

5. COURSE DETAILS

Unit	Major Learning Outcomes (in Cognitive Domain)	Topics and Sub-topics
Unit – I Fixed Beam	1a. Distinguish between determinate and indeterminate structures 1b. Draw Shear Force & Bending Moment Diagram for Fixed Beams	1.1 Different types of Determinate & Indeterminate Structures & Structural Components/Elements 1.2 Advantages of fixed beam over simply supported beam 1.3 Concept of analysis by Area Moment method 1.4 μ and μ' diagram 1.5 Numerical for SF & BM diagrams for 1.6 fixed beam with central point load &/or 1.7 UDL over Full Span
Unit – II Slope & Deflection	2a. Compute deflection & slope induced in Statically Determinate Beams 2b. Draw deflection curve in different types of beams under different loads and support conditions.	2.1 Slope & Deflection 2.2 Formulae of Slope & Deflection for Cantilever Beam subjected to Point Load at free end , point load not at free end and with UDL along full Span 2.3 Formulae of Slope & Deflection for S.S Beam subjected to Central Point Load and with UDL along full Span 2.4 Numerical problems on Slope and Deflection for 2.2 & 2.3
Unit – III Continuous Beam	3a. Calculate Shear Force & Bending Moment Diagram for Continuous Beam using Theorem of Three Moment 3b. Draw Shear Force & Bending Moment Diagram for Continuous Beam using Theorem of Three Moment 3c. Draw Shear Force & Bending Moment Diagram for Continuous Beam using Moment Distribution Method	3.1 Statically Indeterminate Beam Like Propped Cantilever , Continuous Beam with or without Over Hang Define Free Moment & Fixed End moment diagrams 3.2 Theorem of Three Moment (Clapeyron's Theorem) 3.3 Formulae to find B.M of a continuous beam using theorem of Three Moment Method 3.4 Point of Contra-flexure & its importance 3.5 Numerical to draw S.F & B.M Diagram for two or three span continuous beams having end supports as overhang , fixed and / or hinge and subjected to Central Point Load and/ or U.D.L over full span using Theorem of Three Moment 3.6 Stiffness, flexibility, carry over Factor & Distribution Factor 3.7 Moment Distribution Method 3.8 Numerical to draw S.F & B.M Diagram of two or three span continuous beams having end supports as overhang , fixed and / or hinge and subjected to Central Point Load and/ or U.D.L over full span using Moment Distribution Method

Unit	Major Learning Outcomes (Course Outcomes in Cognitive Domain according to NBA terminology)	Topics and Sub-topics
Unit – IV Combined Direct & Bending Stresses	4a. Calculate Direct & Bending Stresses of various structural components 4b. Check stability of Retaining wall & Dam 4c. Draw stress distribution diagram in retaining wall and dams under different types of loads	4.1. Eccentricity 4.2. Formula for combined Direct & Bending Stresses 4.3. Limit of Eccentricity 4.4. Core of section for Rectangular & Circular (Hollow & Solid) 4.5. Formulae for combined stresses on sections subjected to eccentric loads considering Uniaxial & Biaxial eccentricity 4.6. Stress distribution diagrams 4.7. Application of concept of combined stresses to find pressure at base & stability check of Retaining Wall & Rectangular & Trapezoidal Dam 4.8. Numerical for 4.6 & 4.7
Unit – V Principle Stresses & Principle Planes	5a. Calculate Principal Stresses & Principal Plane on a plane in a Strained structural Material	5.1 Formulae for Normal , Tangential & Resultant Stresses due to Direct Orthogonal Stresses & Shear Stress 5.2 Numerical based on 5.1 5.3 Formulae for Principal Stresses and for Location of Principal Planes 5.4 Numerical based on 5.3 5.5 Mohr's Circle and its application for 5.1 & 5.3 5.6 Numerical based on 5.1 , 5.3 Graphically

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Fixed Beam	06	01	02	04	07
II	Slope & Deflection	04	01	02	04	07
III	Continuous Beam	12	04	03	14	21
IV	Combined Direct & Bending Stresses	08	03	04	07	14
V	Principle Stresses & Principle Planes	12	02	05	14	21
Total		42	11	16	43	70

Legends: R = Remember, U = Understand, A= Apply and above Level (Bloom's revised taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table