

K L UNIVERSITY
CONSTRUCTION MATERIALS (11 – ES 212)

SYLLABUS

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Stones: Classification of Stones; Qualities of a good building stone; Stone quarrying; Dressing of stones; Common building stones of India.

Bricks: General; Composition of good brick earth; Harmful ingredients in brick earth; Manufacture of bricks; Comparison between clamp burning and kiln burning; Qualities of good bricks; Classification of bricks; Size and weight of bricks; Fire – clays.

Lime: General; Some definitions; Sources of lime; Constituents of lime stones; Classification of limes; Comparison between fat lime and hydraulic lime; Manufacture of fat lime; Manufacture of natural hydraulic lime.

Timber: Definition; Structure of a tree; Defects in timber; Qualities of good timber; Preservation of timber; Seasoning of timber; Market forms of timber, Alternative materials for wood, galvanized iron, fiber reinforced plastics, steel and aluminum.

Steel: General; Manufacture of steel; Uses of steel; Defects in steel; Market forms of steel; Properties of mild steel; Properties of hard steel; Corrosion of ferrous metals.

Paints: Constituents of paints, types of paints, Painting of new and old substrate Painting; white washing, Varnishing; Distempering.

Insulating Materials: General, thermal insulators, electrical insulators and sound (acoustic) insulators

Cement: General; Cement and lime; Chemical composition of ordinary Portland cement; Functions of cement ingredients; Hydration of cement; Structure of Hydrated cement; Water requirements for hydration; Types of cement and its properties; Field tests for cement; Chemical composition test; Laboratory tests for cement; Grades of cement as per IS specifications.

Aggregates: Classification; Source; Grading of Aggregates; IS: 383 requirements for aggregates; Tests on aggregates; Alkali - Aggregate reaction.

Water: General; Quality of water; Use of sea water; IS: 456 requirements.

Mortar: Functions of sand in mortar; Classification of mortars; Properties of good mortar mix and mortar; Preparation of mortar; Uses of mortar; Precautions in using mortar; Selection of mortar; Tests for mortars.

Cement Concrete: Definition; Properties of cement concrete; Proportioning of concrete; Water/cement ratio.

Admixtures in Concrete: General; Air-entraining agents; Plasticizers; Pozzolanic admixtures; Accelerators; Retardars; Miscellaneous admixtures such as damp proofers and Surface hardeners.

Fresh Concrete: Workability of concrete; Measurement of workability; Segregation; Bleeding; Yield of Concrete.

Manufacture of Concrete: Batching of concrete; Mixing; Transporting Concrete; Placing concrete; Compaction of concrete; Curing of concrete; Finishing.

Tests on Hardened Concrete: Compression test; Moulds and compacting; Curing; Failure of compression specimen; Effect of height / diameter ratio on strength; Flexural strength of concrete; Tensile strength of concrete; Non - destructive testing methods; Tests on composition of hardened concrete; Elastic properties of concrete; Relation between modulus of Elasticity and strength; Factors affecting modulus of elasticity; Creep; Factors affecting creep; Shrinkage; Plastic shrinkage; Mechanism of shrinkage; Factors affecting shrinkage.

Durability of Concrete: Permeability of concrete; Sulphate attack; Methods of controlling sulphate attack; Durability of concrete in sea water; Action of foreign matter on concrete.

Special Concrete & Concreting Methods: Special concretes such as light weight concrete and no fines concrete; High density concrete; Polymer concrete and Fibre reinforced concrete; special concreting methods Cold weather concreting, Hot weather concreting; Guniting or shotcrete; Ferro cement.

Concrete Mix Design: Concept of mix design; Variables in proportioning; Nominal mix and design mix; Indian standard method of mix design; ACI Method

TEXT BOOKS:

1. Building Materials by S. K Duggal New Age International Publishers.
2. Building construction by P C Varghese, Prentice hall of India (P) Ltd, New Delhi
3. Concrete Technology by A.M. Neville, Pearson Edition.

REFERENCES:

1. Civil engineering materials by Parbin Singh Prentice hall of India (P) Ltd, New Delhi
2. Building construction by B. C Punmia, Laxmi Publications, New Delhi
3. Concrete Technology by M.E. Grambhair, Tata Mc Graw- Hill Publishing Company Ltd.
4. Concrete technology by M.S Shetty, S. Chand & Company (Pvt) Ltd., New Delhi.

LIST OF EXPERIMENTS

1. To Determine the initial and final setting time of cement with vicat's apparatus
2. To Determine the Normal Consistency of cement with vicat's apparatus
3. To Determine the fineness modulus of fine aggregates
4. To Determine the fineness modulus of coarse aggregates
5. To find bulk density specific gravity void ratio and porosity of fine aggregates
6. To find bulk density specific gravity void ratio and porosity of Coarse aggregates
7. Workability of concrete by slump cone apparatus
8. Workability of concrete by Compaction factor apparatus
9. To find the compressive strength of concrete cubes and cylinders
10. To determine the tensile strength of concrete by split cylinder test
11. To determine the flexural strength of concrete beam specimen
12. To determine the flakiness index and elongation index of the given aggregate