DM 14 gennaio 2008, pubblicato sulla Gazzetta Ufficiale n. 29 del 4 febbraio 2008 - Suppl. Ordinario n. 30 [In Italian], 2008.
- AS 37100 Masonry Structures, Standards Australia International, 2001.

Prerequisite: