MEC 442/528  
Introduction to Experimental Stress Analysis  
Fall 2010

Instructor: Professor Fu-pen Chiang  
Office: Light Engineering, Room 103

Lectures: Wednesday 3:50PM-6:50PM  
Location: Old Chemistry 144


I. Elements of Elasticity:
   Concepts of Stress, Strain, Stress-Strain Relation, Equilibrium Equation, and Compatibility Equation

   Exam #1

II. Moiré Methods of Strain Analysis:
   Parametrical Description of Moiré
   Geometrical Relationship of Moiré
   General Theory of Moiré Methods
   In-plane Moiré Method
   Shadow Moiré Method
   Reflection Moiré Method

   Project #1 In-plane Moiré Analysis
   Project #2 Shadow Moiré Analysis
   Exam #2

III. Photoelasticity
   Concept of Polarized Light
      • Plane polarized light
      • Circularly polarized light
      • Elliptical polarized light

   Composition of Polariscope
      • Plane polariscope
      • Circular polariscope

   Concepts of Birefringence (double refraction)
   Stress-Optic Law
   Isochromatics and Isoclinics and Stress Analysis

   Project #3 Photoelastic Stress Analysis
IV. Brief Introduction to Speckle Method and Holographic Interferometry

Exam #3 – Final Exam
25% on Elasticity
25% on Moiré
50% on Photoelasticity

Final Grade = 20% Exam #1
20% Exam #2
30% Project Reports
30% Final Exam

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Allowed Calculators
Following the Mechanical Engineering Department’s mandatory calculator policy, only the following calculators will be allowed to be used on the midterm and final exams. There will be no exceptions. This list of calculators is identical to that allowed for the National Council for Examiners for Engineering and Surveying (NCEES) Fundamentals of Engineering (FE) exam that many of you will take in your senior year, as well as the Professional Engineering (PE) exam that you may take several years from now. The sooner you become comfortable on one of these calculators, the better. If you have any questions on this policy please feel free to contact me. The NCEES policy on calculators can be found here: http://www.ncees.org/exams/calculators/.

Casio: All fx-115 models. Any Casio calculator must contain fx-115 in its model name.
Hewlett Packard: The HP 33s and HP 35s models, but no others.
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