

## **CE 5304: Advanced Design of Structural Systems**

Department of Civil Engineering



Tuesday/Thursday: UGLC 340 - 6:00PM to 7:20PM

Final Exam: Tuesday December 14, 2017 - 7:00PM to 9:45PM

### **Instructor**

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### **Course Description**

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From the university course catalog:

Behavior and design concepts for concrete, steel, and composite structural systems.

Topics include a detailed review of design specifications, detailing of frames, floor systems, and bracing components. Students will also be exposed to computational design tools.

My description:

This course will focus on understanding the design and construction process with a specific focus on steel buildings. Topics include general design understanding, developing a building vocabulary, load determination and assignment, and structural design of the primary building components that make up a structural system. Computational design tools will be used extensively.

### **Course Objectives**

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

1. Identify design goals and constraints for engineered systems
2. Understand the individual systems that comprise a building, and how they interact
3. Understand how to use design codes throughout a design effort
4. Understand the structural components that comprise a building structural system
5. Determine design loads and load combinations
6. Design structural components including beams, columns, braces, composite decks, and roof trusses
7. Design structural steel connections
8. Use structural analysis software to aid in design
9. Work in teams to solve challenging real world problems
10. Understand the role of sustainability in aspects of building design

## ***Grading***

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Exams:	25% for Mid-term 25% for Final Exam
Project:	30%
Homework:	10%
Journal Review	10%

Exams will be in-class, and will be open-code, and open-homework only. You will be responsible for correcting your homework, and printing out the relevant sections of the code. The final exam will be cumulative. Only NCEES approved calculators will be permitted, as these are what is allowed for the Professional Engineering exam. Visit the NCEES website (<http://ncees.org/exams/calculator/>) for more information.

## ***Term Project***

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There will be a term project that focuses on a design problem involving a more complex structure. You will be permitted to work in pairs, but each person will be required to develop their own design. Details will follow.

## ***Homeworks***

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There will be several homework assignments throughout the term, focusing on specific aspects of load determination or design. They will be graded based primarily on the procedure you follow, as design problems can have multiple solutions. Homework that do not adhere to the neatness policy below will not receive full credit. If required, solutions from a computational software (STAAD) will be submitted with the homework. You are encouraged to annotate your homework including table and section code references because this is how engineering calculations should be done, and because it will make it easier to grade. Also, it will help you use your homework more effectively during exams.

## ***Journal Review***

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Both in your time as a graduate student, and when you are in your career (academic or industry), it is important to stay informed about current practice and research. To that end, I am asking you each to give a short presentation on a journal paper which you identify and select. The purpose of the presentation is to explain what the paper is about, how the authors went about their research, an overview of the results and conclusions, and a subjective assessment of the value of the paper. We will sign up for dates early in the term. Presentations are expected to take approximately ten minutes, including time for questions. You will be evaluated by your peers.

## ***Attendance Policy***

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I do not take attendance during class. Your work is your responsibility, and you make the decision to show up in person or not.

## ***Class Approach***

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Lectures will be a combination of chalk/whiteboard, Powerpoint, and note shells where I complete the notes during class. We will do a lot of problem solving in small groups in class. In the second half of the term, many lectures will be dedicated to working on our project. 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**

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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., code table references and sections)

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

### **Honor Code**

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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**

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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.

### **Textbook**

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Required:

Fundamentals of Building Construction – 6<sup>th</sup> Edition – Edward Allen and Joseph Iano  
AISC Steel Manual – 14<sup>th</sup> and 15<sup>th</sup> edition are both adequate

Other resources from the UTEP Library (Links will be on Blackboard)

- International Building Code
- ASCE Minimum Design Loads for Buildings and Other Structures
- The Architect's Studio Handbook – Edward Allen and Joseph Iano
- Other Sources will be added as required