

**Tentative Syllabus**  
**University of Texas at Arlington**  
**Department of Civil Engineering**

**CE 5383 – EXPERIMENTAL STRESS ANALYSIS**

**Spring 2015**

**Instructor(s):** Yeonho Park, Ph.D.

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**Office Hours:** M/W 10:00 AM –12:00 AM

**Section Information:** CE 5383 (001/002)

**Time and Place of Class Meetings:** M/W 4:00 PM - 5:20 PM (**Location : TBA**)

**Faculty Profile:** <https://www.uta.edu/profiles/yeonho-park>

**Course Content:**

The objectives of this course will be achieved by learning the state of stress in mechanical bodies and their stress-strain relationships. Students will also learn topics related to mechanical and electrical resistance strain gages, in addition to, topics related to strain analysis methods (Rossette gages, torque gages, residual stress gages). They will understand the concepts associated with the implementation of strain gage circuits (Wheatstone bridge, circuit calibration, electrical noise sources) and their application to the fabrication of strain gage-based transducers. Finally, the acoustic emission technique will be introduced as means to detecting fracture properties of materials.

**Student Learning Outcomes:**

- o **Fundamental Knowledge**
  - The student will command advanced and applied knowledge in the area of material behavior and their mechanics and their applications in civil and general structural engineering by becoming comfortable in a Laboratory Environment
- o **Independent Abilities**
  - As part of the coursework requirements, the student will conduct independent and original study ranging from gathering of information to proposing, creating, documenting the study, and its resolution and/or elucidation. Gain a Physical Feel for the Relationships between Mathematical Models and Actual Mechanical Structural Response. And acquire Knowledge of Sensors, Signal Conditioning and associated Instrumentation for Deformation & Stress Measurements.
- o **Critical Thinking**
  - The student will continue to develop the ability to critique and synthesize literature, review results and to apply this knowledge in developing new ideas; in designing and evaluating scientific investigations; and in assessing, interpreting and understanding data.
- o **Advanced Knowledge**
  - The student will demonstrate mastery of the subject matter at a deeper theoretical and applied level beyond the fundamental knowledge gained in the undergraduate courses. Implementation of various strain measurement techniques for strain measurement and data collection, in addition to, design and build different types of strain gages and the implementation of various strain analysis methods

- o **Effective Communication**
  - The students will present scientific results in both written and oral format through the practice of performing class lectures, presentations, and reports.
- o **Professional Development**
  - The student will acquire knowledge of topics associated with professional practices and methods presented during the lectures in the class.

**Requirements:** CE 2313 or equivalent Mechanics of Materials Course;

**Required Textbooks:** **TBA**

**Major assignments and examinations:**

Homework assignments, two in-class mid-term exams and a comprehensive final exam are scheduled. All homework assignments must be turned in at the start of the class or, no electronic submissions allowed, prior to the class period in which they are due. Failure to do so will constitute a grade of zero for the homework assignment in question. One week of advanced notice will be provided in scheduling the in-class mid-term exams. The final exam will be given according to the university's published final exams schedule. Note that failure to appear for an exam at the scheduled time will constitute a grade of zero in that exam.

**Grading Policy:**

Homework (5%),  
 Mid-term exams (20% each),  
 Class Project (15%),  
 Final Exam (35%).

Final grades have the following guaranteed scale:

<b>A</b>	<b>≥ 89.5</b>
<b>B</b>	<b>79.5 – 89.4</b>
<b>C</b>	<b>69.5 – 79.4</b>
<b>D</b>	<b>60.0 – 69.4</b>
<b>F</b>	<b>&lt; 60.0</b>

(For this course, 59.99 and below is **not** considered 60. The same criterion applies for the other averages). These are the guaranteed cutoff percentages for the grades. Actual cutoffs may be lower, but that will be to the discretion of the instructor.

**Attendance Policy:** Attendance is not mandatory; however, no special accommodations will be made for incomplete or missed assignments and exams due to unexcused absences.

**Drop Policy:** Please see university drop policy and deadlines.

**Americans with Disabilities Act:** The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112 - The Rehabilitation Act of 1973 as amended. With the passage of federal legislation entitled *Americans with Disabilities Act (ADA)*, pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

As a faculty member, I am required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily

rests with informing faculty of their need for accommodation and in providing authorized documentation through designated administrative channels. Information regarding specific diagnostic criteria and policies for obtaining academic accommodations can be found at [www.uta.edu/disability](http://www.uta.edu/disability). Also, you may visit the Office for Students with Disabilities in room 102 of University Hall or call them at (817) 272-3364.

**Academic Integrity:** It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University. "Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, and the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents' Rules and Regulations, Series 50101, Section 2.2)

**Student Support Services Available:** The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. These programs include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.

**Librarian to Contact:** Barbara Howser, Science and Technology Library.

**E-Culture Policy:** The University of Texas at Arlington has adopted the University email address as an official means of communication with students. Through the use of email, UT-Arlington is able to provide students with relevant and timely information, designed to facilitate student success. In particular, important information concerning registration, financial aid, payment of bills, and graduation may be sent to students through email. All students are assigned an email account and information about activating and using it is available at [www.uta.edu/email](http://www.uta.edu/email).

**Make-up Exam Policy:** No make-up exams are given except for medical or other similar hardships where advanced arrangements are made with the instructor; or in case of non-selective medical emergencies with appropriate physician's note or documentation. Other than circumstances described above, failure to take the exam at the scheduled time will constitute a grade of zero in the exam.

**Grade Grievance Policy:** Grade grievances will be handled according to the policy described in the College of Engineering portion of the Catalog.

**Tentative Course Outline:**

1. Introduction to MathCad
2. Statistical Analysis of Experimental Data
3. Elementary Elasticity and Fracture Mechanics
4. Introduction to Strain Measurements (Strain Analysis Methods)
5. Electrical Resistance Strain Gages
6. Strain Gage Circuits
7. Recording Instruments
8. Transducer and Load Cell Design
9. Introduction to Acoustic Emission