

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
SCHOOL OF ENGINEERING
DEPARTMENT OF STRUCTURAL AND GEOTECHNICAL ENGINEERING
ABET COURSE SYLLABI

ICE2413 REINFORCED CONCRETE

Credits and contact hours:	10 UC credits / 10 hours (3 h. Lectures; 1,5 h. Assistantship; 5,5 h. Independent learning experiences)
Instructor's name:	Hernán Santa María
Course coordinator's name	Hernán Santa María
Textbook:	MacGregor, J. (2011) Reinforced concrete, mechanics and design. 6 th ed. Prentice Hall.
Course Catalog Description:	This course provides the students with the basis to understand the behavior of reinforced concrete members subjected to different stresses and design them using the ACI 318 Standard.
Prerequisite Courses:	ICE2114 Structural analysis I
Co-requisite Courses:	None
Status in the Curriculum:	Required
Course Learning Outcomes:	<ol style="list-style-type: none">1. To know the mechanic properties of reinforced concrete.2. To understand the elastic and inelastic behavior of reinforced concrete elements subjected to bending, compression, shear, torsion, and simultaneous bending and compression.3. To understand the design philosophy of reinforced concrete elements in ACI 318.
Relation of Course to ABET Criteria:	<ol style="list-style-type: none">a. Knowledge of mathematics, science and engineeringb. Design and conduct experiments: analyze and interpret datae. Identify, formulate, and solve engineering problemsk. Techniques, skills, and modern tools for engineering practice.
Topics covered:	<ol style="list-style-type: none">1. INTRODUCTION<ol style="list-style-type: none">1.1. Concrete properties.1.2. Properties of reinforcing steel.1.3. Design methods, safety factors.2. BEAM DESIGN<ol style="list-style-type: none">2.1. Elastic and inelastic behavior of bending elements.2.2. Design of rectangular beams with tensile and compression reinforcement.

- 2.3. Design of T-beams and other sections.
- 2.4. Anchorage and length development. Detailing of reinforcement.
- 2.5. Cracking.
- 2.6. Calculations of deflections.
- 2.7. Shear.
- 2.8. Torsion.
- 3. SLAB DESIGN
 - 3.1. Slabs in one and two directions.
 - 3.2. Slabs supported by columns.
 - 3.3. Punching.
- 4. COLUMN DESIGN
 - 4.1. Behavior and design of columns in compression.
 - 4.2. Behavior and design of columns in bending and compression. Interaction curves.
 - 4.3. Columns under biaxial compression and bending.
- 5. COMPLEMENTARY TOPICS.
 - 5.1. Design of foundations.
 - 5.2. Tall beams and brackets.
 - 5.3. Beam-column connections.
 - 5.4. Wall design.