

CIVE 302 – Evaluation of Civil Engineering Materials

Fall 2016

Lecture: TR 9:00-9:50am TILT 221

Instructor:

Dr. Rebecca Atadero

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Office Hours: 10:00-11:00am Tuesdays and Thursdays, please also feel free to stop by anytime my door is open, or contact me to set an appointment at a different time

Course Website: Canvas

Teaching Assistants:

Risa Benvenga risaben@rams.colostate.edu Labs: 1&4 OH: 11-12:30 MW

Greg Rademacher gregrad@rams.colostate.edu Labs: 3&5 OH: 1-2 T, 12:30-1:30 W

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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 and the design constraints and tradeoffs involved in material selection. 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 and failure theories are briefly 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. Describe the basic properties of a variety of civil engineering materials including metals, concrete, aggregates, asphalt, and wood.
2. Explain the importance of standards in the context of civil engineering materials, and know how to locate and use relevant standards.
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 and discuss design trade-offs.
6. Define sustainability and explain the role of material selection in sustainable design.
7. Locate, interpret and evaluate information about materials that can be used for design and decision making.

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:

- *Materials for Civil and Construction Engineers* by Michael S. Mamlouk and John P. Zaniewski, Pearson. The 3rd or 4th edition are both okay.
- *Why Buildings Fall Down*, by Matthys Levy and Mario Salvadori, W.W. Norton Press, 1992.

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:

- 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.
- You must have a passing grade in both the lab and lecture components to pass the class.
- **Lab attendance is mandatory.** If you miss more than two labs without properly documented university excused absences you will fail the course. If you know you will need to miss a lab, consult with your TA BEFORE you miss it.

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. All lab reports are due at the start of lab. Late reports will be accepted for up to one week with a 50% grade deduction. No work will be accepted thereafter.

Homework Assignments (5%) This course will have occasional homework assignments. In some cases the assignments will be based on lecture material, in other cases they may help you prepare for an upcoming lab. Homework assignments will be submitted on Canvas. **NO LATE ASSIGNMENTS WILL BE ACCEPTED.**

Exams (30%) This course will have a midterm exam and a final exam. 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. Exams will be cumulative with an emphasis on more recent material. Students must use a FE approved calculator on exams.

Quizzes (8%) The attached course schedule includes weekly reading assignments from the textbook. In order to encourage you to read the textbook there will be weekly online quizzes on Canvas. You will be allowed 2 attempts for each quiz. The quizzes will be due by midnight of the assigned due date.

Why Buildings Fall Down Reflections (7%) 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 something 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 Canvas. The reflections can be submitted at any time, but **no late assignments will be accepted**. Final due dates for the three reflections are:

- 1st reflection must be submitted by: September 15th
2nd reflection must be submitted by: October 27th
3rd reflection must be submitted by: December 1st

Semester Project (25%) Students will work in groups of 4-5 to complete a semester project where they identify an appropriate material for a specific design scenario. The project will include individual and group tasks. Half of each student's grade will be based on individual effort and half will be based on group assignments and student peer evaluations. See the project description posted on Canvas for more detail.

Academic Integrity:

This course will adhere to the Academic Integrity Policy of the Colorado State University General Catalog (online at <http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/>) and the Student Conduct Code (online at <http://www.conflictresolution.colostate.edu/conduct-code>). In cases where cheating is suspected, the TAs and I will discuss with you before contacting Conflict Resolution. Assignments where cheating is very strongly suspected will earn a grade of zero.

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.

Lab Reports – Students are encouraged 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.

Homework Assignments – Unless otherwise indicated, these assignments will be individual assignments. I encourage students to consult with each other to help learn the material, but the written work that is submitted should your own work.

Exams – Both exams should be completed individually without notes or aid from other students. Exams must be taken with FE approved calculators. Exams will include the following honor pledge for you to sign: ***I have not received or given any unauthorized assistance on this exam.***

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

Textbook Questions - Each student should read the assigned sections of the textbook themselves and take the Canvas quiz independently.

Semester Project – As a group project it is important for each person to make significant contributions to the final product. Your grade will include a peer evaluation component. You and your group will be conducting research and it is important to give credit to sources and avoid plagiarism.

Creating an Inclusive Climate:

I am committed to helping build an inclusive culture in this classroom, in the Department of Civil and Environmental Engineering, in the College of Engineering, and at CSU. Each individual brings diversity to our class in the identities they hold, the ways they think, their interests and skills, their background and past experiences. To me, inclusion means not only accepting these differences, but embracing them and understanding that we can leverage these differences to be better engineers.

My goal for this class is to create an environment where we do not discriminate against individuals because of their identities (for example race, ethnicity, sex, gender identity, sexual orientation, religion, nationality, age, levels of ability). It is also important to understand that even when we hold egalitarian beliefs, we can hold implicit or unconscious biases that can also influence the way we treat others. It is my expectation that students in this class will:

- 1) treat others with respect
- 2) work in teams in ways that recognize the contributions of all team members and provide all team members the opportunity to learn
- 3) examine their own behaviors and refrain from acting in biased ways
- 4) speak with the professor when biased behaviors may occur from other students, their TAs and even the professor
- 5) be sensitive to context and acknowledge that hurtful comments can sometimes be inadvertent

Grievances:

Any issues regarding the grading of lab reports should be first addressed with your TA, in person, within one week of receiving the graded assignments. Concerns with other graded components should be brought directly to me, promptly.

Special Concerns:

If you have any other particular concerns about this class, please come visit me during office hours so that we can discuss how I can help you be successful in this course.