

## CE 507 Mechanics of Solids I(3 units)

2014Fall Semester — Course Syllabus

Professor	Dr. Vincent Lee		
Office	KAP 230B		
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Office Hours	MW9-10am, W 2:30-3:30pm		
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	Wednesday	3:30 – 6:10 p.m.	OHE120, DEN
Required Textbook	P.L. Gould: Introduction to Linear Elasticity, Springer-Verlag, 2 <sup>nd</sup> Edition, ISBN 0387941002		
Required as a Prerequisite for Other Courses	Prerequisite for: <ul style="list-style-type: none"> <li>• CE 509; CE 555 and CE 640</li> </ul> One of two choices of prerequisites for each of these courses: <ul style="list-style-type: none"> <li>• CE 508; CE 542 and CE 544</li> </ul>		
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
Week	WED	No.		Posted on Blackboard Due Wed Next Wk
1	8/27	1 2	Tensor Notation, Coordinate Transformations	HW#1: L01,02
9/02		Labor Day ----- USC Holiday		
2	9/03	3 4	Eigenvectors, Eigenvalues, Solving Cubic Polynomials	HW#2: L03,04
3	09/10	5 6	State of Stress Equilibrium Eqns. Principal Normal & Shear Stresses;	HW#3: L05,06
4	09/17	7 8	Strain and Deformation Strain Compatibility	HW#4: L07,08
5	09/24	9 10	Stress vs. Strain Elastic Constants, Linear Elasticity; Generalized Hooke's Law	HW#5: L09,10
6	10/01	11	Beltrami-Mitchell Equation (Stress Compatibility) Examples	
4:55-6:10pm		Wed	MIDTERM #1: Lectures 1-10	HW#6: L11
7	10/08	12 13	3D Examples Plane Stress	HW#7: L12,13
8	10/15	14 15	Plane Stress (cont), Plane Strain 2-D Cartesian Problems	HW#8; L14,15
9	10/22	16 17	Polar Coordinates I Polar Coordinates II	HW#9: L16,17
10	10/29	18 19	2-D Polar Coordinates Examples Torsion I	HW#10: L18,19
11	11/05	20	Review Midterm No. 2 Problems	
4:55-6:10pm		Wed	MIDTERM #2: Lectures 11-18	NO HW#11
12	11/12	21 22	Torsion II, Torsion Examples Torsion III, Torsion Examples (cont.)	HW#12: L21, 22
13	11/19	23 24	Energy Methods, I Energy Methods, II	HW#13: L23, 24
	11/27		No Class Wed before Thanksgiving	
11/26 – 11/29 Thanksgiving (USC Holidays)				
14	12/03	25	Virtual Displacement Methods, Rayleigh-Ritz Methods	HW#14, L25
			Review of FINAL MIDTERM (No. 3): Lectures 19-25	
12/15		Mon	Final MidTerm #3 2-4pm	
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