CIVE 302 – Evaluation of Civil Engineering Materials
Fall 2014
Lecture: TR 9:00-9:50am TILT 221

Instructor:
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Course Description: In this course students are introduced to the properties and uses of materials commonly used in civil engineering applications including metals (steel and aluminum), aggregates, concrete, wood, asphalt, masonry and fiber reinforced composites. The course covers standards describing materials and tests for determining material properties and includes a lab component where students conduct tests, analyze the resulting data, and prepare technical reports. Principles from an introductory materials science course such as material microstructure, imperfections, alloys, and failure theories are introduced. Concepts related to sustainability are also introduced, including Life Cycle Analysis and sustainability rating systems. Civil engineering failures of the past are included through readings and course discussion.

Course Objectives:
A student successfully completing this course should be able to:
1. Explain the importance of standards in the context of civil engineering materials, and know how to locate and use relevant standards.
2. Describe the basic properties of a variety of civil engineering materials including metals, concrete, aggregates, asphalt, and wood.
3. Follow standards to conduct tests of material properties and perform the calculations necessary to interpret test results.
4. Express the results of tests in the form of a letter report.
5. Identify and explain significant considerations in choosing a material for a specific application including, for example, mechanical properties, durability, and sustainability.
6. Define sustainability and explain the role of material selection in sustainable design.

ABET Outcomes Addressed:
(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Required Texts:

Prerequisites: CHEM 111 General Chemistry I
CIVE 203 Engineering Systems and Decision Analysis
CIVE 360 Mechanics of Solids

Calculators: FE approved calculators must be used for exams.

Assignments and Grading:

**Lab attendance is mandatory.** If you miss more than two labs without properly documented excused absences you will fail the course. If you know you will need to miss a lab, consult with your TA BEFORE you miss.

You must have a passing grade in both the lab and lecture components to pass the class.

Final grades will be assigned using +/- grading. I generally do not have a curve in my courses. Remember that your grade is a reflection of your work throughout the semester. You need to start worrying about your final grade **NOW**. If you wait until December it will be too late. The graded components of the course are described below.

**Laboratory Reports (25%)**
There will generally be a report due each week in the laboratory sections. Details on lab activities and report requirements will be given in lab each week. Most reports will be completed by individual students, but some will be completed in groups.

**Pre-lab Group Assignments (5%)**
Most weeks lab sessions will begin with students working in groups of four to complete pre-lab assignments. These assignments will usually help prepare students for the laboratory activities that week, or in some cases the assignments will provide more time for students to consider a topic from lecture.

**Exams (45%)**
This course will have three exams, two midterms and a final. Each exam will be worth 15% of the course grade. The exams will be given during lecture on the dates indicated in the attached Course Schedule. We will discuss exam topics and format in lecture one week before each exam. All tests will be cumulative with an emphasis on more recent material. Students must use a FE approved calculator on exams.

**Textbook Questions (5%)**
The course schedule lists weekly reading assignments and assigned problems from the textbook. The problems from each week should be completed and turned in during lecture on Tuesday of the following week. For example, the Week 1 problems are due Tuesday of Week 2 (September 2nd).
Why Buildings Fall Down Reflections (5%)
Each week there will be an assigned reading from Why Buildings Fall Down as shown on the Course Schedule. Students are responsible for preparing a roughly 1 page reflection for 3 of the readings. The questions to consider in your reflection are:

1) Describe one thing you learned/found interesting/found surprising/will be valuable for the future and why.
2) What questions did the reading raise for you, or what would you like to know more about?
3) Read the ASCE code of ethics at http://www.asce.org/Ethics/Code-of-Ethics/ Were there ethical issues involved in any of the failures described in this reading? If so, discuss these issues. Can failures happen even when the Code of Ethics is followed?

Reflections should be submitted through the assignments created in RamCT. The reflections can be submitted at any time, but final due dates for the three reflections are:

- 1st reflection must be submitted by: September 23rd
- 2nd reflection must be submitted by: October 28th
- 3rd reflection must be submitted by: December 9th

Final Project (15%)
Students will work in groups of four to five to prepare a fact sheet about a specific material and its applicability to various civil engineering situations. More detail on the project will be given in lecture later in the semester. Projects will be presented in lab during the final week of the semester.

Academic Integrity:
This course will adhere to the Academic Integrity Policy of the Colorado State University General Catalog (online at http://www.catalog.colostate.edu/Content/files/2013/FrontPDF/1.6POLICIES.pdf) and the Student Conduct Code (online at http://www.conflictresolution.colostate.edu/conduct-code.aspx).

As stated by the Catalog “Academic integrity is conceptualized as doing and taking credit for one’s own work.” In this class some work will be completed by individuals and some work will be completed in groups. Below I have described in general terms how academic integrity applies to each graded component. This description is not all inclusive; please contact me if you have questions about behaviors not specifically described here.

Exams will include the following honor pledge for you to sign: I have not received or given any unauthorized assistance on this exam.

Lab Reports – I encourage students to discuss the lab procedures and results with each other as they are preparing individual lab reports. However, the written work that you turn in should be your own work. If sources are used they must be clearly cited. For group lab reports I consider pulling your own weight to be a form of academic integrity. Each individual should clearly understand everything that is described in a group report.

Pre-lab Assignments – These will be group activities, it is important that each person in the group contribute to the assignment.
Exams – The midterms should be completed individually without notes or aid from other students. Exams must be taken with FE approved calculators.

*Why Buildings Fall Down Reflections* – Each student should read the assigned chapters themselves and write their own responses to the questions.

*Textbook Questions* - Each student should read the assigned sections of the textbook themselves and write their own responses to the questions.

*Final Project* – As a group project it is important for each person to make significant contributions to the final product. Your group will be conducting research and it is important to give credit to sources and avoid plagiarism.

**Special Needs:**
If you have any special needs please come visit me during office hours so that we can discuss how I can help you be successful in this course.