

LESSON PLAN

Discipline: Civil Engg. , UGMIT Rayagada
Semester: 5TH 3rd
Name of the Teaching Faculty: DEBABRATA CHHURIA
Lecturer Stage 1
Subject: **BUILDING MATERIALS &
CONCRETE TECHNOLOGY**
(CEPC209)
No of Days/week class allotted: 3
Session: 2025-26

Week	Class Day	Theory/Practical Topic	Remarks
1	1-3	Overview of Construction Materials <ul style="list-style-type: none">• Scope of construction materials in Building Construction, Transportation Engineering, Environmental Engineering, and Irrigation Engineering (applications only).• 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. Natural Construction Materials- Requirements of good building stone; general characteristics of stone; quarrying and dressing methods and tools for stone.	
2	4-6	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. <ul style="list-style-type: none">• Asphalt, bitumen and tar used in construction, properties and uses.• Properties of lime, its types and uses.• Types of soil and its suitability in construction.	
3	7-9	<ul style="list-style-type: none">• Properties of sand and uses Classification of coarse aggregate according to size Artificial Construction Materials <ul style="list-style-type: none">• Constituents of brick earth, Conventional / Traditional bricks, Modular and Standard bricks, Special bricks –fly ash bricks, Characteristics of good brick, Field tests on Bricks,	

		Classification of burnt clay bricks and their suitability,	
4	10-12	<ul style="list-style-type: none"> • Manufacturing process of burnt clay brick, fly ash bricks, Aerated concrete blocks. • Flooring tiles – Types, uses • Pre-cast concrete blocks- hollow, solid, pavement blocks, and their uses. • Plywood, particle board, Veneers, laminated board and their uses. • Types of glass: soda lime glass, lead glass and borosilicate glass and their uses. 	
5	13-15	<p>Ferrous and non-ferrous metals and their uses.</p> <p>Cement, Aggregates , Water and Admixture</p> <p>Composition of Cement</p> <ul style="list-style-type: none"> • Manufacturing process of Cement – dry and wet (only flow chart), types of cement and its uses. Field tests on cement. • Physical properties of OPC and PPC: fineness, standard consistency, setting time, soundness, compressive strength. Different grades of OPC and relevant BIS codes. 	
6	16-18	<ul style="list-style-type: none"> • Testing of cement: Laboratory tests-fineness, standard consistency, setting time, soundness, compressive strength. Storage of cement and effect of storage on properties of cement. <p>BIS Specifications and field applications of different types of cements: Rapid hardening, Low heat, Portland pozzolana, Sulphate resisting, Blast furnace slag, High Alumina and White cement.</p> <ul style="list-style-type: none"> • Aggregates: Requirements of good aggregate, Classification according to size and shape. 	
7	19-21	<ul style="list-style-type: none"> • 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. • Coarse aggregates: Properties, size, shape, surface texture, water absorption, soundness, specific gravity and bulk density, fineness modulus of coarse aggregate, grading of coarse aggregates, crushing value, impact value and abrasion value of coarse aggregates with specifications. □ Water: Quality of water, impurities in mixing water and permissible limits for solids as per IS: 456. 	
8	22-24	<ul style="list-style-type: none"> • Admixtures in concrete: Purpose, properties and application for different types of admixture such as accelerating admixtures, 	

		retarding admixtures, water reducing admixtures, air entraining admixtures and super plasticizers. (concepts only)	
		<p>Concrete</p> <ul style="list-style-type: none"> Concrete: Different grades of concrete, provisions of IS 456 (Latest). 	
9	25-27	<ul style="list-style-type: none"> Duff Abraham water cement (w/c) ratio law, significance of w/c ratio, selection of w/c ratio for different grades, maximum w/c ratio for different grades of concrete for different exposure conditions as per IS 456. Properties of fresh concrete: Workability: Factors affecting workability of concrete. Determination of workability of concrete by slump cone, compaction factor 	
10	28-30	<p>Vee-Bee Consistometer. Value of workability requirement for different types of concrete works. Segregation, bleeding and preventive measures.</p> <ul style="list-style-type: none"> Properties of Hardened concrete: Strength, Durability, Impermeability 	
11	31-33	<p>Concrete Mix Design and Testing of Concrete</p> <ul style="list-style-type: none"> Concrete mix design: Objectives, methods of mix design, study of mix design as per IS 10262 (only procedural steps). 	
12	34-36	<p>Non-destructive testing of concrete: Rebound hammer test, working principle of rebound hammer and factor affecting the rebound index, Ultrasonic pulse velocity test as per IS13311 (part 1 and 2), Importance of NDT tests.</p> <p>Quality Control of Concrete Concreting Operations: Batching, Mixing, Transportation, Placing, Compaction, Curing and Finishing of concrete</p>	
13	37-39	<ul style="list-style-type: none"> Forms for concreting: Different types of form works for beams, slabs, columns, materials used for form work, requirement of good form work. Stripping time for removal of form works per IS 456. Waterproofing: Importance and need of waterproofing, methods of waterproofing and materials used for waterproofing. 	
14	40-42	<ul style="list-style-type: none"> Joints in concrete construction: Types of joints, methods for joining old and new concrete, materials used for filling joints Special Concrete and Extreme Weather concreting Special Concrete: Properties, advantages and limitation of 	

		following types of Special concrete: Ready mix Concrete, Fiber Reinforced Concrete, High performance Concrete, Selfcompacting concrete and light weight concrete	
15	43-45	<ul style="list-style-type: none">• Cold weather concreting: effect of cold weather on concrete, precautions to be taken while concreting in cold weather condition. (only concepts)• Hot weather concreting: effect of hot weather on concrete, precautions to be taken while concreting in hot weather condition . (only concepts)	

Signature of Faculty:

Signature of HOD:


14/07/25