

Structural Engineering II: Introduction to Structural Design

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This course is directed towards juniors in civil engineering who have taken a class in civil engineering materials (e.g., CEE 363) and structural analysis (e.g., CEE 379), but who have not yet taken a class in structural design.

The goals of this course are (1) to give students an overview of major issues that affect structural design, and (2) to develop understanding and proficiency with common tools and procedures for determining loads and capacities.

If you continue your studies of structural engineering, the course will provide you with the background necessary to take material-specific, structural design courses for steel (CEE 451), reinforced concrete (CEE 452), prestressed concrete (CEE 453), timber (CEE 454) and masonry (CEE 455). If your interests take you elsewhere, this course will provide you with a better understanding of the activities of colleagues with whom you will likely work.

1. Design Strategies

- Design goals, responsibilities and process
- Design strategies (ASD, LRFD, capacity, performance)
- Design codes

2. Gravity Loads

- Dead loads, live loads and combinations
- Tributary areas and load paths
- Patterned loads
- Influence lines

3. Member Capacities

- Nonlinear stress-strain relationships in beams
- Application to steel beam plastic moment
- Application to reinforced concrete beams
- Column buckling
- Application to steel columns
- Collapse analysis for simple structures

4. Serviceability Considerations

- Deflection limits
- Transformed sections
- Application to reinforced concrete beams
- Application to steel-concrete composite construction
- Other considerations (e.g., vibrations, temperature, cracking)

5. Environmental Loads

- Wind loads
- Earthquake loads
- Other sources of loading (snow, rain, soil, ice, etc.)

6. Selection of Structural Systems

Homework Assignments

Homework is an important part of this class. You are encouraged to work with each other to understand concepts, and to check numerical and procedural accuracy of your solutions. However, unless otherwise instructed, each of you needs to submit your own solution.

In practice, it is important to communicate your ideas and designs clearly, because miscommunication can lead to faulty construction, lawsuits and injury. In this class, all homework solutions should be completed as follows:

- Attach copy of problem statement to front of assignment (do not need to copy by hand).
- Assignments should be completed on engineering paper.
- The heading on each page should include your name, the date, an identification of the homework set and of the particular problem number. Right-hand corner should include page number and total number of pages.
- Document your solutions neatly such that another engineer (such as the grader) can understand your assumptions and procedures.
- underline intermediate results that are significant, and box final answers.

Grading

Homework and in-class assignments	30%
Midterm	30%
Final Exam	40%

A deduction of 10% will be applied to each homework assignment for each school day that it is late. No homework will be accepted after the solutions have been distributed.

Important Dates

Monday,	May 31st, 2004	Memorial Day
Friday,	June 4th, 2004	Last Class
Wednesday,	June 9th, 2004,	Final Exam, 8:30-10:20.