

### Advanced Reinforced Concrete Design

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Office Hours: MWF 1:30-2:30  
 MWF 4:30-5:00

This course is directed towards graduate students in structural engineering who have already taken an undergraduate course in reinforced concrete design (e.g., CIVE 452). The goal of the course is to develop an improved understanding of the behavior of reinforced concrete members. Once general behavior is understood, the codes can be placed in proper perspective, and one can design in situations that are not considered explicitly in current codes. CESM 512, offered during the Spring Quarter, will discuss the behavior and design of reinforced and prestressed concrete systems.

<b>Course Outline</b>	<b>MacGregor</b>	<b>ACI</b>
1. Design Concepts/Alternatives	Ch 2	Ch 8, 9
2. Materials Properties and Modelling Steel Concrete	Ch 3	Ch 3, 9 Ch 3, 4, 5
3. Flexure Behavior Analysis	Ch 4, 5 and 9	Ch 10
4. Flexure + Axial Loads Interaction Biaxial Slender Columns	Ch 10 Ch 11 Ch 11 Ch 12	
5. Shear Behavior Empirical Methods (ACI) Truss Theory (Strut and Tie Models)	Ch 6	Ch 11
6. Torsion	Ch 7	Ch 11

#### Required Text

MacGregor, J.G. (1992), Reinforced Concrete Mechanics and Design, 2nd edition, Prentice Hall, Englewood Cliffs, NJ.



## **Additional References**

American Concrete Institute Committee 318 (1995). Building Code Requirements for Reinforced Concrete (ACI 318-89) and Commentary, American Concrete Institute, Box 19150, Redford Station, Detroit, Michigan.

Ferguson, P.M., Breen, J.E. & Jirsa, J.O. (1989). Reinforced Concrete Fundamentals, 5th edition, John Wiley & Sons.

Hsu. T.T.C. (1993), Unified Theory of Reinforced Concrete, CRC Press, Ann Arbor, MI.

Leet, K. (1991), Reinforced Concrete Design, McGraw-Hill.

Park, P. and Paulay T. (1975), Reinforced Concrete Structures, John Wiley & Sons.

ACI Structural Journal

ASCE Structural Journal

See reference list for additional references.

## **Grading**

Homework	30%
Midterm	30%
Final Exam	40%

10% percent deduction per day for late homework

## **Important Dates**

Friday,	Nov. 10,	Veterans Day Holiday
Thu.-Fri.,	Nov. 23-24,	Thanksgiving Day Holiday
Friday,	Dec. 8,	Last Day of Classes
Thursday,	Dec. 14,	Final Exam, 2:30-4:20 p.m.