

# Experimental Solid Mechanics

## CIV ENV 413

Fall 2015

Tu-Th. 2:00 – 3:20  
 Room FSL1441 (Frances Searle building)  
 Office: Catalysis Bldg. 326

Prof. I. M. Daniel

Text: Experimental Solid Mechanics, Second Ed. 2014  
 by Arun Shukla and James W. Dally, College House Enterprises  
 Knoxville, TN

Period	Date	Topics
1	September 22	Introduction; Stresses, equilibrium, transformation, principal Stresses
2	24	Maximum shear stress, 2-D state of stress: Strains, strain-displacement relations, strain transformation
3	29	Principal strains; Stress-strain relations
4	October 1	Problems in plane elasticity
5	6	Elementary fracture mechanics 1
6	8	Elementary fracture mechanics 2
7	13	Determination of fracture toughness (Lab)
8	15	Strain measurement methods, electrical resistance strain gages
9	20	Strain gage circuits, potentiometric circuit,
10	22	Wheatstone bridge circuits Cantilever beam transducer (Lab)
11	27	Applications of strain gages; residual stresses
12	29	Basic optics- Theory of photoelasticity
13	November 3	Stress-optic law; two-dimensional photoelasticity
14	5	Photoelastic disk calibration- $f_{\sigma}$ . (Lab) Birefringent coatings

15	10	Geometric moiré methods
16	12	Mid-Term Exam
17	17	Digital Moire/Moire interferometry; <b>Moire Lab</b>
18	19	Dynamic characterization methods,
19	24	Hopkinson bar theory
20	26	Thanksgiving
21 December	1	<b>Hopkinson bar Lab</b>
22	3	Digital image correlation
	11	Final Exam (12:00 to 2:00 PM)

### **Homework**

There are regular homework assignments including laboratory reports.

### **Exams**

A mid-term and a final exam will be given.