

## Course syllabus

Department of Civil Engineering, Indian Institute of Technology Madras

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### CE5010 - Modern Construction Materials

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

**Course Type:** Theory

**Description:** To provide the scientific basis for understanding and development of construction materials. To provide an overview of materials used commonly in construction, their properties, merits and limitations.

**Course Content:** Why to study the science and technology of construction materials. Review of atomic bonding, structure of solids and defects, movement of atoms, and development of microstructure Review of surface properties, response of materials to stress, failure theories, fracture mechanics, rheology and thermal properties, Overview of construction materials and their applications Brick, block and stone masonry, Timber and wood composites, Polymers and fibre reinforced polymers, Metals, Bituminous materials, Concrete, Glass, Anchors, fittings, floor finishes and other non-structural materials, Social perception of materials in construction.

#### Text Books:

- The Science and Technology of Civil Engineering Materials, J.F. Young, S. Mindess, R.J. Gray and A. Bentur, Prentice Hall, 1998.
- Building Materials, P.C. Varghese, Prentice-Hall India, 2008.

#### Reference Books:

- Materials Science and Engineering: An introduction, W.D. Callister, John Wiley, 1994.
- Materials Science and Engineering, V. Raghavan, Prentice Hall, 1990.
- Properties of Engineering Materials, R.A. Higgins, Industrial Press, 1994.
- Construction materials: Their nature and behaviour, Eds. J.M. Illston and P.L.J. Domone, 3rd ed., Spon Press, 2001.
- Engineering Materials 1: An introduction to their properties & applications, M.F. Ashby and D.R.H. Jones, Butterworth Heinemann, 2003.
- The Science and Design of Engineering Materials, J.P. Schaffer, A. Saxena, S.D. Antolovich, T.H. Sanders and S.B. Warner, Irwin, 1995.
- Concrete: Microstructure, properties and materials, P.K. Mehta and P.J.M. Monteiro, McGraw Hill, 2014.

**Prerequisite:** NIL