



SYNERGY SCHOOL OF ENGINEERING, DHENKANAL
LESSON PLAN
SESSION 2026-27
DEPARTMENT OF CIVIL ENGINEERING

Discipline: Civil Engineering	Semester: 3 rd /W 2026	Name of the Faculty: KIRANBALA BEHERA (Lecturer) Email: kiranabalabehera5@gmail.com
Subject: BUILDING MATERIAL & CONCRETE TECHNOLOGY	No. of Days/week: 03	Start Date: 01/07/2026 End Date: 05/11/2026

Week	Class Day	Theory Topics
1st	1st	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.
	3rd	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. Properties of lime, its types and uses.
	3rd	Types of soil and its suitability in construction.
3rd	1st	Properties of sand and uses, Classification of coarse aggregate according to size.
	2nd	Constituents of brick earth, Conventional/ Traditional bricks, Modular and Standard bricks, Special bricks –fly ash bricks, Characteristics of good brick, Field tests on Bricks
	3rd	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. Types of glass: soda lime glass
	3rd	lead glass and borosilicate glass and their uses. Ferrous and non-ferrous metals and their uses.
5th	1st	Composition of Cement. 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.
	2nd	Setting time, soundness, compressive strength. Different grades of OPC and relevant BIS codes. Testing of cement: Laboratory tests-fineness, standard consistency,
	3rd	Setting time, soundness, compressive strength. Storage of cement and effect of storage on properties of cement. BIS Specifications and field applications of different types of cements: Rapid hardening
6th	1st	Low-heat, Portland pozzolana, Sulphate resisting, Blast furnace slag, High Alumina and White cement. Aggregates: Requirements of good aggregate
	2nd	Classification according to size and shape. Fine aggregates: Properties, size, specific gravity, bulk density, water absorption and bulking, fineness modulus
	3rd	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

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4/6/26



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	2nd	Fineness modulus of coarse aggregate, 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.
8 th	1st	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)
	2nd	Concrete: Different grades of concrete, provisions of IS 456 (Latest).
	3rd	Duff Abraham water cement (w/c) ratio law, significance of w/c ratio
9 th	1st	Selection of w/c ratio for different grades
	2nd	Maximum w/c ratio for different grades of concrete for different exposure conditions as per IS 456.
	3rd	Properties of fresh concrete: Workability: Factors affecting workability of concrete.
10 th	1st	Determination of workability of concrete by slump cone, compaction factor
	2nd	Vee-Bee Consistometer. Value of workability requirement for different types of concrete works. Segregation, bleeding and preventive measures.
	3rd	Properties of Hardened concrete: Strength, Durability, Impermeability.
11 th	1st	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
12 th	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	Quality Control of Concrete. Concreting Operations: Batching, Mixing, Transportation, Placing, Compaction, Curing and Finishing of concrete.
13 th	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.
14 th	1st	Joints in concrete construction: Types of joints, methods for joining old and new concrete, materials used for filling joints.
	2nd	Special Concrete: Properties, advantages and limitation of Ready mix Concrete.
	3rd	Properties, advantages and limitation of Fiber Reinforced Concrete, High performance Concrete
15 th	1st	Properties, advantages and limitation of Self- compacting concrete and light weight concrete.
	2nd	Cold weather concreting: effect of cold weather on concrete, 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)

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