

Course No
CE 205

Course Name
**CIVIL ENGINEERING
MATERIALS**

L-T-P-Credits
2- 0- 0: 2

Prerequisite: nil;

Co requisite: nil

Course Objectives:

1. To teach students about civil engg. materials properties which are relevant in engineering applications
2. To understand the governing factors related to material selection and its importance with the design and failure of structures.

Course Outcome:

1. To reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion.
2. To Identify, formulate and solve engineering problems of structural elements subjected to flexure.
3. To Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.

SYLLABUS

Module	Contents	Hours
	Characteristic of building materials	02
I	Structures of solids, ductility, brittleness, strength, stiffness, durability, hardness, toughness; Weakness of materials.	
	Building materials	04
II	Cement: Chemical composition, manufacturing, physical characteristics, hydration, properties of cement compounds, different types of cements.	
	Aggregate:	04
III	Coarse and fine aggregates, Influence of aggregate on the properties of concrete, aggregate selection.	
	Concrete	05
IV	Fresh Concrete: Batching, Mixing, workability, effect of admixture. Hardened Concrete: mechanical properties of hardened concrete, Water cement ratio, Porosity, Curing of concrete, High performance concrete	
	Design of concrete mix:	04
V	IS code recommendation, British code and ACI code.	
VI	Special concrete: Light weight concrete, Fibre reinforced concrete; Polymer modified concrete, Ferro cement, Self-compacting concrete.	04
VII	Brick: Raw materials, drying and burning, Strength and durability, mortar for masonry and strength of masonry	04
VIII	Timber: Seasoning and conversions, properties, tests, defects in timbers.	02
IX	Glass: Chemical compositions, mechanical and optical properties, Various types of glasses, Strengthening of glasses.	02
X	Metal and Steel: Steel for reinforced concrete and pre-stressed concrete construction, structural steel sections.	02
XI	Deterioration of building materials Corrosion, chloride and sulphate attack on concrete, alkali-aggregate reaction, acid aggregate reactions.	03

Essential Readings:

1. Neville M and Brooks J.J., "Concrete Technology", Pearson Education, Twelfth impression, 2014
2. A.R Santhakumar "Concrete Technology", Oxford Higher Education, Ninth impression, 2012

Supplementary Reading:

1. M. S. Mamlouk, and J. P. Zaniewski, Materials for Civil and Construction Engineers, Pearson, Prentice Hall, 2nd Edn., 2006.
2. J. F. Shackelford and M. K. Muralidhara, Introduction to Material science for Engineers, Pearson Education, 6th Edn., 2007.