CEE 782 (Reinforced Concrete Design I) **University of Cincinnati**

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Required Texts:

Class notes on Blackboard
MacGregor J.G., Wight J.K. (2005), "Reinforced Concrete Mechanics and Design," 4th Ed.

References:

ACI 318-05 Building Code and Commentary
Park & Gamble, Reinforced Concrete Slabs, Wiley-Interscience, 1980 or Park & Gamble, Reinforced Concrete Slabs – 2nd Ed., John Wiley & Sons, 2000

Brief Description: The objective of this course is to develop an understanding of fundamental principles governing behavior of reinforced concrete members, and a working understanding of the state of art and practice for design of complete reinforced concrete structures with an emphasis on buildings. Examination of systems will enable development of analysis and design methods. Current design code provisions will be discussed so that bases and limitations of the provisions can be understood. However, the overall objective of the course is to enable the structural engineer to design beyond the limitations of existing code, and not just educate the participants on how to use the codes or where a particular provision is. Recent developments in research and practice are used to illustrate design and detailing of reinforced concrete members and systems. Issues regarding modeling of R.C. structures are also explained.

Prerequisite: In addition to CEE 781, the students are assumed to know ACI 318-05 provisions for shear design of beams (§ 6.1 – 6.3, 6.5 in textbook) and design of one-way slabs (Chapter 10 in textbook). Review materials will be posted on Blackboard, but will these provisions will not be discussed in the class.

Scope: The course includes the topics listed in Table 1. Reading assignments from the textbook are listed. Additional reading materials will be made available on Blackboard.

Course Organization:

- Assignments will include reading from the text and from other posted materials.
- Homework problems will be assigned on a regular basis to illustrate course materials. Assigned problems will be due on days to be announced in class. Normally, one week will be allowed for completion of problems.
- A midterm exam and a comprehensive final exam will be given.

Grading:

The following approximate weights will be used for grading:

Homework	35%
Midterm	30%
Final	35%

Table 1 List of Topics and Dates

Week	**Topics**	**Coverage**
1	Shear behavior, background of ACI provisions, variable angle truss method, shear-friction	Notes, Ch. 6
2	Strut-and-tie models	Notes, §18.1 – 18.11
3	Strut-and-tie models (cont.), ACI provisions for deep beams	Notes, §18.1 – 18.11
4	Use of CAST for STM models Torsion	Notes Notes, Ch. 7
5	Torsion (cont.)	Notes, Ch. 7
6	***Midterm Exam*** Slender Columns	Notes Notes, Ch. 12
7	Slender Columns (cont.)	Notes, Ch. 12
8	Behavior of two-way slabs, Direct design method	Notes, §13.1 – 13.6
9	Direct design method (cont.) Equivalent frame method	Notes, §13.9 – 13.13 (except for shear & moment transfer) Notes, §14.1 – 14.3
10	Equivalent frame method (cont.)	Notes, §14.1 – 14.3