

GANPAT UNIVERSITY									
FACULTY OF ARCHITECTURE DEISGN & PLANNING									
Programme	Bachelor of Architecture				Branch/Spec.	INSTITUTE OF ARCHITECTURE			
Semester	IV				Version	2.0.0.0			
Effective from Academic Year	2020-21				Effective for the batch Admitted in	June 2019			
Subject code	2IVA04SDS-IV		Subject Name	Structure design and system-IV					
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	-	-	-	2	Theory	40	60	100
Hours	2	-	-	-	2	Practical	-	-	-
PRE-REQUISITES:									
Structure – I, II, III									
OBJECTIVE:									
<ul style="list-style-type: none"> <li>This subject is applications of structural engineering principles to design basic structural elements using of reinforced concrete as materials. This subject is specifically aim to develop understanding of various design philosophy, Indian codal provisions, design basis used in design of basic elements of framed structures and its detailing requirement.</li> </ul>									
Learning Outcome:									
<p><b>LO1:</b>Analyse continuous beam and non-sway single bay single story frames using Moment Distribution Method.</p> <p><b>LO2:</b>Select various design philosophies to plan, to draw structural layout and to understand analytical approach to be used in the design of structural elements</p> <p><b>LO3:</b> Evaluate the loading conditions and to calculate loads as per IS Specifications</p> <p><b>LO4:</b> Propose design of basic structural elements like slab, beams, columns, staircase and foundation etc. using concrete as materials</p>									
CONTENT & TEACHING UNITS									
Unit	Content								Hrs
<b>A</b>	<b>INTRODUCTION TO IS CODE:</b> Introduction to various load & load combinations, Use of IS code for loads, Introduction to 456-2000 for design of RCC element. Limit state of collapse & Serviceability: Safety factors for Material & Loading, Limit State of Flexure: Stress-Strain characteristics of Concrete & Reinforcing steel,								<b>04</b>
<b>B</b>	<b>DESIGN OF BEAMS:</b> Theory and Concept of different type of sections: Under reinforced, Over reinforced & Balance section, Neutral Axis depth, Moment of Resistance for singly reinforced and doubly reinforced beam. Design of singly and doubly reinforced beams.								<b>06</b>
<b>C</b>	<b>DESIGN OF COLUMN:</b> Definition, Classifications of column, Assumptions, Design of Short columns considering only axial load.								<b>06</b>
<b>D</b>	<b>DESIGN OF SLAB:</b> Types of Slab, loading transfer behaviors, Design of Simply supported One-Way and Two-Way Slab, Design of One way and Two-Way continuous slab.								<b>06</b>

<b>E</b>	<b>DUCTILE DETAILING:</b> Concepts of Detailing of various structural components as per IS: 13920 provisions. <b>BOND &amp; ANCHORAGE, DEVELOPMENT LENGTH, LAP LENGTH.:</b> Development length $L_d$ , Bond stress ,Anchoring of reinforcement.	<b>04</b>
<b>G</b>	<b>DESIGN OF STAIRCASE:</b> Introduction, Concepts of different types of staircases based on structural behaviors, Calculation of trade and riser, Design of waist slab type staircase.	<b>04</b>
<b>Text Books</b>		
<b>1</b>		
<b>Reference Books</b>		
<b>1</b>	1. Junarkar S. B. & Shah H. J; Tata McGraw Hill book Company.	
<b>2</b>	Wang C. K.; Intermediate Structural Analysis; Tata McGraw Hill book Company, New Delhi	
<b>3</b>	Elements of Civil Engineering (IV Edition) - S. S. Bhavikatti	
<b>4</b>	Shah &Karve; Limit State Theory & Design of Reinforced Concrete; Structure Pub., Pune	
<b>5</b>	IS: 456 - Code of practice for plain and reinforced concrete.	
<b>6</b>	IS: 875 (Part I to V) - Code of practice for structural safety of Buildings Loading standards.	
<b>7</b>	Strength of Materials and Theory of Structures; Vol. II - B.C.Punmia	
<b>8</b>	IS: 13920 -Code of Practice for ductile detailing of RC structure subjected to seismic force.	
<b>9</b>	EQ Tips; IIT Kanpur & BM &TPC New Delhi.	
<b>10</b>	Structural Engineering for architecture - A.P. Dongre	