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

ICM2803 DYNAMICS OF MECHANICAL SYSTEMS

Credits and contact hours:	10 UC credits / 10 hours (3 hours in lectures and 7 individual work hours per week)
Instructor's name:	Cristian Chavez
Course coordinator's name	Luciano Chiang
Textbook:	Chiang, L. "Análisis dinámico de sistemas mecánicos". Editorial Alfaomega, 1995.
Course Catalog Description:	Throughout this unit students will learn how to apply fundamental concepts of Rigid Body Mechanics and Dynamical Analysis of Mechanical Systems to solve real problems of Mechanical Engineering in three dimensions. It will be used and applied Newton Euler and Analytical Mechanics approaches.
Prerequisite Courses:	FIS1513 Statics and Dynamics
Co-requisite Courses:	None
Status in the Curriculum:	Required
Course Learning Outcomes:	a. Analyzing the movement of particles and rigid bodies (in the plane and the space), including its causes. b. Modeling the dynamics of physical systems in order to predict their behavior under different initial conditions. c. Applying the knowledge of dynamics to mechanical vibrations, fatigue and impact problems. d. Formulating Lagrange equations to elemental mechanical systems. e. Analyzing the oscillating dynamical behavior of elemental mechanical systems.
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. Kinematics of the particle in 3 dimensions.
2. Energy and impact methods.
3. Rigid body inertial properties: inertia tensor, principal moments and directions.
4. Newton-Euler equations.
5. Lagrange equations: fundamentals of analytical mechanics, generalized coordinates and forces, conservative and non-conservative systems.
6. Equation of Motion: analytical, numeric and simulation solution methods.
7. Characterization of the dynamic response of systems: times, natural frequency.
8. Basic principles of continuum mechanics.

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