

AEM 638
Introduction to Experimental Mechanics

Semester: Spring 2009

Instructor: Dr. James P. Hubner
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Office Hours: MW 9:30 – 10:30, R 10:45 – 11:45

Lecture Hours: TR 2:00 – 3:15 pm

Prerequisites: None

Required Text: Dally, JW and WF Riley, *Experimental Stress Analysis*, 4th ed. College House Enterprises

Objective: To develop a working knowledge of experimental test techniques, equipment and facilities commonly used in the field of experimental stress analysis.

From Graduate Catalog: Theory and application of electrical resistance strain gages for stress analysis and for use as transducers. Study of circuits and instruments used for strain measurement. Theory and application of photoelasticity for measurement of stress. Fundamentals of servohydraulic testing.

Additional topics including interferometry, image correlation and luminescent techniques will be covered.

Class Policy:

Attendance: Attendance and on-time arrival is expected. Students are responsible for all scheduling and policy announcements made in class.

Lecture: Lectures are 50 minutes (first two weeks 65 minutes). Reading assignments are to be completed prior to class. Please keep cell phones, pagers or other electronic items that can disturb the lecture turned off.

Assignments: Assignments include homework and laboratory reports. Homework is designed to further assist in the understanding of concepts discussed in lecture as well as prepare the student for demonstrations and laboratories. Assignments must be neat and orderly.

Lab sessions will be scheduled on Thursdays and Fridays. Each lab conducted will require some type of a lab report. Further information regarding lab reports will be posted on the eLearning web page. Students will work in individual or in groups of two as assigned by the instructor.

Oral Presentation: Each student will present a 20-25 minute lecture on an experimental stress analysis technique. Approximately two-weeks prior to the presentation, a corresponding

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term paper will be due. Topic options as well as paper and presentation requirements will be discussed in early February.

Schedule Conflicts: Scheduled events conflicting with lectures, laboratories and assignment due dates must be addressed prior to the event and will be handled case-by-case.

Grading Policy:	Assignments	35 %
	Term Paper and Presentation	15 %
	Midterm Exam	25 %
	Final Exam	25 %

Services: Students requiring disability services must follow the ODS (<http://ods.ua.edu>) guidelines.

University counseling services are available at <http://sa.ua.edu/counseling>.

Honor Pledge: I promise or affirm that I will not at any time be involved with cheating, plagiarism, fabrication, or misrepresentation while enrolled as a student at The University of Alabama. I have read the Academic Honor Code, which explains disciplinary procedures that will result from the aforementioned. I understand that violation of this code will result in penalties as severe as indefinite suspension from the University.

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Date	Topic	Reading Assignment	
Jan	8	No Class	
	13	ESA Overview, Lab Tour	1
	15	Stress-Strain	2
	20	" "	
	22	Strain Measurement	9 (5)
	27	ERSG	
	29	" "	10 (6)
	Lab 1		
Feb	3	Strain Gage Circuits	11 (7)
	5	" "	
		Lab 2	
	10	Recording Instruments, LabVIEW and NIMAX	7 (8), 8 (x)
	12	" "	
		Lab 3	
	17	Strain Analysis Methods	12 (9)
	19	" "	
	Lab 4		
24	" "		
26	Midterm Exam		
Mar	3	Basic Optics	13 (10)
	5	" "	
		Lab 5	
	10	Moire Methods	17 (11)
	12	" "	
		Lab 6	
	24	Photoelasticity	14 (12)
	26	" "	15.1-15.9 (13)
	Lab 7		
31	Photoelastic Coatings	15.10 (15)	
Apr	2	" "	
		Lab 8	
	7	Luminescent Coatings	
	9	" "	
		Lab 9	
	14	Visual Image Correlation	19 (x)
	16	" "	
		Lab 10	
	21	Fracture	20 (14)
	23	" "	
	28 Student Presentations		
	30 Student Presentations		
May	4	Final Exam	

Numbers in () represent corresponding chapters in the third edition.