

Devi Ahilya Vishwavidhyalaya, Indore, India Institute of Engineering & Technology				II Year B.Tech. (Civil Engineering)		
Course Code & Name	Instructions Hours per Semester and Credits					
3RVPC3 Construction Material & Technology	Classroom Instruction (CI)		Lab Instruction (LI)	Term Work (TW) and Self Learning (SL)	Total no. of Hours Per semester	Total Credits (Total Hours/30)
	L	T	P	TW+SL	120	4
	20	10	20	70		

Course 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 concrete ingredients, test and concrete mix design.
4. To study the behavior of concrete in 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, whitewashing, 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

Course Outcome:

CO	CO	PO
CO1	Apply the Knowledge of properties of materials for their suitability in construction.	PO-1
CO2	Understand the importance of experimental verification of material properties	PO-1, PO-2
CO3	Design the concrete mix for required properties and strength	PO-2, PO-3, PO-5
CO4	Understand the requirement of concrete for various purposes	PO-4
CO5	Apply the various construction techniques and practices	PO-1, PO-2, PO-3,

Books 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.

CO-PO Relationship

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PSO 1	PSO 2	PSO 3
3RVPC3.CO1	3											2		
3RVPC3.CO2	2	3										2		
3RVPC3.CO3		3	3		2							2	3	
3RVPC3.CO4				3								2		
3RVPC3.CO5	2	2	3									2		3

List of Practical Assignment:

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.