Design of Reinforced Concrete Structures (I)
ECIV 3316

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Course Description:
Strength of reinforced concrete; design of short columns; beam in flexure and shear; one-way slabs; development and anchorage of reinforcement and isolated footings.

Objectives:
1. Students will gain a basic understanding of the integration of analysis and design.
2. Students will learn how to design reinforced concrete members, including short columns, beams, one-way slabs, and isolated footings for applicable strength and serviceability limit states according to ACI 318-2008.
3. Students will ultimately learn how to design a reinforced concrete building frame system.

Instructional Methods:
1. Three lecture hours per week covering theoretical background in addition to solving numerical examples.
2. One discussion hour per week focusing on a comprehensive design project. This design project will be completed throughout the semester. Design groups will be assigned by the Teaching Assistant.

Textbook:
Reinforced Concrete Design, draft of third edition (available on my webpage).

References:
1. Building Code Requirements for Reinforced Concrete, ACI 318-08, Farmington Hills, MI, USA.
Course Outline:

1- Introduction:

2- Materials and Properties:
   - Concrete
   - Steel reinforcement

3- Design Requirements:

4- Design of Columns:
   - Axially Loaded Short Columns

5- Design for Flexure:
   - Singly Reinforced Rectangular Sections
   - T-Shaped Sections
   - Irregular Sections

6- Design for Shear:

7- Design of One-way Slabs:
   - Solid
   - Ribbed

8- Development of Reinforcement:
   - Development lengths
   - Lap Splices
   - Bar Cutoffs

9- Design of Isolated Footings (Concentrically Loaded):
   - Square
   - Rectangular

10- Applications
   - Comprehensive Design Project

Attendance:

   - Regular attendance is strongly recommended for maintaining pace with the lectures and the progress of the class.

Grading Policy:
The students will be evaluated by a mid-term exam, a final exam and assigned comprehensive project. The final grades for this course will be based on the following percentages:

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Midterm Exam</td>
<td>25 %</td>
</tr>
<tr>
<td>Final Comprehensive Exam</td>
<td>60 %</td>
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<tr>
<td>Design Project</td>
<td>15%</td>
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<tr>
<td>Total</td>
<td>100 %</td>
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