



MODERN CONSTRUCTION MATERIALS

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Department of Civil Engineering
IIT Madras

PRE-REQUISITES : Knowledge of civil engineering or architecture

INTENDED AUDIENCE : Core for post-graduates, Post-graduate and upper level undergraduate, BE/BTech/ME/MTech/BArch/MArch/MS/MPhil/Ph.D

INDUSTRIES APPLICABLE TO : Companies in the construction sector.

COURSE OUTLINE :

The aim of the course is to provide the scientific basis for the understanding and development of construction materials. It serves as a foundation course for post-graduate students interested in careers involving research, teaching and/or construction engineering, as well as marketing, decision making, innovation and specification related to construction materials. It can also be a capstone course for undergraduates finishing their studies in civil engineering and architecture.

ABOUT INSTRUCTOR :

Prof. Ravindra Gettu is a chair professor of civil engineering at IIT Madras. He has coordinated the introductory course at IITM and given lectures at other institutes on civil engineering for more than 10 years. He has a wide range of experience in research, education and consultancy. His specific area of expertise is construction materials.

Aslam Kunhi Mohamed is an Assistant Professor in the Building Technology, Construction Materials, and Management (BTCM) Group, Department of Civil Engineering at IIT Madras since 2023. He received his B.Tech in Metallurgical and Materials engineering from IIT Madras and then proceeded to EPFL for his Master's degree. In the same university, he then pursued his Ph.D on the atomic structure of the main hydration product of cement, the calcium silicate hydrates using molecular simulations. This was followed by a few years of postdoc at ETH Zurich where he worked on molecular modelling of organic admixtures in concrete.

COURSE PLAN :

- Week 1:** Prologue – Intro. to the course, Science,Engineering and Technology of Materials- 1&2, Atomic Bonding-1
- Week 2:** Atomic Bonding-2, Structure of Solids-1, Structure of Solids-2&3
- Week 3:** Movement of Atoms, Development of Microstructure-1,Development of Microstructure-2
- Week 4:** Surface Properties, Response to Stress-1, Response to Stress-2&3
- Week 5:** Failure Theories, Fracture Mechanics-1, Fracture Mechanics-2
- Week 6:** Rheology & Thermal properties, Review of Const. Materials & Criteria for Selection, Wood and Wood Products-1
- Week 7:** Wood and Wood Products-2, Wood and Wood Products-3, Polymers
- Week 8:** Fibre Reinforced Polymers-1&2, Metals-1, Metals-2
- Week 9:** Metals-3, Bituminous Materials-1, Bituminous Materials-2
- Week 10:** Concrete-1, Concrete-2, Concrete-3
- Week 11:** Concrete-4, Concrete-5, Glass - Guest Lecture
- Week 12:** Waterproofing Materials, Polymer Floor Finishes, Anchors