BUILDING MATERIALS AND CONCRETE TECHNOLOGY

Course Code:	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Course Outcomes:

At the end of the course the student will be able to:
CO1: Distinguish various types of bricks & stones used in construction (LO2)
CO2: Explain different components & systems of buildings (LO2)
CO3: Infer the concept of water & damp proofing materials and construction techniques (LO2)
CO4: Identify the characteristics of basic ingredients and properties of concrete (LO2)
CO5: Distinguish the properties of fresh and hardened concrete (LO2)

UNIT-I: **(10 Lectures)**

BRICKS & STONES:

Composition of good earth brick, Qualities of a good brick, Classification of bricks, Manufacturing of clay bricks, Comparison between clamp burning and kiln burning, English and Flemish bonds in brick masonry.

Properties of building stones – Classification of stones, Stone Masonry- Random Rubbled, Coarsed Rubbled and Ashlar Masonry.

SUSTAINABLE MATERIALS.

Locally available materials, recycled materials, industrial wastes, alternative materials and smart materials.

Learning outcomes:
At the end of the unit, the student will be able to
1. discuss the properties and classification of bricks and stones (L2)
2. explain types of bonds in brick masonry (L2)
3. explain about the sustainable materials (L2)

UNIT-II **(10 Lectures)**

BUILDING COMPONENTS:

Lintels, Arches and Vaults - Staircases – Types. Different types of flooring-Concrete, Mosaic, Terrazo floors; Different types of roofs- Pitched, Flat and Curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs - King and Queen Post Trusses. Doors & Windows– Types, Sizes.

Learning outcomes:
At the end of the unit, the student will be able to
1. list out types of Lintels, Arches and Staircases (L2)
2. discuss different types of flooring (L2)
3. explain different types of roof (L2)

UNIT-III **(10 Lectures)**

OTHER CONSTRUCTION PRACTICES:

Damp Proofing and Water Proofing- Materials used- Specifications of Damp Proof Course in

walls, Basic principles of water proofing of basements, Plastering, Pointing, White washing, Distempering and Painting, Formwork and Scaffolding, False ceiling, fire resisting materials.

Learning outcomes:

At the end of the unit, the student will be able to

1. explain damp proofing in buildings (L2)
2. list out wall finishing works like plastering and painting (L2)
3. discuss formwork and scaffolding in building construction (L2)

UNIT-IV **(10 Lectures)**

CONSTITUENTS OF CONCRETE:

CEMENT: Chemical Composition, Chemical and Physical processes of Hydration, Structure of Hydrated Cement, Blended Cements, Properties of cement and their effect on properties of Concrete. (Test procedures not required)

AGGREGATES: Classification, Mechanical, Physical and Thermal properties of Fine and Coarse aggregates that affect the properties of concrete. (Test procedures not required), Manufacturing Sand, Quality of mixing water.

Learning outcomes:

At the end of the unit, the student will be able to

1. discuss different properties of cement (L2)
2. distinguish different properties of fine and coarse aggregates (L2)
3. list out classification of cement fine and coarse aggregates (L2)

UNIT-V

FRESHCONCRETE: **(10 Lectures)**

WORKABILITY: Definition, Factors affecting workability, significance, Tests available for measurement (test procedures not required)

SEGREGATION AND BLEEDING: Definitions – causes and effects, measurement – Laittance, Factors affecting performance of Hardened concrete, Water/ Cement Ratio, Abram's law, Powers law, Gel space ratio, Maturity concept.

HARDENED CONCRETE:

Properties of Hardened concrete: Deformation characteristics: Creep– Shrinkage – Soundness &Thermal properties, Durability. Mix Design.

Learning outcomes:

At the end of the unit, the student will be able to

1. explain workability of fresh concrete (L2)
2. discuss segregation and bleeding which effect strength and stability of concrete (L2)
3. distinguish different properties of hardened concrete (L2)

Text Books:

1. S. K. Duggal, "Building Materials", 2nd Edition, New Age International Publishers, 2010.
2. S.C. Rangwala, "Engineering Materials", Charotar Publications, New Delhi, 2nd Edition.
3. M.S.Shetty, "Concrete Technology", 6th Edition, Chandn Publication, 2010.

References:

1. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, "Building Construction" – Laxmi Publications (P) Ltd.,NewDelhi.
2. A.M.Neville, J.J.Brookes, "Concrete Technology", 5th Edition, Pearson Education, 2009.
3. R.Chudly, "Construction Technology",(Volumes I and II), 2nd Edition, Longman, UK,1987.
4. P.C. Varghese, "Building Materials" by Prentice-Hall of India Private Ltd, 3rd Edition, New Delhi.
5. M.L. Gambhir, "Concrete Technology", 3rd Edition, Tata Mc-Graw hill Publishers, New Delhi,2008.
6. IS 456:2000, "Code of practice of plain and reinforced concrete", 4th Revision, August 2000.
7. IS 516, "Methods of Tests for strength of concrete", 18th print, June 2006
8. IS:10262., " Concrete Mix Proportioning Guidelines", 2019

Web References:

1. https://nptel.ac.in/courses/105/102/105102088/
2. https://nptel.ac.in/courses/105/102/105102012/