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http://www.ce.gatech.edu/~cee4520a/

Room 511 Mason

CE 4520 – Reinforced Concrete Design

Course Objectives: This course introduces students to the basic techniques required by practicing engineers for designing structures using reinforced concrete. The structural elements covered are beams, columns, footings, and slabs. Time permitting, students will be exposed to seismic resistant design of concrete structures. Some computer analysis may be used for illustrative purposes.

Prerequisites: Structural Analysis

Computer Programs: Several computer programs will be used throughout the course of this class. They will be available on the computers on the second floor of Mason.

Textbook: Design of Reinforced Concrete by McCormac (Fifth Edition)

Code Book: ACI 318-02 Building Code Requirements for Structural Concrete and Commentary : <http://www.aci-int.net/>

COURSE ORGANIZATION

- Tu-Th 8:00-9:30 am 142 Mason, Office Hours : Mon-Wed 3:30-5:00
- Assigned work will include weekly reading in the reference books and homework problems. You are encouraged to **work in groups**, however, you must hand in your own assignment.
- Late assignments will marked down 50%! *Assignments will not be excepted more than 1 day late You can drop your lowest HW assignment!*
- There will be 6-8 quizzes during the semester; roughly 1 quiz after each HW assignment, except during the week of the midterms. You can drop your lowest quiz grade.
- There will be two 2-hour midterms and one 3-hour comprehensive final examination. The exams will be closed book and open notes.
- There will be one Final Project to be presented during the last week of class. You can work in groups of up to 4 students.

GRADING

Grading is NOT based on a curve

- Your grade will be determined from the following grading scheme shown below:

Homework (10%), Quizzes (20%), Midterms (30%), Final Project (10%) Final Exam (30%)

Solutions to homeworks, and exams will posted on the course webpage at <http://www.ce.gatech.edu/~cee4520a/>

TENTATIVE EXAM SCHEDULE

Midterm 1: Tuesday, February 18th

Midterm 2: Thursday, April 3rd

Final: Thursday, May 1st, 8am

COURSE CONTENT

- **Introduction and Design Process**
Overview of Course, Reinforced concrete structures, Building Codes, The design process: relationship of analysis to design. **1 Lecture (1/7)**
Chapter 1
 - **Materials**
Strength of concrete, Mechanical properties of concrete, durability **1 Lecture (1/9)**
Chapter 1
 - **Flexure – Basic Concepts, Rectangular Beams**
Flexure theory, analysis of RC beams, design of RC beams, **2 Lectures (1/14-16)**
Chapter 2- 3
 - **T-Beams, Beams with Compression Reinforcement**
T-beams, Beams with compression reinforcement, **3 Lectures (1/21-23-28)**
Chapter 4
 - **Shear in Beams**
Shear, Truss model, shear in columns **3 Lectures (1/30 1-2/4-6)**
Chapter 7
 - **Development, Anchorage, and Splicing of Reinforcement**
Mechanism of Bond, development length, anchorage lengths, splicing **2 Lectures (2/11-13)**
Chapter 6
- MIDTERM 1 (Tuesday, February 18, 2002)***
- **Serviceability**
Elastic analysis of beams, cracking, effective EI, deflections, **2 Lectures (2/26-28)**
Chapter 5
- Spring Break (March 3-7)***
- **Continuous Beams and One -Way Slabs**
Shear & moment in continuous beams, slab design **2 Lectures (3/11-13)**
Chapter 3
 - **Column Design – Combined Axial Load and Bending**
Ties & spirals, interaction diagrams, reinforcement & detailing, **4 Lectures (3/18-20-25-27)**
Chapter 8-9
- MIDTERM 2 (Thursday, April 3, 2002)***
- BEGIN FINAL PROJECT***
- **Design and Analysis of Multi-Story Building Frames** **2 Lectures (4/8-10)**
 - **Earthquake Resistant Design of RC Buildings** **2 Lectures (4/15-17)**
- FINAL PROJECT (Tu-Th, April 22-24, 2003)***

Instructor out of town on the following days;
TBD