

THEORY OF PLATES AND SHELLS

Course Code	22MEMD2T5B	Year	I	Semester	II
Course Category	Programme Elective	Branch	ME	Course Type	Theory
Credits	4	L-T-P	4-0-0	Prerequisites	Material Science and Metallurgy
Continuous Internal Evaluation:	40	Semester End Evaluation:	60	Total Marks:	100

Course outcomes: At the end of the course, the student will be able to:

CO	Statement	BTL	Units
CO1	Understand the Simple bending of Plates and Different Boundary Conditions for plates	L2	1
CO2	Analyze circular plates subjected to different kinds of loads	L4	2
CO3	Understand the concept of Material Orthotropy, Structural Orthotropy and Plates on elastic	L2	3
CO4	Design various types of shells structures and folded pipes.	L4	4

Contribution of Course outcomes towards achievement of programme outcomes & Strength of correlations (High:3, Medium: 2, Low:1)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	3	3				2			1		2	3	1
CO 2	3	3	3				2			1		2	3	1
CO 3	3	3	3				2			1		2	3	1
CO 4	3	3	3				2			1		2	3	1

Syllabus		
Unit	Contents	Mapped CO
1	Simple bending of Plates, Assumptions in thin plate theory, Different relationships, Different Boundary Conditions for plates, Plates subjected to lateral loads, Navier's method for simply supported plates, Levy's method for general plates, Example problems with different types of loading.	CO1
2	Circular plates subjected to Axi-symmetrical loads, concentrated load, uniformly distributed load and varying load, Annular circular plate with end	CO2

	moments, Rayleigh-Ritz method, Application to different problems, Finite difference method, Finite element methodology for plates.	
3	Orthotropic Plates, Bending of anisotropic plates with emphasis on orthotropic plates, Material Orthotropy, Structural Orthotropy, Plates on elastic foundation	CO3
4	Shells- Classification of shells - Membrane and bending theory for singly curved and doubly curved shells - Various approximations -Analysis of folded plates	CO4

Learning Resources

Text Book(s):

1. Theory and Analysis of Plates by Rudolph Szilard, Prentice Hall, New Jersey 1986.
2. Theory of Plates and Shells by Timoshenko S.P and Woinowsky Krieger, McGraw Hill, 1984.
3. Design and Construction of Concrete Shell Roofs by G. S. Ramaswamy, CBS Publishers. 2005.

References:

1. Theory and Analysis of Elastic Plates and Shells by J N Reddy, CRC Press, 2007.
2. Theory of Plates by K Chandra Shekhara, University Press, Hyderabad, 2001

Course coordinator:

HOD