

Branch Name:	Civil Engineering (Computer Aided Structural Analysis & Design)
Semester/Year:	Semester II/ First Year
Subject Title:	Plates and Shell (Elective-II)
Subject Code:	2ET2060206T
Pre-requisite:	Mechanics of Solids, Structural Analysis and Engineering Mathematics

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
4	3	1	0	4	24	60	16	40	00	00	00	00	100

Course Objective:

1. Plates and Shells have become important structural forms of modern infrastructures. Analysis of such structure requires rigorous mathematical treatment.
2. It is essential to understand structural behaviour and analysis of plates and shells for their safe design.
3. The course on Plates and Shell equips the students with analysis methodology of plates and shell using analytical methods.

Subject Contents				
Sr. No	Topic	Total Hours	Weightage (%)	
1	Introduction to thin plates, small deflection theory, plate equation. Isotropic and orthotropic plates, bending and twisting of plates, Navier's solution, Levy's solution and energy method, rectangular, circular plates with variable rigidity In Cartesian and polar co-ordinates, Numerical solutions.	21	50	
2	Shell behaviour, shell surfaces and characteristics, classification of shells equilibrium equations in curvilinear co-ordinates. Stress-strain & force displacement relations. Membrane analysis of shells of revolution and cylindrical shells under different loads. Shallow shells, membrane solution of elliptic paraboloids and hyperboloids. Solution of some typical problems. Introducing to stability of plates and stiffened plates.	21	50	

Course Outcome:

At the end of this course, the student would be able

1. Identify, formulate and solve theoretical problems with structural plate and shell, Employability
2. Understand behaviour of plates under bending and twisting, Skill development
3. Analyze shells under different loading conditions, Skill development
4. Know type of shell and present force-displacement relationship Skill development

List of Reference Books

1. Theory of plates and shells - Timoshenko
2. Theory & analysis of plate - Classical & Numerical methods - Szilard
3. Design & construction of concrete shell roofs - Ramaswamy, G. S.
4. Theory of cylindrical shells - Glibson J. E.
5. A text book of plate Analysis- N. K. Bairagi
6. Shell Analysis - N. K. Bairagi



Sankalchand Patel University
Faculty of Engineering and Technology
First Year Master of Technology in Civil Engineering
(Computer Aided Structural Analysis and Design)
In Effect from Academic Year 2023-24

List of Open Source Software/learning website:

<http://ocw.mit.edu/courses/mechanical-engineering/2-081j-plate-and-shell-spring-2007/>

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Identify, formulate and solve theoretical problems with structural plate and shell,	L-1 and L-2
CLO2	Understand behaviour of plates under bending and twisting	L-2 L-3 and L-4
CLO3	Analyze shells under different loading conditions	L-4
CL04	Know type of shell and present force-displacement relationship	L-1 and L-2

L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create

Mapping of CLOs with POs & PSOs

	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
Course Learning Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CLO1	M	M		M	M	M	M	M	M			M	M		M
CLO2	M	M	M	M	M	M		M	M			M	M		M
CLO3	M	M		M	H	M		M	M			H	M	H	M
CL04	M	M	M	M	H	M		M				M	M	M	M

H: High, M: Medium, L: Low