

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
COLLEGE OF ENGINEERING
DEPARTMENT OF MECHANICAL AND METALLURGICAL ENGINEERING
ABET COURSE SYLLABI

ICM2323 INTRODUCTION TO MECHANICAL ENGINEERING DESIGN

Credits and contact hours:	10 UC credits / 10 hours (3 hours in lectures and 7 individual work hours per week)
Instructor's name:	Diego Celentano
Course coordinator's name	To be defined
Textbook:	Nash, W. Mecánica de materiales. U.S.A., Schaum, Schaum's outlines series, 1994. Shigley, J. E. & Mischke, C. R. Design in mechanical engineering, 5 ^a ed. México, McGraw Hill, 1990, Catalog S.K.F.
Course Catalog Description:	This course describes the methodology for design and delivers the basic concepts for the preliminary design of mechanical products. Fundamental standards for mechanic technique are reviewed and normalized mechanical elements are analyzed, in order to set foundations to select and calculate mechanical components. CAD graphical design software is used to calculate strenght of mechanical materials.
Prerequisite Courses:	ICM2313 Graphical Design, ICM2303 Mechanics Of Solids
Co-requisite Courses:	None
Status in the Curriculum:	Required
Course Learning Outcomes:	<ol style="list-style-type: none">1. To apply Newton's laws, principles of rigid-body dynamics, stress strain formula, principles of engineering materials and mechanical science, related to mechanical design.2. To design joint elements, choosing from threaded o permanent joints.3. To identify transmission elements to select the most efficient according to requirements4. To develop a practical approach in the application of mechanical sciences, in order to implement mechanical design projects efficiently.

**Relation of Course to ABET
Criteria:**

- a. Knowledge of mathematics, science and engineering
- b. Design and conduct experiments: analyze and interpret data
- c. Design a system, component, or process
- e. Identify, formulate, and solve engineering problems
- f. Professional and ethical responsibility
- g. Effective communication
- j. Knowledge of contemporary issues
- k. Techniques, skills, and modern tools for engineering practice.

Topics covered:

- 1. Basic concepts of mechanical design
- 2. Materials used in mechanical engineering
 - 2.1. Understanding of engineering materials behavior, through the study of their properties and laboratory testing
- 3. Strength of mechanical.
 - 3.1. Develops a theoretical foundation needed to model forces and deformation.
 - 3.2. Forces and deformation in mechanical elements.
 - 3.3. Static failure criteria.
- 4. Joint elements.
 - 4.1. Basic joint element design, using bolts, rivets and welding.
 - 4.2. Elementos roscados: representación, designación de roscas, diseño de uniones apernadas.
 - 4.3. Rivets, pins, keys, locks.
 - 4.4. Welding: joint classification, welds and welding symbols, design of welding joints.
- 5. Shape tolerance, dimension and piece fitting.
 - 5.1. Piece sizing, with concepts and symbols from dimensional tolerance and shape of pieces. Piece fitting.
- 6. Transmission elements.
 - 6.1. Elements used to transmit motion from an engine to a machine. Existent solutions will be presented, and transmission elements will be selected from manufacturer's catalogs.
 - 6.2. Selection of bearings from catalogs

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