

For Lecturers in **B. Tech. Civil Engineering Vth Semester**

Course No.		Title of the Course	Course Structure	
CE-309A		Concrete Technology	L-T-P	2-0-0
COURSE OUTCOMES (CO)				
CO1	Students will be able to study the construction materials like Cement & Aggregates and its properties			
CO2	Students will be able to design concrete and perform test on concrete on various strength parameters, modifying its properties using other substances.			
CO3	Students will be able to study various effects on concrete & its non-destructive tests for properties evaluation.			
CO4	Students will be able to study about methods of repairing and design of special concrete.			
UNIT NO`	Topics To Be Covered		Lecture Nos	
	Introduction to CE-309A Concrete Technology (Co, PO, Syllabus)		1.	
I	Introduction of Concrete, preparation of concrete		2.	
	grades of concrete, advantages of concrete, concept of quality control		3.	
	Introduction of Cement, ingredient in cement		4.	
	basic chemistry, types of cement, ordinary Portland cement		5.	
	rapid hardening cement, low heat cement, sulphate resistant cement		6.	
	Portland-pozzolona cement, high strength Portland cement, high alumina cement		7.	
	waterproof cement, white Portland cement, hydrophobic cement, colored Portland cement		8.	
	Field and laboratory tests on cement		9.	
	Pozzolanic materials, Fly ash, metakaoline, GGBS, iron slag, rise husk ash - its types, properties, applications & limitations		10.	
	Aggregates, classification of aggregates based on petrography, size, shape and textures		11.	
	deleterious substances in aggregates, bulking of fine aggregates		12.	
	sieve analysis, grading of aggregates as per IS-383-1970		13.	
	fineness modulus, Maximum size of aggregate		14.	
	Quality of mixing water, curing water		15.	
	Revision		16.	
	II	Introduction, Design of mix by IS & ACI methods including batching of materials		17.
mixing of concrete materials, transportation of concrete, compaction of concrete, ready mixed concrete		18.		
vibrators, Internal vibrators, external vibrators, concrete curing and formwork removal		19.		
Introduction, workability, factors influencing workability		20.		
measurement of workability, requirements of workability		21.		
properties of hardened concrete, stress and strain characteristics of concrete		22.		

	Young's modulus of concrete, creep and shrinkage of concrete	23.
	permeability of concrete, durability of concrete sulphate attack, fire-resistance, thermal properties of concrete	24.
	construction joints, expansion and contraction joints	25.
	Revision	26.
III	Significance of Non-Destructive Testing	27.
	Rebound Hammer, Ultrasonic pulse velocity techniques, Penetration techniques	28.
	pullout tests, vibration methods, radioactive techniques, Cover meter, core-tests	29.
	Causes of concrete deterioration, deterioration by water, surface	30.
	weir, frost action, deterioration by chemical reactions	31.
	sulphate attack, alkali-aggregate reaction, corrosion of embedded steel in concrete	32.
	Prevention of deterioration of concrete	33.
	Revision	34.
IV	Symptoms and diagnosis of distress, evaluation of cracks, repair of cracks	35.
	common types of repairs, distress in fire damaged structures, underwater repairs	36.
	Lightweight concrete, definition and its properties	37.
	applications, high strength concrete, definitions, its properties and applications	38.
	Mass Concrete, waste material based concrete, shotcrete, fiber reinforced concrete: Materials Fibres types and properties	39.
	ferrocement, polymer concrete composites, heavy weight concrete for radiation shielding	40.
	Introduction, basic concepts, classifications and types of prestressing	41.
	prestressing systems, and properties of materials	42.
	pre tensioned and post tensioned concrete elements	43.
	Revision	44.

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