

20CE3503 - STRUCTURAL ANALYSIS

Offering Branches	CE		
Course Category:	Professional Core	Credits:	3
Course Type:	Theory	Lecture-Tutorial-Practical:	3-0-0
Prerequisites:	20CE3404-Mechanics of Solids	Continuous Evaluation:	30
		Semester End Evaluation:	70
		Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to:

CO1	Evaluate the slopes and deflection in beams and pin jointed frames.	K5
CO2	Evaluate the fixed end moments in fixed beams and can analyze two span continuous beams by slope deflection method	K5
CO3	Analyze the two span continuous beams by Moment distribution Method and Kani's method	K4
CO4	Evaluate the stresses for both concentrically loaded and eccentrically loaded Columns.	K5
CO5	Evaluate the stress strain behavior of both the thin and thick cylinders.	K5

Contribution of Course Outcomes towards achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2			2	3							2	3
CO2	2	2			2	3							2	3
CO3	3	3			3	3							3	3
CO4	2	2			2	3							2	3
CO5	2	2			2	3							2	3
Avg.	2	2			2	3							2	3

1- Low

2-Medium

3-High

Course Content

UNIT-1	Deflection of Statically Determinate Structures: Introduction, Pure bending, Relation between curvature, slope and deflection, Deflection curves, Maculay's Method, Moment area method, Slopes and deflection for cantilevers and simply supported beams.	CO1
	Deflection Of pin jointed frames: Deflection of trusses by Unit load method (having 9 members or less)	
UNIT-2	Analysis of Indeterminate Beams Fixed beams: Shear force and bending moment diagrams for Fixed beams subjected to U.D.load, central point load, eccentric point load. Number of point loads, uniformly varying load, couple and combination of loads, effect of sinking of support, effect of rotation of a support. Two span continuous beams: Shear force and bending moment diagrams for two span continuous beams with and without sinking of supports using Slope deflection method.	CO2.
	Analysis of two span continuous beams Moment distribution method: Shear force and bending moment diagrams for two span continuous beams with and without sinking of supports using Moment Distribution Method. Kani's method: Shear force and bending moment diagrams for two span continuous beams with and without sinking of supports using Kani's Method.	
UNIT-3		CO3

UNIT-4	<p>Columns and Struts: Introduction, Column with one end free and other fixed, Column with both ends hinged, column with both ends fixed, column with one end fixed and the other hinged, Limitation of Euler's formula, column carrying eccentric load, Rankine-Gordon formula, Perry's formula</p> <p>Combined bending and direct stresses–Introduction, Limit of eccentricity for no tension in the section, kernel of a section for rectangular, circular sections.</p>	CO4
UNIT-5	<p>Thin Cylinders - Introduction, Stresses and strains in thin cylinders, volumetric change in cylinder.</p> <p>Thick cylinders: Thick cylinders subjected to internal pressure and external pressure, compound cylinders.</p>	CO5

Learning Resources

Text Books	<ol style="list-style-type: none"> 1. Pandit.G , Gupta.S and Gupta.R, Theory of Structures Vol.I & II, McGraw Hill Education, 2017. 2. V.N Vazirani and M.M Ratwani, Analysis of Structures Vol-II, Khanna Publishers, 2012
Reference Books	<ol style="list-style-type: none"> 1. C.K.Wang, Statically Indeterminate Structures, TataMcGrawHill, 2010. 2. R.C. Hibbeler, Structural Analysis, 6/e, Pearson, 2011.
e- Resources & other digital material	<ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/105101085/25-31 2. https://onlinecourses.nptel.ac.in/noc17_ce25/preview 3. https://www.edx.org/learn/structural-engineering