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

ICE2005 STRUCTURAL MECHANICS

Credits and contact hours:	10 UC credits / 10 hours (3 h. Lectures; 3 h. Assistantship; 4 h. Independent learning experiences)
Instructor's name:	Miguel Medalla
Course coordinator's name	Diego Lopez-García
Textbook:	- Hibbeler, R. (2004) Mecánica vectorial para ingenieros: Estática. 10ma ed. Pearson, México DF. - Meriam, J.; Kraige, L. (2006) Engineering mechanics. 6ta ed. Wiley, New York, USA. - Hidalgo, P. (1992) Análisis Estructural. 1era ed. Ediciones Universidad Católica, Santiago, Chile
Course Catalog Description:	In this course the basics of statics of rigid bodies are studied, the base of the Theory of Structural Analysis, applied to statically determined structures and special cases of statically indeterminate structures. Finally, the fundamental concepts of energy methods applied to the solution of conservative systems subjected to static loads are introduced.
Prerequisite Courses:	(FIS1513 or ICE1513) Statics and Dynamic and MAT1620 Calculus II
Co-requisite Courses:	None
Status in the Curriculum:	Required
Course Learning Outcomes:	1. Develop the ability to understand, model and solve statically determined structural systems under the action of static loads. 2. Enforce laws that enable the static to solve practical engineering problems where it is required to balance one or more bodies. 3. Introduce the basic principles of structural analysis that allow students to progress consistent with the higher grades ahead.
Relation of Course to ABET Criteria:	a. Knowledge of mathematics, science and engineering
Topics covered:	1. Introduction to Statics. Vectors basics concepts. Description and properties of Force systems. 2. Equilibrium 2.1. Conditions of static equilibrium. 2.2. External and Internal Joints. 2.3. Reactions Forces.

2.4. Distributed Forces
2.5. Determine the position of centroids of lines, areas, and volumes.

3. Structures
   3.1. Analysis of Plane and Space Trusses.
   3.2. Matrix analysis.
   3.3. Internal forces in frame structures.
   3.4. Analysis of statically determinate structures and mechanical systems.
   3.5. Cable structure analysis.
4. Friction
   4.1. Concepts of friction.
   4.2. Practical applications.
5. Kinematics
   5.1. Degree of freedom.
   5.2. Lineal and no-lineal kinematics.
   5.3. Support of rigid bodies and constraints
6. Virtual Work and Energy
   6.1. Work of conservative and non- Force system
   6.2. Virtual Work
   6.3. Lineal spring.
   6.4. Potential Energy.
   6.5. Stability of the equilibrium conditions in conservative mechanisms.