Devi Ahilya University Indore, India Institute of Engineering & Technology				II B.E. (Civil Engineering) Full Time			
Subject Code and Name	Instruction Hours Per Week			Credits			
VLR3C4:Construction Materials and Technology	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 hours	3	1	2	3	1	1	5

Learning Objectives:

1. To introduce students to various materials commonly used in civil engineering construction and their properties.
2. To make the student aware of the various construction techniques, practices and the equipment needed for different types of construction activities.
3. To understand the properties of ingredients of concrete, test and concrete mix design.
4. To study the behavior of concrete at its fresh and hardened state.

Pre-requisites: Engineering Chemistry

COURSE CONTENTS

UNIT I

Lime: Impurities in limestone, Classification, Slaking and hydration, Hardening, Testing, Storage, Handling, IS Specifications, Uses

Bricks: Classification, Characteristics of good bricks, Ingredients of good brick earth, Harmful substance in brick Earth, Different forms of bricks, testing of bricks.

Mortars: Classification, Uses, Characteristics of good mortar, Ingredients. Cement mortar, Lime Mortar, Lime cement mortar, special mortars

UNIT II

Glass: Definition, constituents, manufacture, classification commercial forms, uses of different types of Glasses.

Timber: Definition, Classification, Characteristics of good Timber, uses of Timber, Physical and Mechanical properties, defects, Seasoning, Preservation, Veneers , Plywood, Fiber Boards, Particle Boards, Chip Boards , Black Boards, Button Board and Laminated Boards, Applications of wood and wood products.

Plastics: Classification, Ingredients, General properties, fabrication of plastic products.

UNIT III

Concrete Materials: Cement: OPC: Composition, PPC, Slag cement, Hydration, Setting time.

Aggregates: Classification, Characteristics, Deleterious substances, Soundness, Alkali –aggregates reaction, Fine aggregates, coarse aggregates, testing of aggregates.

Admixtures, types and properties, Concrete, Workability, segregation and Bleeding, Tensile and Compressive Strength, Modulus of Elasticity, Effect of Shrinkage and Creep. Mixing and Transporting, Placing, Compaction, Finishing, Curing, Quality Control, Design of Concrete Mixes.

UNIT IV

Paints, Enamels and Varnishes: Composition of oil paint, characteristic of an ideal paint, preparation of paint, covering power of paints, Painting: Plastered surfaces, painting wood surfaces, painting metal Surfaces. Defects, Effect of weather, enamels, distemper, water wash and colour wash, Varnish, French Polish, Wax Polish.

Plastering and Pointing: Plastering with cement mortar, Defects in plastering, pointing, white washing, colour washing, Distempering.

UNIT V

Foundations: Function of Foundations, Essential requirement of good foundation, Different types of shallow and deep Foundations.

Brick masonry: Definitions, Rules for bonding, Type of bonds – stretcher bond, Header bond, English bond, Flemish Bond, Comparison of English Bond and Flemish Bond.

Doors and Windows: Common types of doors and windows of timber and metal.

Flooring: Components of a floor, selection of flooring materials, Brick flooring, Cement concrete flooring, mosaic, marble, Terrazzo flooring, Tiled roofing.

Roofs: Types, Pitched roofs and their sketches, Lean – to roof, King Post – Truss, Queen post truss and Simple steel Truss, Roof Covering materials: AC sheets GI sheet

Learning Outcomes:

On completion of this course the students will be able to

1.Knowledge on properties of materials for concrete by suitable test and mix design of concrete.

2.Compare the properties of most common and advanced building materials.

3. understand the typical and potential applications of these materials

4. Understand the importance of experimental verification of material properties
5. Will have understanding of different construction techniques, practices and equipments. They will be able to plan the requirements for substructure and superstructure a construction.

Books & References Recommended:

1. Surendra Singh, *Engineering Materials,* Vikas Publishing House.
2. Rangwala, *Engineering Materials,* Charatar Publications.
3. Shetty M.S., *Concrete Technology, Theory and Practical,* S. Chand & Co. Ltd., New Delhi.
4. Sushil Kumar, Building Construction.

List of Experiments:

1. To determine the Compressive Strength of Modular Brick.
2. To determine the Water Absorption of Modular Brick.
3. To determine the Fineness of Cement.
4. To determine the Consistency of Cement.
5. To determine Initial and Final Setting Time of cement by Vicat Apparatus.
6. To determine compressive strength of Cement.
7. Sieve Analysis of Fine and Coarse Aggregates and determination of Fineness Modulus.
8. To determine Flakiness and Elongation Index of Aggregates.
9. To determine workability of Fresh Concrete by Slump Cone Test.
10. To determine Compressive Strength of Hardened Concrete.