



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF CIVIL ENGINEERING

I Year - I Semester		L	T	P	C
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BUILDING MATERIALS AND CONCRETE TECHNOLOGY (ESC1203)					

Aim and Objective of this course

1. To introduce various building construction materials
2. To describe various properties of ingredients of concrete
3. To explain various properties and tests of fresh and Hardened Concrete

Course Outcomes (COs)

1. Know various engineering properties of building construction materials and suggest their suitability
2. Identify the functional role of ingredients of concrete and apply this knowledge to concrete mix design
3. Acquire and apply fundamental knowledge in the fresh and hardened properties of concrete

Syllabus

Unit - I (Stones, Bricks, Tiles, Wood and Paints)

Stones: Classification of Stones – Properties of stones in structural requirements

Bricks: Composition of good brick earth, Various methods of manufacturing of bricks

Tiles: Characteristics of good tile – Manufacturing methods, Types of tiles

Wood: Structure – Properties – Seasoning of timber – Classification of various types of woods used in buildings – Defects in timber

Paints: White washing and distemping, Constituents of paint – Types of paints – Painting of new and old wood – Varnish

Unit – II (Aggregates, Cement and Admixtures)

Aggregates: Classification of aggregate, Bond, Strength and other mechanical properties of aggregate, Physical properties of aggregate, bulking of sand, Deleterious substance in aggregate, Soundness of aggregate, Alkali-Aggregate reaction – Thermal properties, Sieve analysis – Fineness modulus – Grading curves – Grading of fine and coarse aggregates as per relevant IS code, Maximum aggregate size

Portland Cement: Chemical composition, Hydration, Structure of hydrated cement – Setting of cement, Fineness of cement, Tests for physical properties – Different grades of cements

Supplementary cementitious materials: Fly ash, GGBS, Silica fume, Rice husk ash, Calcinated ash (Basic properties and their contribution to concrete strength)

Admixtures: Mineral and Chemical admixtures

Unit - III (Fresh Concrete)

Manufacture of concrete – Mixing and vibration of concrete, Workability – Segregation and bleeding – Factors affecting workability, Measurement of workability by different tests, Effect of time and temperature on workability – Quality of mixing water, Ready mix concrete, Shotcrete

Unit - IV (Hardened Concrete)



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Water / Cement ratio – Abram’s law, Gel space ratio, Nature of strength of concrete – Maturity concept, Strength in tension and compression – Properties of Hardened Concrete (Elasticity, Creep, Shrinkage, Poisson’s ratio, Water absorption, Permeability, etc.), Relating between compression and tensile strength, Curing

Unit - V (Testing of Hardened Concrete)

Factors affecting properties of Hardened concrete, Compression tests, Tension tests, Flexure tests, Non-destructive testing methods – Codal provisions for NDT – Rebound hammer and UPV method

TEXT BOOKS

1. “Concrete Technology” by M. S. Shetty - S. Chand & Co., 2004
2. “Engineering Materials” by Rangwala S C, (36th edition), Anand Charotar Publishing House
3. “Concrete Technology” by Shantha Kumar – Oxford Publications

REFERENCE BOOKS

1. “Building Materials” by S. K. Duggal, New Age International Publications
2. “Building Materials” by P. C. Verghese, PHI learning (P) Ltd., 2009
3. “Properties of Concrete” by A. M. Neville – Pearson – 4th edition