

Course syllabus

Department of Civil Engineering, Indian Institute of Technology Madras

CE3100 - Structural engineering laboratory

Credit Distribution: C:4 L:0 T:0 P:3 E:0 O:1 TH:0

Course Type: Lab

Description: To measure the load versus deformation behaviour of reinforced concrete (RC) and metal structural members under different loading conditions, for elastic and/or ultimate conditions; To compare theoretical predictions or expected behaviour with experimental data and observations; To verify and validate the fundamental assumptions which form the basis of structural theory.

Course Content: 1. Testing of Hardened Concrete and Reinforcing Bars 2. Tests of Reinforced Concrete Members, Behaviour of under-reinforced and over-reinforced concrete beams under flexure, Behaviour of short RC column under axial compression, Behaviour of RC beams under shear, Behaviour of RC beam under torsion, Bond strength tests 3. Tests of Metal Members, Bending of rolled steel joist, Bending of symmetrical and unsymmetrical sections, Torsion of aluminum circular rods with closed and open sections, Plastic behaviour of steel rods, Buckling of single and double angle compression members, Lateral torsional buckling of steel Ibeams, Behaviour of bolted connections under tension

Text Books

- Engineering Mechanics of Solids, Popov E.P., Prentice Hall of India Private Limited, 2004.
- Mechanics of Materials, Beer F.P., Johnson E.R., and DeWolf, J.T., Tata McGraw-Hill, 2004.
- Reinforced Concrete Design, Pillai S.U., and Menon D., 3rd Edition, McGraw Hill Education Private Limited, 2011.
- NPTEL web courses on Design of Steel Structures - I and II, www.nptel.ac.in/courses/IIT-Madras.

Reference Books

- IS 456, IS 516, IS 800, IS 1608, IS 2770 - Bureau of Indian Standards.
- SP 6 Handbook for Structural Engineers, (1) Structural Steel Sections, (6) Plastic Analysis, Bureau of Indian Standards.
- SP 16: 1980 Design Aids for Reinforced Concrete to IS 456 : 1978, Bureau of Indian Standards.
- SP 24: 1983 Explanatory Handbook on Indian Standard Code of Practice for Plain and Reinforced Concrete, Bureau of Indian Standards.

Prerequisite: NIL