



**Sharif University of Technology
School of Civil Engineering**

**Concrete Design Project
Fall 2017**

Course Description

The primary objective of the course is to extend the student's knowledge and proficiency in analysis and design of reinforced concrete structures. To accomplish this objective, the course will examine topics related to the behavior of beams, columns, one-way slabs, structural walls and foundations, design, and detailing and constructability issues.

Course Outline

1. Review of concrete I and concrete II (Flexural design - Shear design - Design of Columns)
2. Different types of gravity systems
3. Different types of lateral resisting systems
4. Loading of concrete structures
5. Load distribution between gravity and lateral resisting systems
6. Principles for design of special moment frames
7. Analysis and design guidance
8. Detailing and constructability issues

COURSE STAFF:

Instructor: Siamak Epackachi
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CLASS SCHEDULE:

Lecture: Wednesdays 8:00 – 10:00 AM Room 210

1. Assigned work includes reading and written homework assignments as described below.
 - a. *Reading*: The reading includes assignments in ACI 318-14, the textbook and other materials. It is the student's responsibility to read the material indicated for each topic being covered in class.
 - b. *Homework*: Homework problems will be assigned usually once per week. The assignments are due in class a week after they are assigned. Homework solutions should be prepared on engineering paper but it is essential that the solutions be neat and well organized. Points will be deducted for poor organization and messy work. Late homework will not be accepted.
 - c. *Final project*: It includes the analysis and design of a 5 story concrete structure.
2. Student conduct is governed by the rules of the University and students are expected to know and abide by the University policies on academic honesty and integrity. These policies state "...students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and the respect of other's academic endeavors. By placing their name on academic work, students certify the originality of all work not otherwise identified by appropriate acknowledgements." Violation of these policies is subject to penalties that include receiving a failing grade in the course, suspension, and dismissal.
 - a. One midterm exam and one final exam will be given.
3. Grading will be based on the following approximate weights:
 - a. Homework: 10%
 - b. Midterm exam: 20%
 - c. Final exam: 30%
 - d. Final project: 40%

Required Textbooks

Wight, J. and MacGregor, J. Reinforced Concrete: Mechanics and Design, Prentice Hall, Eighth Edition, 2012.

ACI Committee 318, Building Code Requirements for Reinforced Concrete and Commentary, American Concrete Institute, 2014.

Moehle, J. and Hooper, J., Seismic Design of Reinforced Concrete Special Moment Frames, NEHRP Seismic Design Technical Brief No.1, 2014.

Nilson, A., Darwin, D., and Dolan, C., Design of Concrete Structures, 1997.

Priestley, M.J.N. and Paulay, T., Seismic design of reinforced concrete and masonry buildings, John Wiley, 1992.

Prerequisites

It is assumed that all students are proficient in structural analysis, analysis of concrete structures, and mechanics and a basic course of civil engineering materials.

Tentative Lecture Schedule

Lectures 1 - 2:

Review of concrete I and concrete II (Flexural design - Shear design - Design of Columns)

Lectures 3:

Different types of gravity systems

Lectures 4:

Different types of lateral resisting systems

Lectures 5:

Loading of concrete structures

Load distribution between gravity and lateral resisting systems

Lectures 6 - 8:

Principles for design of special moment frames

Analysis and design guidance

First mid-term exam

Lectures 9 - 10:

Detailing and constructability issues

Lectures 11 - 15:

Final project

Final exam