

Sankalchand Patel University
Faculty of Engineering and Technology
First Year Master of Technology in Civil Engineering
(Computer Aided Structural Analysis and Design)
In Effect from Academic Year 2023-24

Branch Name:	Civil Engineering (Computer Aided Structural Analysis & Design)
Semester/Year:	Semester I / First Year
Subject Title:	Advances in Concrete Technology (Elective - I)
Subject Code:	2ET2100102T
Pre-requisite:	Building Materials, Concrete Technology

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	0	0	3	24	60	16	40	00	00	00	00	100

Course Objective:

1. To understand the properties of ingredients of concrete
2. To study the behavior of concrete at its fresh and hardened state
3. To study about the concrete design mix
4. To know about the procedures in concreting
5. To understand special concrete and their use

Subject Contents			
Sr. No	Topic	Total Hours	Weightage (%)
1	Materials and Their Properties Review of properties of cement, their physical and chemical properties, special purpose cements, Classification and properties of aggregates. Admixtures & construction chemicals, Use of Fly Ash, Silica Fumes, Metakaolin & GGBS in concrete, futuristic materials and their properties	6	25
2	Properties of Concrete Rheological behavior of concrete, requirements of workability of concrete, Durability & Effect of environmental conditions, Strength & maturity of hardened concrete, Impact, Dynamic and fatigue behavior of concrete, shrinkage and creep of concrete, behavior of concrete under fire.	10	20
3	Permeability and durability of concrete Permeability and Durability of concrete, Parameters of durability of concrete, chemical attack on concrete, Production of concrete; batching mixing, transportation, placing, compaction of concrete. Special methods of concreting and curing, Hot weather and cold weather concreting, Guniting (Shotcreting)	2	10
4	Concrete Mix Design Concrete mix design, Basic considerations and choice a mix proportions, various methods of mix designs including IS Code method. Quality control and quality assurance of concrete, Acceptance criteria, Quality management in concrete construction, Inspection and testing of concrete. Non-destructive testing of concrete, core test and load test.	3	25
5	Special Concrete Special concrete such as high strength, Lightweight, heavy weight, vacuum processed concrete, Mass concrete, high performance concrete, Pumpable concrete, Self-Compacting concrete, Air entrained concrete, Ferro cement, fiber reinforced concrete, Polymer impregnated concrete. Jet concrete. Recycling & re-use of industrial waste material. Deterioration and repair technology of concrete, Distress and type of repairs, crack sealing techniques	8	20



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Course Outcome:

After learning the course, the students should be able to:

1. Understand the physical and chemical properties of cement. Skill Development
2. Understand the various properties of concrete. Skill Development
3. Understand, Analyze and Evaluate the Concrete mix design. Skill Development
4. Understand the various special concrete and its uses. Skill Development

Reference Books

1. Neville, A.M., Properties of Concrete, Pearson Education Asia (P) Ltd, England, 2000.
2. Concrete Technology, Gambhir M.L, Tata McGraw Hill
3. Concrete Technology, Gambhir M.L, Tata McGraw Hill
4. Concrete Technology, M.S.Shetty, S.Chand& Company New Delhi
5. Concrete microstructure, properties & materials, P.KumarMehata, Paulo & J.M. Monteiro,
6. Light Weight Concrete, Short & Kenniburg, Asia Publishing House, Bombay

E-Resources (If any):

https://onlinecourses.nptel.ac.in/noc16_ce10/preview

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand the physical and chemical properties of cement.	L-1 and L-2
CLO2	Understand the various properties of concrete.	L-3 L-4 and L-5
CLO3	Understand, Analyze and Evaluate the Concrete mix design	L-5
CL04	Understand the various special concrete and its uses.	L-4 and L-5

L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create

Mapping of CLOs with POs & PSOs

	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
Course Learning Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CLO1	M	M		M		M			M				M		
CLO2	M	M		M		M			M				M		
CLO3	M	M		M		M		M	M			H	M	H	
CL04	M	M		M		M		M				M	M	M	

H: High, M: Medium, L: Low