

Discipline: CIVIL	Semester: 3RD	Name of Teaching Faculty:-Shri Prakash Chandra Murmu
Subject:- BUILDING MATERIAL & CONCRETE TECHNOLOGY (Th-4)	No of Days/Week Class allotted:- 03	Semester from date:14.07.2025 to 15.11.2025 No of Weeks: 15
Week	Class Day	Theory Topics
1st	1st	1. Overview of Construction Materials : Scope of construction materials in Building Construction, Transportation Engineering, Environmental Engineering, and Irrigation Engineering (applications only).
	2nd	Selection of materials for different civil engineering structures on the basis of strength, durability, Eco friendly and economy. Broad classification of materials – Natural, Artificial, special, finishing and recycled.
	3rd	2. Natural Construction Materials: Requirements of good building stone; general characteristics of stone; quarrying and dressing methods and tools for stone.
2nd	1st	Structure of timber, general properties and uses of good timber, different methods of seasoning for preservation of timber, defects in timber, use of bamboo in construction.
	2nd	Asphalt, bitumen and tar used in construction, properties and uses.
	3rd	Properties of lime, its types and uses. Types of soil and its suitability in construction.
3rd	1st	Properties of sand and uses. Classification of coarse aggregate according to size
	2nd	3. Artificial Construction Materials: Constituents of brick earth, Conventional / Traditional bricks, Modular and Standard bricks, Special bricks –fly ash bricks, Characteristics of good brick
	3rd	Field tests on Bricks, Classification of burnt clay bricks and their suitability, Manufacturing process of burnt clay brick, fly ash bricks, Aerated concrete blocks.
4th	1st	Flooring tiles – Types, uses Pre-cast concrete blocks- hollow, solid, pavement blocks, and their uses.
	2nd	Plywood, particle board, Veneers, laminated board and their uses.
	3rd	Types of glass: soda lime glass, lead glass and borosilicate glass and their uses. Ferrous and non-ferrous metals and their uses.
	1st	4. Cement, Aggregates , Water and Admixture: Composition of Cement. Manufacturing process of Cement – dry and wet (only flow chart), types of cement and its uses. Field tests on cement.

5th	2nd	Physical properties of OPC and PPC: fineness, standard consistency, setting time, soundness, compressive strength. Different grades of OPC and relevant BIS codes.
	3rd	Testing of cement: Laboratory tests-fineness, standard consistency, setting time, soundness, compressive strength. Storage of cement and effect of storage on properties of cement.
6th	1st	BIS Specifications and field applications of different types of cements: Rapid hardening, Lowheat, Portland pozzolana, Sulphate resisting, Blast furnace slag, High Alumina and White cement.
	2nd	Aggregates: Requirements of good aggregate, Classification according to size and shape.
	3rd	Fine aggregates: Properties, size, specific gravity, bulk density, water absorption and bulking, fineness modulus and grading zone of sand, silt content and their specification as per IS 383. Concept of crushed Sand.
7th	1st	Coarse aggregates: Properties, size, shape, surface texture, water absorption, soundness, specific gravity and bulk density, fineness modulus of coarse aggregate
	2nd	grading of coarse aggregates, crushing value, impact value and abrasion value of coarse aggregates with specifications.
	3rd	Water: Quality of water, impurities in mixing water and permissible limits for solids as per IS: 456.
8th	1st	Admixtures in concrete: Purpose, properties and application for different types of admixtures such as accelerating admixtures, retarding admixtures, water reducing admixtures, air entraining admixtures and super plasticizers. (concepts only)
	2nd	5. Concrete: Different grades of concrete, provisions of IS 456 (Latest).
	3rd	Duff Abraham water cement (w/c) ratio law, significance of w/c ratio, selection of w/c ratio for different grades
9th	1st	maximum w/c ratio for different grades of concrete for different exposure conditions as per IS 456.
	2nd	Properties of fresh concrete: Workability: Factors affecting workability of concrete
	3rd	Determination of workability of concrete by slump cone, compaction factor, Vee-Bee Consistometer
10th	1st	Value of workability requirement for different types of concrete works
	2nd	Segregation, bleeding and preventive measures
	3rd	Properties of Hardened concrete: Strength, Durability, Impermeability.

11th	1st	6. Concrete Mix Design and Testing of Concrete: Concrete mix design: Objectives, methods of mix design
	2nd	study of mix design as per IS 10262 (only procedural steps).
	3rd	Non- destructive testing of concrete: Rebound hammer test
12th	1st	working principle of rebound hammer and factor affecting the rebound index
	2nd	Ultrasonic pulse velocity test as per IS13311 (part 1 and 2), Importance of NDT tests.
	3rd	7. Quality Control of Concrete: Concreting Operations: Batching, Mixing, Transportation, Placing, Compaction, Curing and Finishing of concrete.
13th	1st	Forms for concreting: Different types of form works for beams, slabs, columns, materials used for form work
	2nd	Requirement of good form work. Stripping time for removal of form works per IS 456
	3rd	Waterproofing: Importance and need of waterproofing, methods of waterproofing and materials used for waterproofing
14th	1st	Joints in concrete construction: Types of joints, methods for joining old and new concrete, materials used for filling joints
	2nd	8. Special Concrete and Extreme Weather concreting: Special Concrete: Properties, advantages and limitation of following types of Special concrete: Ready mix Concrete
	3rd	Fiber Reinforced Concrete, High performance Concrete, Self- compacting concrete and light weight concrete
15th	1st	Cold weather concreting: effect of cold weather on concrete
	2nd	Precautions to be taken while concreting in cold weather condition. (only concepts)
	3rd	Hot weather concreting: effect of hot weather on concrete, precautions to be taken while concreting in hot weather condition. (only concepts)

SHR
11.07.25