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

ICE2533 STEEL STRUCTURES

Credits and contact hours: 10 UC credits / 10 hours (4,5hrs Lecture; 5,5hrs Independent learning experiences.)

Instructor's name: Rodrigo Jordán

Course coordinator's name Rodrigo Jordán

Textbook: Salmon, C. G. y Johnson, J. E., "Steel Structures, Design and Behavior", Harper Collins Publishers, 5th. Edition, 2008.

Course Catalog Description: Introductory course to the design of steel structures. Study of the theoretical basis that gives origin to the design dispositions used by the Chilean Code and the American Institute of Steel Construction (AISC).

Prerequisite Courses: ICE2114 Structural analysis I

Co-requisite Courses: None

Status in the Curriculum: Required

Course Learning Outcomes:

1. Knowing the difference between LRFD and ASD design methods.
2. Understanding the behavior of steel elements under tension, compression and flexure.
3. Explaining the origin of the expressions of the code "Specification for Structural Steel Buildings".
4. Design steel beams under flexure and shear with no slab collaboration using the LRFD method.
5. Design steel columns under compression and flexure using LRFD method.

Relation of Course to ABET Criteria:

a. Knowledge of mathematics, science and engineering
b. Design and conduct experiments: analyze and interpret data
e. Identify, formulate, and solve engineering problems
k. Techniques, skills, and modern tools for engineering practice.

Topics covered:

1. STEEL
   - 1.1. Properties
   - 1.2. Yield criteria
   - 1.3. Fragile failure
   - 1.4. Fatigue design
   - 1.5. LRFD method
2. ELEMENTS UNDER TENSION

2.1. Resistance
2.2. Net area and effective area.
2.3. Slenderness requirements.
2.4. Design.

3. SYMETRIC ELEMENTS UNDER COMPRESSION
   3.1. Elastic buckling in columns.
   3.2. Effective length coefficients
   3.3. Elastic buckling of plates.
   3.4. Slender section analysis.
   3.5. Design.
4. NON SYMETRIC ELEMENTS UNDER COMPRESSION.
   4.1. Torsional rigidity of closed and open sections of thin walls.
   4.2. Torsional buckling.
   4.3. Differential equation for nonuniform torsion.
   4.4. Flexural-torsional buckling.
   4.5. Design.
5. ELEMENTS UNDER FLEXURE (BEAMS)
   5.1. Elastic and inelastic behavior.
   5.2. Design of beams with no lateral-torsional buckling.
   5.3. Deflection control.
   5.4. Design of load stiffeners.
   5.5. Lateral-torsional buckling on beams.
   5.6. Design.
   5.7. Local stability on double-T beams.
   5.8. Rigidity stiffeners.
   5.9. Shear design.
   5.10. Shear and flexure interaction.
6. ELEMENTS UNDER COMPOUN FLEXURE (BEAM-COLUMN)
   6.1. Resistance of beams and columns.
   6.2. Interaction curves.
7. CONECTIONS.
   7.1. Bolts
   7.2. Welding