CE 2343: Structural Analysis
Department of Civil Engineering

General Information

Instructor:	Jeff Weidner, Ph.D. Office: A-222 Lab: E-214 Office Phone: (915)-747-6913 Email: jweidner@utep.edu Office Hours: By appointment – Schedule at weidner.acuityscheduling.com
Teaching Assistant:	Daniela Mora Email: dmora3@miners.utep.edu Office: E-214 Office Hours: Monday/Wednesday/Friday: E-214 – 12:30PM to 1:30PM
Meeting Time and Location:	Monday/Wednesday/Friday: LART 323 - 11:30AM to 12:20PM
Final Exam:	TBD
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.
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. For communication, questions on homework, and test preparation questions, use Microsoft Teams. You all have access to this through the University for free. 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 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 have no issues with you using technology during lecture. 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.

Textbook: Required: Hibbeler, R.C. "Structural Analysis" 10th Edition
* Note that Mastering Engineering is required.

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

Class Policies

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.

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. If you do not show up you may miss quizzes. Makeup quizzes will not be given without an excused absence (e.g., a doctor's appointment with a note). Validity of excused absences is at my discretion and are not debatable. If you have a valid excuse to miss class and are concerned about missing material, please discuss with me in **advance**. Student athletes should speak with me at the start of the term to work out a plan for expected absences.

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.** Any work submitted on paper that is not engineering paper will be deducted 25%.
- 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)
- Make a clean digital copy for submission

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 and RISA are provided by ETC). 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 and/or RISA. If you prefer to use another software, please consult with Dr. Weidner BEFORE turning in a homework assignment using that software.

Calculator Policy: 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. No phones.

Coursework and Grading Expectations

Grading: Grade Breakdown:

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

Final Grade Thresholds:

$A \geq 89.5$
$89.5 > B \geq 79.5$
$79.5 > C \geq 69.5$
$69.5 > D \geq 59.5$
$59.5 > F$

Exams: Exams will be in-class and closed book. I make the exam questions up myself, and do not reuse questions. Makeup exams are only provided after **advance** discussion with me. If you miss an exam due to unexpected circumstances (e.g., car crash, family emergency, etc.), notify me immediately and we will discuss options.

The final exam is cumulative. I am looking to see improvement in your capabilities as the term progresses. As such, I will replace your lowest exam score from Midterms 1 and 2 with your final exam grade, assuming that the final exam grade exceeds your scores on Midterm 1 or 2. I will not replace Midterm 3.

Extended exams (longer than the allotted class period) are only provided through the Center for Accommodations and Support Services (https://www.utep.edu/student-affairs/cass). This includes exceptions that result from acute events that occur throughout the term.

Quizzes: Quizzes will be at the beginning of some classes. They will be one problem and will generally take ten minutes or less. I do not take attendance, but obviously if you are not in class, you will not receive credit for quizzes. That being said, I will make an effort, but not guarantee, to provide advance warning of quizzes.

Homework: 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 one problem. 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: In all aspects of life, learning from a failure is critical to progressing. Structural Analysis is no different, though the consequences may be substantial. Throughout history, many structures have failed. Engineering practice has a

responsibility to react. As up and coming engineers, you need to learn from history and ensure that mistakes are not repeated.
The overarching purpose of this project is to expose you to structural failures, and the circumstances that bring them about. The project has two portions – development and presentation of a physical model depicting the failure mechanism, and a short paper that discusses the failure, it's consequences, and the role of the engineer throughout.
I will assign you groups of four, and you may choose your failure. The presentation and the development of the model will be group work. The paper will be individual. Only six groups, at most, will be allowed to present a particular failure, and it is first come first serve.

Part 1: Present the details of your structural failure using a physical model
Select a structural failure to research. You may pick from the following choices:

- Kansas City Skyway
- I-35W in Minneapolis

Throughout the term, you and your group will develop a simple physical model to explain your failure. You do not need to create a replica of the structure. Your goal is to show the mechanism by which the failure occurred. Think outside the box in terms of materials and approach. You are required to meet with Dr. Weidner as a group prior to the end of February to discuss the concept for your model. Failure to schedule this meeting will result in a 25% reduction in your overall project grade.
You will accompany your model with PowerPoint slides that cover the circumstances that led to the failure that may not be strictly engineering related – like decisions which led to a situation where failure was likely. I also want you to reflect on how building a model did or did not help you better understand the failure. The presentation should be ten minutes or less, and will be peer evaluated. I want this to be fun, so surprise us.
Class Presentations will be on April 23, 2018. Attendance is mandatory for peer evaluation. Your presentation slides and model will be submitted. The model will be returned to you if you want it. The slides should be presented electronically.

Part 2: Discuss the impact of your failure in a short paper
The final portion of the project is individual. You are to write a short paper (less than five pages with images) that briefly explains the material covered in your presentation; mainly the history of the failure and the circumstances that led to the failure. This should take no more than two pages. The rest of the paper should discuss the consequences of the failure, the influence on engineering practice, and the role of the engineer in this failure and in preventing future failures. This is primarily a reflection, so use your own words.
You need to cite at least three sources. This paper must be original work, and will be checked electronically for plagiarism. If you are found to have

plagiarized, the paper will receive no credit, and Dr. Weidner is obligated by university policy to report the incident to the Office of Student Conduct. Please do not plagiarize. If you have questions about plagiarism there are plenty of online resources at your disposal, or you may come speak with Dr. Weidner. The paper is due on April 30, 2018 in electronic form by 9AM.