

THE GEORGE WASHINGTON UNIVERSITY, WASHINGTON DC
SCHOOL OF ENGINEERING AND APPLIED SCIENCE
CIVIL & ENVIRONMENTAL ENGINEERING DEPARTMENT

CE208, Section 10, CRN: TBA, 3.0 credits
Advanced Reinforced Concrete Structures

Meet in TBA, on TBA, at TBA

TENTATIVE COURSE OUTLINE

Prerequisites: CE206, Design of Reinforced Concrete Structures
CE210, Methods of Structural Analysis

Instructors: Sameh S. Badie, PhD, PE
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Office hours for questions: TBA

References:

1. "Building Code Requirements for Reinforced Concrete ACI 318-05 with commentary
2. "Design of Reinforced Concrete Structures," Arthur H. Nilson, 13th Edition, 2003, McGraw-Hill, Inc., New York, ISBN 0-07-292199-4
3. "Structural Engineering Handbook" by Edwin Gaylord, Charles Gaylord, and James Stallmeyer, McGraw Hill, 4th Edition, 1997
4. Minimum Design Loads for Buildings and Other Structures, ASCE Standard, ASCE7-95
5. Portland Cement Association, PCA Publications:
 - a. Notes on ACI 318-02
 - b. Shear Wall-Frame Interaction, A Design Aid with Commentary, PCA Special Publications
 - c. Miscellaneous
6. Precast/Prestressed Concrete Institute Publications:
 - a. PCI Design Handbook, Precast/Prestressed Concrete Institute, 5th Edition, 1999
 - b. Papers from the PCI Journal
 - c. Special publications by PCI
 - d. Miscellaneous
7. Concrete Construction Engineering Handbook, by Edward Nawy, CRC Press, 1997
8. A. Ghali and A.M. Neville. "Structural Analysis: A unified classical and matrix approach", Fourth Edition, E & FN Spon, 2003

Course Objectives:

The purpose of the course is to develop the student's ability to analyze and design special types of reinforced concrete structures, and to broaden his perspective of reinforced concrete application in structural systems.

After completion of the course, the student should be able to design special type of structures such as long columns, floor systems, tanks, folded plates, shells, domes, etc., and to recognize the structural behavior of these structures.

Tentative Course Content:

1. Slender Compression Members:
 - 1.1 P-Delta Effects
 - 1.2 Sway Versus No-Sway Columns
 - 1.3 Design Of No-Sway Columns
 - 1.4 Design Of Sway Columns
2. Lateral Load Resisting Systems:
 - 2.1 MRF, SW, & Dual Systems
 - 2.2 Distribution Of Lateral Loads Of Shear Walls In High Rise Buildings
 - 2.3 Design Of RC Shear Walls
3. Analysis And Design Of RC Floor Systems
 - 3.1 Direct Design Method
 - 3.2 Equivalent Frame Design Method
 - 3.3 Shear Transfer For Slab/Column Connections
4. Strut-And-Tie Method Of Analysis
 - 4.1 Applications: Design Of Deep Beams
 - 4.2 Applications: Design Of Corbels
5. Connection Details For Seismic Loads
 - 5.1 CIP Monolithic Beam/Column Connections For Non-Seismic Areas
 - 5.2 Connection Details For Precast Construction
 - 5.3 PRESSS Program
6. Moment Curvature Relationship Of RC Sections
 - 6.1 Using modified Stress-Strain Relationship for Concrete & Steel
 - 6.2 Using Exact (elastic-plastic) Stress-Strain Relationship for Concrete & Steel

Additional Topics (if time allows):

7. Fiber Reinforced Plastics (FRP)
8. Analysis And Design Of Spherical Domes
9. Analysis And Design Of Folded Plate Structures
10. Beams On Elastic Foundations
11. Analysis And Design Of RC Tanks

Course Operation:

- Homework problems will be assigned in class.
- Homework must be done on engineering paper, utilizing pencil and straight edges for sketches.
- Homework must be turned in before the announced deadline. No late homework can be accepted for grading.
- No make-up tests or quizzes will be given without prior consent of the instructor and only under very unusual circumstances.
- A Design or Research Project will be assigned by the end of first week. A final report and shall be submitted by the assigned dead line. Also, a PPT presentation will be delivered by every student.

Components of Final Grade:

Homework	20%
Quizzes	20%
Midterm exam	20%
Final Exam	20%
Projects	20%

Tentative Letter Grades:

A	≥ 95%
A-	≥ 90%
B+	≥ 85%
B	≥ 80%
B-	≥ 75%
C+	≥ 70%
C	≥ 65%
F	< 65%

Course Website:

Visit the course website at: GW Black Board

You can use it to check the new assignments, your grades, and any other information related to the course.
