

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Bachelor of Technology				Branch/Spec.	CIVIL Engineering			
Semester	V				Version	2.0.0.0			
Effective from Academic Year	2019-20				Effective for the batch Admitted in	2014-15			
Subject code	2CI504		Subject Name	<b>ELEMENTS OF STRUCTURAL DESIGN</b>					
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	3		1		4	Theory	40	60	100
Hours	3		2		5	Practical	35	15	50
Pre-requisites:									
Learning Outcome:									
<p>After Completion of the curriculum of element of structural design, students can understand the different methods for calculating the forces or moments of structural member. They get knowledge regarding how to analysis and design different structural member like beam, column, slab and footing. Similarly in steel section students can get knowledge of different cross section of steel and how to analyse tension member and compression member, laterally supported beam and unsupported beam and also how to make suitable connection for different structural components.</p>									
Theory syllabus									
Unit	Content							Hrs	
1	<b>Loads &amp; Reinforcement:</b> Indian standard specifications for dead, live and wind loads on buildings, wind loads on typical roof trusses , Different types of reinforcement and their properties							1	
2	<b>Design Methods :</b> Various limit states, limit state design, ultimate load method, plastic design, general principles and applicability.							1	
3	<b>Reinforced Concrete :</b> <b>1) Reinforced Concrete Beams and Slabs:</b> a) Introduction to working stress method actual and critical (balanced neutral axis).Balanced, under reinforced and over reinforced section, moment of resistance: singly and doubly reinforced rectangular and flanged section. b) Limit state method: Safety and serviceability requirement. Limit state of serviceability. Analysis and Design of rectangular and flanged (T & L) sections of beams. Singly and doubly reinforced beams.							19	

	<p><b>2) Design of One way and Two ways Simply Supported Slabs.</b></p> <p><b>3)Limit State of Collapse:</b> Shear and Torsion: Design for shear reinforcements for beam.</p> <p><b>4) Axially Loaded Reinforced Concrete Columns:</b> Longitudinal and transverse reinforcement load carrying capacity of short columns. Design reinforcements in columns.(uniaxial)</p>	
4	<p><b>R.C. Column footings:</b> Axial loaded footings, critical sections for bending and shear. Shear and bending strength of footings, design of axial isolated footings, square and rectangular shape.</p>	4
5	<p><b>Steel Structures :</b> Connections: Bolted &amp; welded with gusset plate and lug angles.</p>	7
6	<p><b>Tension &amp; Compression Members :</b> Design of Tension members &amp; compression members.</p>	7
<b>Practical content</b>		
Practical and Term work shall be based on the above mentioned course content.		
<b>Text Books</b>		
1	Limit state theory & Design of Reinforced Concrete by Shah and Karve, Structure Publication.	
2	Reinforced Concrete by H.J.Shah, Charotar Publishing House pvt. Ltd	
3	Design of steel structures by Dayratnam, S.Chand Publication.	
4	IS CODES : IS-456, IS-800, IS-875, SP34	
<b>Reference Books</b>		
1	Design of Concrete Structure by A.K. Jain, Nem Chand & Bros.; Seventh edition (2012)	
2	Design of steel structure by Arya & Ajmani, NEM CHAND & BROS; 2015 edition	
3	Design of steel structure by Ramchandra, Scientific Publishers Journals Dept.	
4	Reinforced concrete Design by S.N. Sinha, McGraw Hill Education (India) Private Limited;	
5	Reinforced concrete by Syal and Gupta, S.Chand (G/L) & Company Ltd; Reprint Edition 2007 edition	
6	Limit State Design by Dr. Ramchandra,, Scientific Publishers Journals Dept. (30 January 2010)	