COURSE CONTENT

BUILDING MATERIALS AND CONCRETE TECHNOLOGY								
III Semester: CE								
Course Code	**Category**	**Hours/ Week**			**Credits**	**Maximum Marks**		
2530113	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	0	0	3	40	60	100
Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		
Prerequisites: NIL								

Course Overview :

Building Materials and Concrete Technology covers properties, testing, and applications of construction materials such as stone, brick, steel, timber, and concrete. The course emphasizes cement chemistry, mix design, production, durability, quality control, and sustainable practices, preparing students to select appropriate materials and design durable, economical concrete structures.

Course Objectives: This course is expected to enable the student to:

- To introduce the classification, properties, and applications of traditional and modern building materials
- To impart knowledge on the types and properties of cement, aggregates, water, and admixtures, including their standards and testing procedures
- To enable students to understand the behavior of fresh and hardened concrete
- To provide a comprehensive understanding of concrete mix design methodologies as per IS 10262:2019, including nominal and design mixes, quality control, and acceptance criteria as per IS 456:2000.
- To familiarize students with the composition, properties, and applications of special concretes, such

Course Outcomes: Upon completion of this course, students should be able to

- Explain how stones, bricks, tiles, and timber are classified, made, and used in building construction.
- Describe different types of paints, varnishes, glass, plastics, and modern materials, and explain their uses in buildings.
- Test and understand the properties of aggregates, water, and admixtures, and how they affect concrete quality.
- Understand how fresh and hardened concrete behaves and what factors affect its strength and durability.
- Prepare concrete mix designs as per IS 10262:2019 and suggest suitable special concretes based on their properties and uses.

UNIT - I

Building Materials -I: Stones, Bricks, and Tiles: Classification and properties of building stones, Quarrying, dressing, and testing of stones, Manufacturing, classification, and properties of bricks, Tests on bricks, Types and properties of clay tiles – manufacturing process, Uses of tiles in buildings.

Timber and Wood Products: Classification and structure of timber, Defects in timber, seasoning, and preservation, Types of engineered wood – plywood, particle board.

UNIT - II

Building Materials - II:

Paints, Varnishes, and Miscellaneous Materials: Types of paints, constituents, and applications, Varnishes, distempers – composition and uses, Glass – types and uses, Plastics, asphalt, bitumen, adhesives, and sealants – properties and applications, Modern building materials: GFRP, geo synthetics, AAC blocks.

Cement: Types as per IS codes (OPC, PPC, PSC), Composition and hydration of cement compounds, Tests on cement (consistency, setting time, strength)

UNIT - III

Aggregates and Admixture:

Aggregates: Classification of fine and coarse aggregate, Properties like specific gravity, bulk density, grading, shape, surface texture. Tests on aggregates like sieve analysis, impact value, crushing value, flakiness index.

Water: Requirements for mixing and curing, Effect of impurities

Admixtures Types: plasticizers, super plasticizers, retarders, accelerators, air-entraining agents, pozzolanic admixtures and the effects admixtures on concrete properties

UNIT - IV

Fresh and Hardened Concrete

Fresh Concrete: Workability, factors affecting, Measurement of workability using slump cone, compaction factor, Vee-Bee test, flow table, Segregation and bleeding, setting time of concrete, Batching, mixing (hand and machine), transporting, placing, compacting, finishing, Curing methods and significance

Hardened Concrete: Strength gain with age, Compressive, tensile, and flexural strength, Factors affecting strength, Water–cement ratio: Abram's law, Maturity concept. Shrinkage and creep

UNIT - V

Mix Design and special concretes

Concept of mix design – nominal mix and design mix, Factors influencing mix design, Indian Standard method (IS 10262:2019), Target strength, water-cement ratio, workability, air content, Mix design examples using IS method, Acceptance criteria for concrete (as per IS 456:2000), Quality control and quality assurance in concrete works**.**

Special Concretes (Ingredients and Properties only): Self-compacting concrete (SCC), Lightweight concrete, High performance concrete (HPC), Fiber-reinforced concrete, Roller Compacted concrete.

TEXT BOOKS:

1. Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, "Building Construction", Eleventh edition 2016 Laxmi Publications.
2. Concrete Technology by M. S. Shetty, S. Chand publishing & Company Pvt. Ltd.

REFERENCE BOOKS:

1. Sushil Kumar "Building Materials and construction", 20th edition, reprint 2015, Standard Publishers.
2. Properties of Concrete by A. M. Neville – 4th edition.
3. P C Varghese, "Building Materials", PHI Learning Pvt. Ltd.
4. IS 10262: 2019 code for Concrete Mix Proportioning.
5. National Building Code (NBC) of India.