Course Name:
Design of Concrete Structures II

<table>
<thead>
<tr>
<th>Course Number: 20-017</th>
<th>Credit: 2</th>
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<tbody>
<tr>
<td>Program: Undergraduate</td>
<td>Course Type: Technical required</td>
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<tr>
<td>Prerequisite: Design of Concrete Structures I</td>
<td>Corequisite: -</td>
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Course Description (Objectives):
Following the course “Design of Concrete Structures I (20231)”, in this course students become familiar with basics of design and analysis of short columns, long columns, slabs, shear walls, and foundations based on the international code ACI318M-14. Students will learn to work with integrated analysis and design programs like ETABS and SAFE. If time allows, seismic provisions of reinforced concrete structures are also covered.

Course Content (outline):

- **Short Columns**
  Ultimate behavior of columns under axial loads with various eccentricities; interaction diagram; biaxial bending; Bresler’s reciprocal load method; Bresler-Parme’s method; splice details of longitudinal rebar reinforcement

- **Long Columns**
  Review of buckling theory; effective length factor in sway and non-sway frames; effective length factor of columns in concrete frames; secondary moments; first-order and second-order analyses; slenderness criteria; moment magnification method

- **Slabs**
  Types of floor systems, and their advantages and disadvantages; analysis and design of one-way slabs; definition of column and middle strips in two-way slabs; analysis of two-way slabs with direct method and equivalent frame method; limitations of classic analysis methods; punching shear; analysis and design of two-way slabs with finite element programs like SAFE

- **Shear Walls**
  Types of structural walls; behavior of short and tall shear walls; Types of shear walls; design requirement of shear walls with rectangular section

- **Footings**
Types of footings; soil bearing stress beneath single footings; design requirements of single footings; combined footings

- **Seismic Provisions**
  Type of lateral load resisting systems; seismic provisions of intermediate and special moment frames; seismic provisions of intermediate and special shear walls

**References:**