II Year B.Tech. Civil Engg. I - Semester	L	T	P	To	C
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CE223 BUILDING MATERIALS AND CONCRETE TECHNOLOGY

Objective of the Course:

This course is meant to understand various engineering properties of building materials like stones, bricks, lime, timber, steel and paints. This course is also designed to understand the properties and tests on cement, aggregates and concrete. It also covers the mix design of concrete.

UNIT - I

Building Materials :

Stones: Qualities of a good building stones, Common building stones of India.

Bricks: General, Composition of good brick earth, Harmful ingredients in brick earth, Manufacture of bricks by clamp burning and kiln (Hoffman's kiln only) burning, Qualities of good bricks, Tests for bricks, Classification of bricks, Size and weight of bricks.

Lime: General, Some definitions, Sources of lime, Constituents of limestones, Classification of limes, Properties of fat lime and hydraulic lime, manufacture of lime.

Timber: Definition, Structure of a tree, Qualities of good timber; Decay of timber; Seasoning of timber, Preservation of timber; Advantages of timber construction.

UNIT - II

Cements & Aggregates : Cements: Portland cement, chemical composition, hydration, setting of cement, Structure of hydrated cement, Tests on physical properties, Different grades of cement.

Aggregates: Classification, source, size and shape, texture and influence of texture on strength, specific gravity of aggregates, moisture in aggregates, bulking of fine aggregate, methods used for determination of moisture content of aggregates, grading of aggregates, sieve analysis, standard grading curve, grading limits of fine aggregates as per IS: gap grading.

UNIT - III

Fresh Concrete & Admixtures: Workability, Factors affecting workability, Measurement of workability by different tests, Setting times of concrete, Effect of time and temperature on workability, Segregation & bleeding, Mixing and vibration of concrete, Methods of curing, Quality of mixing water.

Admixtures: General, plasticizers and super plasticizer, Dosage, mixing procedure, equipment, effect of super plasticizers on the properties of hardened concrete, Retarders, accelerators, Air-entraining admixtures, factors affecting amount of air-entrainment, effect of air-entrainment on the properties of concrete, fly ash, effect of fly ash on fresh and hardened concrete, high volume fly ash concrete, silica fume, available forms, effect of silica fume on compressive strength of concrete, construction chemicals for curing, construction chemicals for water proofing.

Hardened Concrete: General; water-cement ratio, gel/space ratio; gain of strength with age; maturity concept of concrete, effect of maximum size of aggregate on strength.

Testing Of Hardened Concrete: Compression tests, Factors affecting strength, Flexure test, Splitting tests, Non-destructive testing methods, codal provisions for NDT.

UNIT - IV

Elasticity, Creep & Shrinkage: Modulus of elasticity, Dynamic modulus of elasticity, Posisson's ratio, Creep of concrete, Factors influencing creep, Relation between creep & time, Nature of creep, Effects of creep, Shrinkage, types of shrinkage.

Durability of Concrete: Factors contributing to cracks in concrete, sulphate attack and methods of controlling sulphate attack, chloride attack, corrosion of steel and its control.

UNIT – V

Mix Design: Factors in the choice of mix proportions, Quality Control of concrete, Statistical methods, Acceptance criteria, Proportioning of concrete mixes by various methods, BIS method of mix design.
Special Concretes: Light weight aggregates, Light weight aggregate concrete, Fiber reinforced concrete, Different types of fibers, Factors affecting properties of F.R.C, High performance concrete.

TEXT BOOKS:

1. M.S.Shetty, "Concrete Technology", 1st ed., S.Chand & Co, 2005.
2. S. C. Rangwala, "Engineering Materials", 36th ed., Charotar Publishing House, Anad, 2009.

REFERENCE BOOKS:

1. M.L. Gambhir, "Concrete Technology", 3rd ed., Tata McGraw Hill Publishers, New Delhi, 1986.
2. A.R. Santha Kumar, "Concrete Technology", 3rd ed., Oxford University Press, New Delhi, 2009.
3. A.M.Neville, "Properties of Concrete", 4th ed., Longman Technical & Scientific, 2009.