

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3	Sheet No. 1/4
Branch	CIVIL ENGINEERING		Semester	5 th	
Course Code		Course Name	Design of R.C.C. Structures		
Course Outcome 1	Explain the design philosophies of reinforced concrete structures including limit state and working stress.		Teach Hrs	Marks	
Learning Outcome 1	Describe the different types of steel and grade of concrete as per IS 456-2000		04	06	
Content	Purpose of concrete and steel in R.C.C, suitability of steel, types of steel like mild steel, HYSD steel and TMT bars, Grades of concrete and steel, Location of tension steel in beams and slabs, Types of loading on structures IS 875-1987, Various important codes and their purpose like IS 456 2000, IS 1893 etc.				
Method of Assessment	External Theory Exam – Pen Paper Test				
Learning outcome 2	Explain concepts of working stress method.		10	12	
Content	Basic concept, assumptions, equivalent area of section, stress-strain behaviour for singly reinforced section, permissible stresses in concrete and steel, Neutral Axis of section, Concept of under reinforced, over reinforced and balanced section, Moment of resistance, Simple numerical problems on calculating moment of resistance and area of steel of singly and doubly reinforced rectangular sections only.				
Method of Assessment	External Theory Exam – Pen Paper Test				
Learning outcome 3	Explain concepts of limit state method.		10	10	
Content	Basic concept, types of limit states, characteristic and design values of strength and load, partial factor of safety for materials and loads, assumptions, comparison between WSM and LSM, Loading on structure as per IS 875, effective depth, effective span, nominal cover, minimum and maximum reinforcement, control of deflection				
Method of Assessment	External Theory Exam – Pen Paper Test				
Course outcome 2	Analyse and design reinforced concrete beams for flexure, shear and bond applying principles of LSM.		Teach Hrs	Marks	
Learning outcome 1	Analyse and design singly reinforced beam for flexure applying principles of LSM.		12	12	
Content	Stress-strain diagram for singly reinforced section, stress block diagram parameters (No derivation), Limiting depth of Neutral Axis, Actual depth of Neutral Axis for singly reinforced rectangular section, concept of under				

	reinforced, over reinforced and balanced section, analysis of singly reinforced rectangular section, limiting and actual moment of resistance, simple numerical problems on determining moment of resistance and area of steel of singly reinforced rectangular sections only.		
Method of Assessment	External Theory Exam – Pen Paper Test		
Learning outcome 2	Calculate the moment of resistance of doubly reinforced section applying principles of LSM.	08	10
Content	Necessity of doubly reinforced section, stress-strain diagram of doubly reinforced section, analysis of doubly reinforced section, depth of neutral axis, moment of resistance of section, simple numerical problems on determining moment of resistance of doubly reinforced rectangular sections only.		
Method of Assessment	Internal Theory Exam – Mid Semester Test I		
Learning outcome 3	Analyse and design T beam section for neutral axis with in the flange applying principles of LSM.	08	10
Content	Effective width of flange, stress-strain diagram of singly reinforced T beam, depth of neutral axis, moment of resistance of T section with neutral axis within the flange, Analysis of T-beam, Simple numerical and design problems of T section with neutral axis within the flange only.		
Method of Assessment	Internal Theory Exam – Mid Semester Test II		
Learning outcome 4	Analyse and design beam for shear and bond criteria applying principles of LSM.	12	10
Content	Necessity of shear reinforcement, nominal shear stress, shear strength of concrete, maximum shear stress, minimum shear reinforcement, forms of shear reinforcement, maximum spacing of stirrups, design of shear reinforcement, simple numerical problems on adequacy of section for shear Concept of bond, bond stress, types of bond, check for bond stress Development length in tension and compression, check for development length, lapping of bars, Anchorage value of hooks for 90° bend and 45° bend, Design of simply supported and cantilever rectangular beam for flexure including shear check.		
Method of Assessment	External Theory Exam – Pen Paper Test		
Course outcome 3	Apply the principles, analysis and design of reinforced concrete one way and two way slab and prepare drawings of beam and slab.	Teach Hrs	Marks
Learning outcome 1	Design one way and two way slab applying principles of LSM.	10	10
Content	Classification of slabs as one way and two way, check for deflection and shear, main and distribution steel, codal provisions of slab, design of one way simply supported and cantilever slab with corners free to lift for flexure		

	including check for deflection and shear, design of two way simply supported slab with corners free to lift for flexure including check for deflection and shear. Design procedure of waist slab of Dog legged staircase (No problem on dog legged staircase in external exam)		
Method of Assessment	External Theory Exam – Pen Paper Test		
Learning outcome 2	Prepare a detailed plan and section of simply supported beam and slab.	18	
Content	<ol style="list-style-type: none"> 1. Draw cross-section and longitudinal section of simply supported rectangular beam showing reinforcement details. 2. Draw cross-section and longitudinal section of rectangular cantilever beam showing reinforcement details. 3. Draw cross-section and longitudinal section of simply supported T beam showing reinforcement details. 4. Draw plan and sections of simply supported one way slab with corners free to lift showing reinforcement details. 5. Draw plan and sections of simply supported two way slab with corners free to lift showing reinforcement details. 6. Draw plan and sections of dog legged staircase showing reinforcement details. 		
Method of Assessment	Practical Exam : Both Internal and External		
Course outcome 4	Analyse and design the axially loaded short column applying principles of LSM.	Teach Hrs	Marks
Learning outcome 1	Design axially loaded short column and explain procedure of designing isolated footing	09	10
Content	<p>Classification of columns, effective length, minimum eccentricity, IS specifications of longitudinal and lateral reinforcement, Simple numerical and design problems of short axially loaded square, circular and rectangular columns</p> <p>Design steps of square isolated footing of uniform thickness (No numerical problems)</p>		
Method of Assessment	External Theory Exam – Pen Paper Test		
Learning outcome 2	Prepare a detailed plan and section of column and footing.	09	
Content	<ol style="list-style-type: none"> 1. Draw plan and section of column showing reinforcement details. 2. Column and joint detailing as per IS 13920 3. Draw plan and sections of square or rectangular footing showing reinforcement details. 		
Method of Assessment	Practical Exam : Both Internal and External		
Course outcome 5	Explain the concept of pre-stressed concrete, its losses and fundamentals of earthquake engineering.	Teach Hrs	Marks

Learning Outcome 1	Describe pre-stressed concrete and its methods.	05	05
Content	Concept of pre-stressed concrete, advantage and disadvantage of pre-stressing, materials used in pre-stressed concrete, methods of pre-stressing: pre tensioning and post tensioning, losses in pre stressing. No numerical problems		
Method of Assessment	Internal Theory Exam: Assignments/ Seminars/ Presentations		
Learning outcome 2	Describe the importance of earthquake engineering in RCC structures.	05	05
Content	Introduction, Richter Scale, earthquake zones in India as per IS 1893, causes of failures of structure during earthquake, ductile detailing, ,principal of constructing earthquake resistant buildings		
Method of Assessment	Internal Theory Exam: Assignments/ Seminars/ Presentations		

Note: 1. Use of IS 456-2000 is permitted in the examination.

2. Internal marks of practical exam is mentioned in Format 4.

3. External practical exam will be of maximum 30 marks and any of the practical mentioned in LO's can be assessed.

List of Suggested Books: -

S. No.	Authors	Title	Publisher
1.	Dr. V.L. Shah & Late Dr. S.R. Karve.	Limit State Theory & Design of Reinforced Concrete.	Structure Publications
2.	N.C. Sihna & S.K. Roy	Fundamentals of Reinforced concrete.	S.Chand& Company
3.	N.Krishna Raju R.N. Pranesh	Reinforced concrete Design (IS 456-2000) Principles & Practice	New Age International
4.	N. Krishna Raju	Prestressed Concrete	
5.	S.U. Pillai & Devdas Menon	Reinforced concrete Design	Tata Mcgraw Hill
6.	P.C. Varghase	Limit State Design of Reinforced Concrete	Prentice Hall of India.
7.	Shah & Kale	R.C.C. Design	
8.	Lokesh Meena, Harsh Gupta &Sandeep Chaudary	Design of RCC Structures(Hindi)	Neelkanth Publishers Pvt. Ltd.
9.	Neelam Sharma	R.C.C. Design & Drawing (Hindi)	S.K. Kataria & Sons