

CE 507 Mechanics of Solids I 29732D 29733D (3 units)

2019Fall Semester — Course Syllabus

Professor	Vincent Lee vlee@usc.edu		
Office	KAP 230B		
Phone	(213) 740-0568		
Blackboard	Register at 1) https://courses.uscdcn.net and 2) https://piazza.com		
Office Hours	MW8-9am, MW 3-3:30pm or other times through Piazza		
Teaching Assistant	TBD		
Email	TBD		
TA Office Hours	TBD		
COURSE DESCRIPTION			
Analysis of stress and strain; constitutive equations for elastic materials; plane stress and strain; torsion; introduction to plates and shells; energy methods.			
COURSE OBJECTIVES			
The materials presented will serve as a basis of the linear elasticity applicable to several branches of solid mechanics, including the theories of plates and shells, composite materials, finite elements and geotechnical mechanics. The course is valuable for students prepared to be practicing engineers and/or scientists.			
LEARNING OBJECTIVES			
For the first month, the students will be introduced to the theory of tensors to be used in the theory of deformation and stresses, studied independently, which are subsequently united by introducing the stress-strain relations. The plane theory of elasticity in rectangular and polar coordinates is studied, and that of bar subjected to torsion. General solutions of elasticity are presented, including solutions by energy principles.			
Prerequisite	none		
Days, Time, Location	Wednesday	3:30 – 6:10 p.m.	OHE100C, DEN
Required Textbook	P.L. Gould: Introduction to Linear Elasticity, Springer-Verlag, 4 th ed. ISBN 9783030088781 or 3 rd ed. ISBN 9781461448327		
Grading Schema	Homework	10	%
	All Exams	90	%
	Total	100	%

CE 507 Mechanics of Solids – Class Schedule

DATE		Lecture	Topics	Homework
Week	WED	No.		Posted on Blackboard Due Wed Next Wk
1	8/28	1	Tensor Notation, Coordinate Transformations	
		2		HW#1: L01,02
9/02 Monday Labor Day ----- USC Holiday				
2	9/4	3	Eigenvectors, Eigenvalues, Solving Cubic Polynomials	
		4		HW#2: L03,04
3	09/11	5	State of Stress	
		6	Equilibrium Eqns. Principal Normal & Shear Stresses;	HW#3: L05,06
4	09/18	7	Strain and Deformation	
		8	Strain Compatibility	HW#4: L07,08
5	09/25	9	Stress vs. Strain	
		10	Elastic Constants, Linear Elasticity; Generalized Hooke's Law	HW#5: L09,10
6	10/02	11	Beltrami-Mitchell Equation (Stress Compatibility) Examples	
4:55-6:10pm		Wed	MIDTERM #1: Lectures 1-10	HW#6: L11
7	10/09	12	3D Examples	
		13	Plane Stress	HW#7: L12,13
8	10/16	14	Plane Stress (cont.), Plane Strain	
		15	2-D Cartesian Problems	HW#8: L14,15
9	10/23	16	Polar Coordinates I	
		17	Polar Coordinates II	HW#9: L16,17
10	10/30	18	Stress-Concentration Problem of Circular Hole in Thin Plate	
		19	Review Midterm No. 2 Problems	HW#10: L18,19
11	11/06	20	Torsion I	
4:55-6:10pm		Wed	MIDTERM #2: Lectures 11-18	HW#11: L20
12	11/13	21	Torsion II, Torsion Examples	
		22	Torsion III, Torsion Examples (cont.)	HW#12: L21, 22
13	11/20	23	Energy Methods, I	
		24	Energy Methods, II	HW#13: L23, 24

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DATE		Lecture	Topics	Homework
Week	WED	No.		Posted on Blackboard Due Wed Next Wk
	11/27		No Class on Wed before Thanksgiving	
11/23 – 11/25 Wed-Fri Thanksgiving (USC Holidays)				
14	12/04	25	Virtual Displacement Methods, Rayleigh-Ritz Methods	HW#14, L25
			Review of FINAL MIDTERM (No. 3): Lectures 19-25	
12/16		Mon	Final 2-4pm (to be revised: same time as CE526)	
Christmas Holidays				

STATEMENT ON ACADEMIC INTEGRITY

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own.

All students are expected to understand and abide by these principles. *SCampus*, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A:

- <http://www.usc.edu/dept/publications/SCAMPUS/gov/>. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty.
- The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>.

STATEMENT FOR STUDENTS WITH DISABILITIES

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible.

DSP Contact Information

- Office Location: STU 301
- Open: 8:30 a.m. until 5:00 p.m., Monday through Friday.
- Phone number: (213) 740-0776