

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology			Branch/Spec.		Civil		
Semester		IV			Version		2.0.0.0		
Effective from Academic Year			2019-20		Effective for the batch Admitted in			July 2018	
Subject code		2CI406		Subject Name		Concrete Technology			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	03	00	01	00	04	Theory	40	60	100
Hours	03	00	02	00	05	Practical	30	20	50
Pre-requisites:									
Learning Outcome:									
After successful completion of the course, student will be able to:									
<ul style="list-style-type: none"> <li>Get provide basic idea of concrete ingredients. As we know the concrete is very highly vulnerable material for construction. So the knowledge of concrete is required to become a good civil engineer. The subtopics of concrete like properties, mix design, adverse effects on it, repair and rehabilitation techniques etc are very useful contents to become sound in this area.</li> </ul>									
Theory syllabus									
Unit	Content								Hrs
1.	<b>General:</b> Historical background, composition of concrete, general note on strength mechanism, current practice and future trends.								1
2.	<b>Ingredients Of Concrete:</b> <b>Cement-</b> Chemical composition, hydration, heat of hydration, hydrated structure, various types of cement, testing of cement as per Indian standard. <b>Aggregates-</b> Function in concrete, classification, effect of geometry & texture, strength, mechanical properties, moisture content, water absorption, bulking of sand, deleterious substances, sieve analysis, various grading and grading requirements, sampling & testing as per Indian Standards. <b>Water-</b> General Requirements & limiting values of impurities. <b>Admixtures-</b> Additives and admixtures, types, need and benefits <b>Mineral admixture</b> - Fly ash, silica fume, blast furnace slag, and other pozzolonic materials. <b>Chemical admixtures</b> - Accelerator, retarder, water reducing elements, plasticizer and super plasticizer, their functions and dosage.								13
3.	<b>Fresh Concrete:</b> Methods of mixing, transporting and placing of concrete. Workability – Definition and need, factors affecting workability, various tests as per IS ad ASTM. Segregation and bleeding, stiffening, re-tempering. Curing: necessity and various methods, micro cracking.								4
4.	<b>Hardened Concrete</b> – Compressive and tensile strength and their relationship, various tests as per IS and ASTM. Factors affecting strength – water cement ratio, gel space ratio, aggregate cement ratio, properties of ingredients, and effect of age, maturity, and aggregate cement-paste interface various finishes of concrete. Introduction to aspects of elasticity, shrinkage and creep. Tests for strength of concrete: Destructive, semi destructive and non- destructive tests with their limitations, test methods as per IS and ASTM								4
5.	<b>Durability And Permeability Of Concrete:</b> Definitions, causes, carbonation, cracking								3
6.	<b>Concrete In Aggressive Environment:</b> Alkali – aggregate reaction, sulphate attack, chloride attack, acid attack, effect of sea water, special coating for water proofing, sulphate chloride and acid attack, concrete for hot liquids.								3
7.	<b>Special Concrete:</b> Review of behaviour and characteristics of high strength concrete, high performance concrete, fibre reinforced concrete, mass concrete, light weight and heavy weight concrete, Precast concrete, Bacteria Concrete, Transparent Concrete, Voided Concrete, Permeable Concrete.								5
8.	<b>Special Concreting Techniques:</b> Pumped concrete, shotcrete, underwater concrete, pre-placed								5

	concrete, vacuum dewatered concrete, hot and cold weather concreting, Ready mixed concrete	
9.	<b>Concrete Mix Design:</b> Principles of mix proportioning, probabilistic parameters, factors governing selection of mix. Road note - 4, DOE, ACI and IS method (10262-2009) of concrete mix design, Variability of test results, acceptance criteria, various IS code provisions.	5
10.	<b>Repair And Rehabilitation:</b> Distress in structure – causes and precautions, damage assessment of structural elements, repairing techniques and repairing materials.	2
TOTAL		45
<b>Term Work</b>		
(A) Term work shall consist of tests on cement and aggregate, fresh concrete and hardened concrete. It includes destructive, partial destructive and non- destructive tests.		
(B) Term work shall include report on topic assigned by respective lab in-charge.		
(C) Term work shall include field visit and students will have to submit a report on it.		
(D) Oral/Practical marks include viva-voce on practical performed and submitted reports.		
<b>Text Books</b>		
1.	M.S.Shetty : Concrete Technology : S.Chand Publishing	
<b>Reference Books</b>		
1.	A.M.Neville ; Properties of Concrete , Prentice Hall.	
2.	D.F.Orchard; Concrete Technology, Elsevier Science & Technology.	
3.	P Kumar Mehta, Monteiro; Concrete Technology, McGraw-Hill Professional.	
4.	A R Santhakumar; Concrete Technology, Oxford university press-new Delhi	
5.	M L Gambhir; Concrete Technology, Tata McGraw-Hill Education.	
6.	IS 456:2000, IS 383-1917, IS 10262-2009	
<b>ICT/MOOCs</b>		
1.	<a href="http://www.nptel.iitm.ac.in/">http://www.nptel.iitm.ac.in/</a>	
2.	<a href="https://www.bgccatering.nl/Mon/15355-civil-engineering-material-and-concrete-technology-notes/">https://www.bgccatering.nl/Mon/15355-civil-engineering-material-and-concrete-technology-notes/</a>	