

CE 507Mechanics of Solids I (3 units)

2013Fall Semester — Course Syllabus

Professor	Dr. Vincent Lee		
Office	KAP 230B		
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Office Hours	MW 4-5pm		
Teaching Assistant			
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Office Hours			
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	Monday and Wednesday	5:00 – 6:15 p.m.	RTH105, DEN
Required Textbook	P.L. Gould: Introduction to Linear Elasticity, Springer-Verlag, 2 nd Edition, ISBN 0387941002		

Required as a Prerequisite for Other Courses	Prerequisite for: <ul style="list-style-type: none"> • CE 509; CE 555 and CE 640 One of two choices of prerequisites for each of these courses: <ul style="list-style-type: none"> • CE 508; CE 542 and CE 544 		
Required Course	Master of Science, Aerospace and Mechanical Engineering (Computational Fluid and Solid Mechanics)		
Grading Schema	Homework	16	%
	All Exams	84	%
	Total	100	%

CE 507 Mechanics of Solids – Fall 2013 Class Schedule

DATE		Lecture	Topics	Homework
MON	WED	No.		Posted on Blackboard Due Wed Next Wk
08/26		1	Tensor Notation, Coordinate Transformations	
	08/28	2		HW#1: L01,02
9/02 Labor Day ----- USC Holiday				
	9/04	3	Eigenvectors, Eigenvalues, Solving Cubic Polynomials	
9/09		4		HW#2: L03,04
	09/11	5	State of Stress	HW#3: L05
09/16		6	Equilibrium Equations. Principal Normal and Shear Stresses; Strain and Deformation	
	09/18	7		HW#4: L06,07
09/23		8	Strain Compatibility; Stress vs. Strain	
	09/25	9		HW#5: L08,09
09/30		10	Elastic Constants, Linear Elasticity; Generalized Hooke's Law	
	10/2	Wed	MIDTERM No. 1: Lectures 1-9	HW#6: L10
10/07		11	Beltrami-Mitchell Equation (Stress Compatibility) Examples	
	10/09	12		HW#7: L11,12
10/14		13	Plane Stress, Plane Strain	
	10/16	14		HW#8: L13,14
10/21		15	2-D Cartesian Problems	

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DATE		Lecture	Topics	Homework
MON	WED	No.		Posted on Blackboard Due Wed Next Wk
	10/23	16		HW#9: L15,16
10/28		17	Polar Coordinates II; More 2-D Polar Coordinates	
	10/30	18	Examples	HW#10: L17,18
11/04		19	Review, Midterm No. 2 Problems	
	11/06	Wed	MIDTERM No. 2: Lectures 10-18	
11/11		20	Non-Axisymmetric Problems	
	11/13	21	Torsion I	HW#11: L20,21
11/18		22	Torsion II, Torsion Examples	
	11/20	23	Torsion II, Torsion Examples (cont.)	HW#12: L22, 23
11/25		24	Energy Methods, I	HW#13: L24
	11/27		No Class Wed before Thanksgiving	
Thanksgiving (USC Holidays)				
12/2		25	Virtual Displacement Methods, Rayleigh-Ritz Methods	HW#14, L25
	12/4		Review of FINAL MIDTERM (No. 3): Lectures 19-25	
12/11			Final MidTerm #3 4:30 – 6:30pm	
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