

# Structural Design-I

Period	Unit	Topic
1	Working stress method (WSM)	Objectives of design and detailing and different methods of design of concrete structure
2		Introduction to reinforced concrete, Reinforced Concrete structures and their behavior
3		Grades of concrete, permissible stresses and assumptions in WSM
4		Basic concepts of under reinforced, over reinforced and balanced sections
5		Analysis and design of singly reinforced structures
6		Problems on design of singly reinforced structures
7	Philosophy of Limit State Method	Definition, advantages of LSM over WSM, Limit state of collapse & serviceability, Characteristic strength of material
8		Characteristic load, partial safety factor, design load, loading on structure, I.S specification regarding spacing of reinforcement in slab
9		IS specification regarding cover to reinforcement and minimum reinforcement in slab, beam & column, concept of lapping, anchorage, effective span for beam and slab
10	Analysis and design of reinforced structures by LSM	Limit state of collapse in flexure and reinforcement provisions
11		Assumptions in Limit state as per clauses of IS 456-2000
12		Concept of Neutral Axis and finding its depth
13		Concept of stress Strain diagram of concrete and steel
14		Type of section based on the strain diagram
15		Finding limiting value of moment of resistance of singly reinforced balanced sections
16		Problems based on moment of resistance of balanced sections
17		Moment of resistance of singly reinforced sections
18		Questions on moment of resistance
19		Concept of doubly reinforced sections and its need
20		Depth of neutral axis of doubly reinforced sections
21		Moment of resistance of doubly reinforced sections
22		Analysis of doubly reinforced sections
23		Design of doubly reinforced sections
24		Problems on design of doubly reinforced structures
25	Shear Bond and Development length	Concept of shear in RCC structures

26		Shear Stress distribution in normal and RCC structures and their difference
27		Concept of shear stresses with the help of Mohr's Diagram and cracking pattern in beams
28		Shear Provisions as per IS 456:2000
29	Analysis and design of T beams	Shear Reinforcement in beams
30		Questions on shear reinforcement
31		Introduction to flanged beams
32		Effective width of flange in flanged sections
33		Isolated T beams and their effective width
34		Analysis of section when NA lies in web
35		Analysis of section when NA lies in flange
36		T beam Vs Rectangular beams
37		Design considerations of T beams
38		Design of a T beam
39		Question on design of T beams
40		Design of L beams
41		Question on design of L beams
42		Practical applications of design of L beams
43		Uses of T and L beams
44	Analysis and design of slab and staircase	One way slab
45		Two way slab
46		Design of one way slab
47		Design of sunshade/chajja/cantilever slab
48		Design of two way slabs with corners free to lift
49		Design of two way slabs with corners prevented from lifting
50		Design of dog legged staircase
51		Design of cantilever staircase
52		Question on cantilever sunshade
53		Design of one way slab
54		Design of two way slab
55		Corners held down two way slab design
56		Design of dog legged staircase
57		Design of cantilever staircase
58		Reinforcement detailing of cantilever and dog legged staircase
59	Design of axially loaded columns and footings	Assumptions in Limit state for columns per clauses of IS 456-2000
60		Effective length of columns
61		Design specifications for main bars and ties

62		Analysis of short axially loaded column
63		Design of helically reinforced circular column
64		Example of helically reinforced circular column
65		Types of footing
66		Design of isolated square footing
67		Design of strip footing
68		Questions on design of short axially loaded columns
69		Question on determination of allowable load carrying capacity
70		Design of circular columns example
71		Example of design of isolated square footing
72		Example of design of rectangular footing
73		Practical applications of design of footings
74		Difference between Helically reinforced circular columns and circular columns with lateral ties
75		Failure pattern in columns due to axial loads
76		Behavior of columns when subjected to moments along with axial load
77	Revision Classes	Revision Classes
78		
79		
80		
81		
82		
83		
84		
85		