

Branch Name:	Civil engineering
Program Code:	ET401
Course Name:	Mechanics Of Structure-II
Course Code:	2ET4010401
Pre-requisite Course:	---

COURSE OBJECTIVE:

The content should be taught and implemented with the aim to develop skills so that students are able to acquire following competencies:

1. To analyze Fixed beams using area moment method
2. To analyze beams using various methods like slope & deflection, moment distribution and Theorem of three moments.
3. To learn concept of eccentric loading and stresses in vertical members like column, Chimneys, dam.
4. To learn concept of Principal Stresses & Principal Plane on a plane in a strained structural Material

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous assessment
04	-	02	05	60	40	20	30

DETAILS OF COURSE CONTENTS:

S.NO.	TOPIC	Total Hrs.	WEIGHTAGE
1	Fixed Beam & Continuous Beam 1.1 Different types of Determinate Indeterminate Structures & Structural Components 1.2 Advantages of fixed beam over simply supported beam 1.3 Concept of analysis by Area Moment method 1.4 Numerical for SF&BM diagrams for fixed beam with central point load &/or UDL over Full Span 1.5 Theorem of Three Moment (Clapeyron's Theorem) 1.6 Formula to find B.M of a continuous beam using theorem of Three Moment Method 1.7 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 1.8 Stiffness, flexibility, carry over Factor & Distribution Factor 1.9 Moment Distribution Method 1.10 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	22	38%

2	Slope & Deflection 2.1 Slope & Deflection, Flexural rigidity and its significance, Identify factors affecting slope and 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 Simply Supported Beam subjected to Central Point Load and with UDL along full Span 2.4 Numerical problems on Slope and Deflection	10	18%
3	Combined Direct & Bending Stresses 3.1 Eccentricity 3.2 Formula for combined Direct & Bending Stresses 3.3 Limit of Eccentricity & Core of section 3.4 Formulae for combined stresses on sections subjected to eccentric loads considering Uniaxial & Biaxial eccentricity 3.5 Stress distribution diagrams 3.6 Application of concept of combined stresses to find pressure at base of Retaining Wall & Dam (Rectangular & Trapezoidal) 3.7 Stability check of Retaining Wall & Dam (Rectangular & Trapezoidal)	08	16%
4	Principle Stresses & Principal Planes 4.1 Formulae for Normal, Tangential & Resultant Stresses due to direct Orthogonal Stresses & Shear Stress & Numerical 4.2 Formulae for Principal Stresses and Location of Principal Planes 4.3 Numerical based on principal stresses equations	08	14%
5	Analysis Of Truss 5.1 Perfect & Imperfect Truss 5.2 Various trusses for different spans and application 5.3 Analysis of Triangle, Howe, North Light & Fan trusses under Panel Point Loads using Graphical & Method of Joint	08	14%

LIST OF PRACTICAL:

SR. No.	Experiment / Exercises
1	Solve at least five real life problems pertaining to Unit-1
2	Perform Deflection test on a Simply Supported beam with different sectional properties (Material/s dimensions etc.)
3	Perform Deflection test on a cantilever beam with different sectional properties (material/s dimensions etc.)
4	Perform Deflection test on a fixed beam with different sectional properties (material/s dimensions etc.)
5	Solve at least Six real life problems pertaining to Unit – 2
6	Solve at least Six real life problems pertaining to Unit-3
7	Solve at Least four real life numerical Problems of Unit-4
8	Solve at least Eight real life problems pertaining to Unit-5

LIST OF REFERENCES:

Sr.no.	Title	Author & Publication
1	Strength of Materials	S Ramamrutham, Dhanpat Rai Publishing Company(P) Ltd.
2	Theory of Structures – vol I & II	S B Junarkar , H J Shah
3	Theory of Structures	R.S.Khurmi - S Chand Publishing, Delhi (2000)
4	Strength of Material & Mechanics of Structures	B C Punamia

LIST OF OPEN SOURCE SOFTWARE/LEARNING WEBSITE:

- 1) <https://nptel.ac.in/courses/105104160>
- 2) <https://nptel.ac.in/courses/106106108>
- 3) <https://www.youtube.com/watch?v=GkFgysZC4Vc&list=PL27C4A6AEA552F9E6>
- 4) www.vlab.co.in (Virtual Lab by Ministry of Education, Government of India)

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To analyse Fixed beams using area moment method	2 Understanding 1 Remembering 4 Analyse
CLO2	To analyse beams using various methods like slope & deflection, moment distribution and Theorem of three moments.	2 Understanding 3 Applying
CLO3	To learn concept of eccentric loading and stresses in vertical members like column, Chimneys, dam.	5 Evaluate 4 Analyse
CLO4	To learn concept of Principal Stresses & Principal Plane on a plane in a strained structural Material	4 Analyse 2 Understanding
CLO5	To analyse of truss	2 Understanding 3 Applying 5 Evaluate

Course Learning Outcomes	Program Outcomes(Po's)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CLO1	H				M							
CLO2	H		L									
CLO3	M						M					
CLO4	M					L						
CLO5	H	L		M			M					

H: High, M: Medium, L: Low