

**CE 462 - Reinforced Concrete Design**

Class hours: 10:00 - 10:50 AM, MWF, Fall 2018, Room G78A ESB

**Instructor:** Dr. Hung-Liang (Roger) Chen, Professor  
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Office hours: 11:00 - 12:00PM MWF, or by appointment.

**Course Objectives:**

To design and analyze reinforced concrete members.

**Course Description:**

Understanding the material properties; design methods; safety considerations; ACI code; beams under flexure and shear; columns under flexure and axial loads; bond and anchorage. Introduction to slabs, floor system, footing, and prestressed concrete.

**Text Books:**

- (1) Building Code Requirements for Reinforced Concrete and Commentary, ACI 318-14, American Concrete Institute, 2014. (required)
- (2) Reinforced Concrete - A Fundamental Approach by E. G. Nawy, 6th edition (ACI 318-08 code edition), Prentice Hall, 2009, ISBN-10: 0-13-241703-0. (recommended)
- (3) Reinforced Concrete Design by Wang, Salman, Pincheira and Parra-Montesinos, 8<sup>th</sup> edition (ACI 318-14 code edition), Oxford University Press, 2017. (recommended)

**Course Outline:**

1. Introduction
2. Material Properties of Concrete and Reinforcement
3. Flexure in Beams
4. Shear and Diagonal Tension in Beams
5. Combined Compression and Bending: Columns
6. Bond Development of Reinforcing Bars
7. Serviceability of Beams and One-way Slabs
8. Introduction to Footings and Concrete Structural Floor Systems

9. Introduction to Prestressed Concrete
10. Introduction to Seismic Design of Concrete Structures
11. Experimental Observation of Reinforced Concrete Behavior
12. Introduction to Computer-Aided Design programs

**References:**

- (1) Design of Concrete Structures by Darwin, Dolan and Nilson, 15<sup>th</sup> ed., McGraw Hill, 2015.
- (2) Design of Reinforced Concrete by McCormac and Brown, 10<sup>th</sup> ed., Wiley, 2015.
- (3) Reference list given in class.

**Grading:**

Homework:	15
Class Participation and 4 Quizzes:	15
Exam I:	30
Exam II:	35
Design Project:	15
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	110

	Grade
Above 90	A
89 - 80	B
79 - 70	C
69 - 60	D
59 - 0	F

**Remark:**

- (1) Exam I and Exam II will be in-class. There will be NO MAKE-UP EXAM.
- (2) Reading the textbook and the class notes, and class participation are required. When you are not able to come to class, please let me know. Taking notes in class is strongly recommended. Think with me and try to understand everything in class. If you have questions, feel free to ask me immediately.
- (3) Homework assignment will have a due date. NO LATE HOMEWORK will be accepted unless there is an emergency.
- (4) Four quizzes will be given in class and the lowest score will not be counted. Quiz dates will be announced and there will be NO MAKE-UP QUIZ.
- (5) The design project will be a team project. Each team should have 4-5 members. Choose your own team partners. Choose your own topics (feel free to discuss this with me). Use your computer skill and creativity. The final report should be a design project report. Grading will be based on the final report, the presentation and the use of teamwork.

Each team has to submit the followings:

1. Names of your members and your team - 8/29/2018.
  2. Tentative titles of your project and work-share (responsibility) of each member – 9/14/2018.
  3. Project Title and Table of Contents - 9/24/2018
  4. Final report - 11/16/2018.
- Presentation of the project (max.15 min./team) - 11/26/18, 11/28/18, 11/30/18.

**Course Prerequisites:** CE 361.

**Expected Learning Outcomes:**

Course Outcome Description	ABET Program outcome *
(1) Learn about fundamental principles of analysis and design of flexural reinforced concrete members	(a), (c), (e)
(2) Learn about fundamental principles of analysis and design of reinforced concrete columns	(a), (c), (e), (j)
(3) Learn about the design requirements in the current ACI code	(a), (c), (e), (j), (k)

\* ABET Program outcomes:

- (a) Apply knowledge of math, science, and engineering
- (c) Design Civil engineering projects and components of projects
- (e) Identify, formulate, and solve Civil Engineering problems
- (j) Knowledge of contemporary issues
- (k) Use techniques, skills, and modern engineering tools

**Social Justice Statement:**

West Virginia University is committed to social justice. West Virginia University is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect and inclusion.

**Academic Honesty Statement:**

The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code at <https://studentconduct.wvu.edu/campus-student-code> Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me before the assignment is due to discuss the matter.