

CE 2343: Structural Analysis

Department of Civil Engineering



Tuesday/Thursday: LART 102 - 9:00AM to 10:20AM

Final Exam: Tuesday December 12, 2017 - 10:00AM to 12:45PM

Instructor

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Teaching Assistant

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Course Description

From the university course catalog:

A study of framed structures, trusses, girders, beams including applications of static and moving loads and bridges

My description:

A study of structural forms, components, actions, and responses stemming from various loading scenarios including both classical and computer (finite element modeling) solution approaches with a focus on current practice and trends.

Course Objectives

By the end of this course you should be able to:

1. Identify structural components, applicable loads, and requisite analysis assumptions
2. Rapidly assess simple structures for stability and determinacy (review)
3. Apply mechanics principles to solve static equilibrium problems (review)
4. Solve for forces in statically determinate trusses (review)
5. Draw shear and moment diagrams for beams and frames (review)
6. Draw influence lines for reactions, forces, shears and moments
7. Determine internal forces in arches and cables
8. Estimate deflections in beams, frames, and trusses
9. Solve for simple statically indeterminate structures using classical methods
10. Develop a stiffness matrix and solve simple problems using matrix methods
11. Develop an understanding of current structural engineering practice
12. Document structural calculations and understand the responsibility of an engineer
13. Use the internet as a resource to obtain information in support of structural analyses
14. Use and interpret results of structural analysis software

Grading

Exams:	10% for Mid-term 1 10% for Mid-term 2 20% for Mid-term 3 20% for Final Exam
Quizzes:	15%
Project:	15%
Homework:	10%

Exams will be in-class and closed book. The final exam will be cumulative. Only NCEES approved calculators will be permitted, as these are what is allowed for the Fundamentals of Engineering exam. Visit the NCEES website (<http://ncees.org/exams/calculator/>) for more information.

There will be two types of homework assignments. The first type of homework assignments will be primarily designed to provide you with ample practice for a certain technique. These assignments will be through the Mastering Engineering system and will be relatively short. The second type of homework assignment will be conceptual and comprehensive problems that you will solve completely and I will grade. These will be challenging and time-consuming.

Term Project

There will be a term project that focuses on a structural failure. There are three components to this project: an overview presentation early in the term, development and presentation of a physical model that demonstrates the physical mechanism behind the failure, and a summary paper that discusses the importance of the failure, and the role of the engineer. More details on the project will be provided.

Attendance Policy

I do not take attendance during class. Your work is your responsibility, and you make the decision to show up in person or not. See the class approach for information about online resources.

Class Approach

I will use Blackboard to provide you with assignments, class materials, and other related information. Blackboard will provide a connection to the Mastering Engineering system as well. I will post grades on Blackboard. All this is to say that you should be prepared to use Blackboard.

Throughout this term, I will be attempting to convert all of my lecture notes into short video segments (approximately 10 minutes in length each). As I move forward with this effort, I will make the videos available to you on Blackboard. I hope to be able to shift to a lecture-recitation format where we will work on problems in small groups during one lecture each week. In order to achieve this, you will be expected to review some lecture videos at home on your own time. I will post lecture note shells (PowerPoint slides with blanks) prior to lecture for you to either print and write on, or take notes electronically using an iPad or Surface. I will also post the version of my notes that we use in class.

I have no issues with you using technology in the classroom. In fact, I will deliver many lectures on an iPad which mirrors to the projector, allowing me to move about the room. Periodically I will seek your opinion on the class and my approach through anonymous surveys. I encourage you to be open and honest in the surveys.

Neatness Policy

Part of being an engineer is executing tasks in a neat, understandable and repeatable manner. This is a critical aspect of engineering education that is often overlooked. In this class, I ask that you do the following:

- Complete homework assignments on engineering paper (available in the bookstore or on Amazon). Loose-leaf paper is not permitted.
- Homework must be stapled.
- Use sharp pencils and a straight-edge for your work. Write precisely and neatly.
- Include your name on every page of your homework.
- Number, title and date the pages of your homework.
- Clearly sketch out any diagrams with labels as required.
- Box answers so they can be readily identified.
- List any external references used in the homework (i.e., textbook tables)

Handwritten homework assignments which do not adhere to this policy will not be accepted.

Honor Code

Students are expected to adhere to the Honor Code of the Department of Civil Engineering, which can be found here (<http://ce.utep.edu/honorcode.htm>). Instances of suspected cheating or other violations of the Honor Code will be handled according to the procedures in the UTEP Handbook of Procedures.

Group Work Policy

Working in groups is encouraged for homework assignments, but everyone must submit their own work. Blatant copying is not permitted and both the copier and the person who provided their work to be copied will lose credit for the assignment.

Computer Policy

When explicitly required by the instructor, homework assignments must be checked using a contemporary structural analysis software package (STAAD is provided). If the output from a computer analysis is not submitted when required, no credit will be given for the assignment. Please see ETC to ensure that you have access to STAAD. If you prefer to use another software, please consult with Dr. Weidner BEFORE turning in a homework assignment using that software.

Textbook

Hibbeler, R.C. 9th Edition

Note that this is the Mastering Engineering edition.