Course Modules of the Subject Taught for the Session Sept – Dec 2025-26 (Odd Semester)

Course Syllabi with CO's

Faculty Name:			Academic Year: 2025-2026				
Department: CIVIL ENGINEERING							
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
BCV503	**Concrete Technology**	**Core**	**-**	**3**	**0**	**0**	**40**
Objectives	This course will enable students to 1. To recognize material characterization of ingredients of concrete and its influence on properties of concrete 2. To study the properties of fresh concrete and hardened concrete 3. Proportion ingredients of Concrete to arrive at most desirable mechanical properties of Concrete. 4. Ascertain various types of special concrete with their properties.						

Topics Covered as per Syllabus

Module 1 - Concrete Ingredients

Cement manufacturing process, chemical composition and their importance, hydration of cement, types of cement. Testing of cement, steps to reduce carbon footprint. Fine aggregate: Functions, requirement, Alternatives to River sand, M-sand introduction, and manufacturing. Coarse aggregate: Importance of size, shape and texture. Grading and blending of aggregate. Testing on aggregate, requirement. Recycled aggregates Water – qualities of water. Chemical admixtures – plasticizers, accelerators, retarders, and air entraining agents. Mineral admixtures – Pozzolanic and cementitious materials, Fly ash, GGBS, silica fumes, Metakaolin and rice husk ash. **8 Hours**

Module 2 - Fresh Concrete

Factors affecting workability. Measurement of workability–slump, Compaction factor and Vee-Bee Consistometer tests, flow tests. Segregation and bleeding. Process of manufacturing of concrete- Batching, Mixing, Transporting, Placing and Compaction. Curing – Methods of curing – Water curing, membrane curing, steam curing, accelerated curing, self- curing. Good and Bad practices of making and using fresh concrete and Effect of heat of hydration during mass concreting at project sites. **8 Hours**

Module 3 - Hardened Concrete

Factors influencing strength, W/C ratio, gel/space ratio, Maturity concept, testing of hardened concrete, Creep – factors affecting creep. Shrinkage of concrete – plastic shrinking and drying shrinkage, Factors affecting shrinkage. Definition and significance of durability. Internal and external factors influencing durability, Mechanisms- Sulphate attack – chloride attack, carbonation, freezing and thawing. Corrosion, Durability requirements as per IS-456, In situ testing of concrete- Penetration and pull-out test, rebound hammer test, ultrasonic pulse velocity, core extraction – Principal, applications and limitations. **8 Hours**

Module 4 - Concrete Mix Design

Principles of concrete mix design, Parameters and factors influencing mix design, Concept of Mix Design with and without admixtures, variables in proportioning and Exposure conditions, Selection criteria of ingredients used for mix design, Procedure of mix proportioning. Numerical Examples of Mix Proportioning using IS: 10262:2019. **8 Hours**

Module 5

RMC-manufacture and requirement as per QCI-RMCPCS, properties, advantages, and disadvantages. Self-Compacting concrete- concept, materials, tests, properties, application and typical mix Fiber reinforced concrete - types of fibres, properties, application of FRC. Light weight concrete-material properties and types. Typical light weight concrete mix proportion and applications, materials, requirements, mix proportion and properties of Geo polymer Concrete, High Strength Concrete and High-Performance Concrete**.** **8 Hours**

List of Text Books

1. Neville A.M. "Properties of Concrete"-4th Ed., Longman.
2. M.S. Shetty, Concrete Technology - Theory and Practice Published by S. Chand and Company, New Delhi.

List of Reference Books

1. Kumar Mehta. P and Paulo J.M. Monteiro "Concrete-Microstructure, Property and Materials", 4th Edition, McGraw Hill Education, 2014 2. A.R. Santha Kumar, "Concrete Technology", Oxford University Press, New Delhi (New Edition).		
URLs: https://nptel.ac.in/courses/105102012/10		
Course Outcomes	Relate material characteristics and their influence on microstructure of concrete.	L2
	Distinguish concrete behavior based on its fresh and hardened properties.	L2
	Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes	L3
	Select a suitable type of concrete based on specific application.	L2
Internal Assessment Marks: 30 + 10 (3 Session Tests are conducted during the semester and marks allotted based on average of 3 test and assignment performances).		

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code:	BCV503	TITLE: **Concrete Technology**				Faculty Name:					
List of Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	2											2
CO-2	2											2
CO-3	2		2					2		2		2
CO-4	2											2

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution

The Correlation of Course Outcomes (CO's) and Program Specific Outcomes (PSO's)

Subject Code:	BCV503	TITLE: **Concrete Technology**	Faculty Name:	
List of Course Outcomes	Program Specific Outcomes			
	PSO1		PSO2	
CO-1	2		-	
CO-2	2		-	
CO-3	2		-	
CO-4	2		-	
CO-5	2		-	

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution