USC Viterbi School of Engineering

AME509 Applied Elasticity
Spring 2017

Instructor	Professor Ben Yang
	Office: OHE 400F; Phone: (213) 740-7082; Email: bingen@usc.edu
Class Meeting	Tuesday 7:00-9:40 pm, OHE136
Office Hour	Tuesday 3:00 – 5:00 pm; Friday – by appointment only

TA	Mr. Hao Gao
	Office: VHE202; Email: haogao@usc.edu
Office Hour	Monday 6:00-8:00 pm; Wednesday 6:00-8:00 pm

Required Readings and Supplementary Materials

[1] Textbook: A.K. Mal, and S.J. Singh (1991). Deformation of Elastic Solids, Prentice Hall, Englewood Cliffs, N.J.   (ISBN-13: 978-0132007009)

[2] Class notes and handouts: downloadable from the website

Grading Breakdown

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Three One-Hour Midterm Exams (@15% each)          45%
Final Exam                                        40%
Homework *                                          0%
Project                                           15%
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Total                                            100%
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* 10 sets of non-credit homework problems will be assigned and homework solutions will be provided.

Course Description
Condensed treatment dealing with engineering applications of the principles of elasticity, using the theories of elasticity, elastic stability, and plates and shells.

Learning Objectives
Cartesian tensors; three fundamental relations of elasticity: kinematics of deformation, balance laws, and constitutive equations; variational principles; elastic stability; elastodynamic problems; plates and cylindrical shells; analytical and numerical solution methods for elasticity problems; the distributed transfer function method; finite elasticity; special topic.

Pre-requisite: AME 403

Course Schedule

Week	Date	Material	Note
1	1/10/2017	Introduction; math foundation	HW 1
2	1/17/2017	Math foundation: Cartesian tensors	HW 2
3	1/24/2017	Kinematics of deformation	HW 3
4	1/31/2017	Kinematics of deformation; balance laws	HW 4
5	2/7/2017	Balance laws	**Midterm 1**
6	2/14/2017	Constitutive equations	HW 5
7	2/21/2017	Constitutive equations; elastostatics	HW 6
8	2/28/2017	Variational principles	HW 7, Project description
9	3/7/2017	Plane problems; Airy's stress functions	**Midterm 2**
10	3/14/2017	Spring recess -- no class	
11	3/21/2017	Three dimensional problems	HW 8
12	3/28/2017	Plates and shells	HW 9
13	4/4/2017	Beams	**Midterm 3**
14	4/11/2017	Distributed transfer function method	HW 10
15	4/18/2017	Finite element method	
16	4/25/2017	Special topic: wrinkling of thin membranes	Last lecture
	5/2/2017	Project due by 5 pm on Tuesday	**Project report due**
	5/9/2017	Final exam, 7-9 pm	**Final Exam**

Important Dates:

2017/02/07   Midterm Exam 1

2017/03/07   Midterm Exam 2

2017/04/04   Midterm Exam 3

2017/05/02   Project report due

2017/05/09   Final Exam