

Course syllabus

Department of Civil Engineering, Indian Institute of Technology Madras

CE4410 – Structural Masonry

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

Course Type: Theory

Description: To enable learning of theories on mechanical behaviour of masonry assemblages - To present working stress and limit states approaches to analysis and design unreinforced and reinforced masonry members, under vertical and lateral loads

Course Content:

- Introduction: Overview of masonry in ancient and modern times; Methods of design of codes and standards; Structural-functional requirements of masonry buildings; Classification of masonry construction; Loads.
- Masonry Materials and Properties: Properties and experimental testing of components (masonry units, mortars, grout, reinforcement).
- Strength and Behaviour of Masonry: Axial compression, eccentric compression; direct and flexural tension; shear and compression; biaxial state of stresses; P-M interaction; Deformation characteristics.
- Design of Unreinforced Masonry Members: Basic principles; Working stress and limit state design; Serviceability limit states (deflection, cracking, stability); Design for combined out-of-plane bending and axial compression; Design for in-plane flexure; Design of shear walls; Relevant IS code provisions.
- Design of Reinforced Masonry Members: Basic principles and methods of reinforcing; Working stress and limit states design; Serviceability limit states (deflection, cracking); Design for combined out-of-plane bending and axial compression; Design for in-plane flexure; Design of shear walls; Detailing requirements; Relevant code provisions.

Text Books

- Klingner, R E, Masonry Structural Design, McGraw-Hill Companies, Inc., 2010.
- Drysdale, R.G., Hamid, A.A., and Baker, L.R., Masonry Structures: Behaviour and Design, Prentice Hall, 1994.

Reference Books

- Taly, N., Design of Reinforced Masonry Structures, Mc-Graw Hill Companies, Inc., 2010.
- IS 1905 Code of Practice for Structural Use of Unreinforced Masonry, Bureau of Indian Standards.
- SP 20: 1981 Explanatory Handbook on Masonry Code, Bureau of Indian Standards.
- Other relevant Indian and International Standards.

Prerequisite: NIL