

## CEE 3120 MECHANICS OF MATERIALS LABORATORY

CEE 3120 lab or CEE 3040 lab or CEE 3430 lab is required

### Catalog Description:

Lab. 2. Credit 1.

Prerequisite: CEE3110. A series of experiments which demonstrate the theory of mechanics of materials and the most important characteristics of engineering materials.

Math & Basic Sciences:	0 Credits	Course Coordinator:	Guillermo Ramirez
Engineering Topics:	1 Credits	Contains Significant Design:	No
General Education:	0 Credits	Updated:	09/30/2013
Other:	0 Credits	Specify Type if Other:	

### Text Book(s) and Supplemental Material(s):

Department of Civil and Environmental Engineering, *Laboratory Manual, Mechanics of Materials*, Tennessee Technological University, March 1992.

### Course Goal(s):

To reinforce and extend the students' understanding of the mechanical behavior of a variety of materials under different types of loading. To get hands-on experience in material testing.

### Instructional Outcomes for the Course:

Students will be expected to

1. Be able to identify different types of loads acting on materials and the failure pattern that is likely to result from such loading.
2. Become familiar with both the procedures and equipment required for measuring different mechanical properties of materials.
3. Be able to describe the stress-strain behavior of materials in tension.
4. Be able to describe the load-deflection behavior of both short and long columns under compressive loading.
5. Be able to describe the stress-strain behavior of ductile materials in torsion.
6. Be able to measure and calculate deflections and stresses in both simply supported beams and statically indeterminate beams.
7. Be able to determine the stress distribution and the stress concentration factor near a hole in a flat plate subjected to tension.
8. Prepare clear engineering reports consisting of drawings and graphs coupled with written procedures, results, and conclusions.

### Criterion 3 Student Outcomes addressed by this Course:

- a) An ability to apply knowledge of mathematics, science, and engineering (Level 3)
- b) An ability to design and conduct experiments, as well as to analyze and interpret data (Level 4)
- g) An ability to communicate effectively (Level 4)
- k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (Level 3)

**Program Criteria addressed by this Course:**

1. Apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of basic science, consistent with the program educational objectives (Level 3)
2. Conduct civil engineering experiments and analyze and interpret the resulting data (Level 4)

**Course Topics:**

1. Brittle and ductile tensile stress-strain mechanical behavior (10%)
2. Compressive stress-strain behavior of short columns (10%)
3. Brittle and ductile torsional stress-strain mechanical behavior (10%)
4. Flexural stress in simply supported beams (10%)
5. Buckling study of long columns (10%)
6. Statically indeterminate beams (10%)
7. Stress concentrations of plates under tension (10%)
8. Impact and hardness tests (10%)
9. Fatigue behavior of materials (10%)

**Additional Topics/Assignments for dual-level (4000/5000) courses:**

N/A