

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

ICM2003 ELECTROMECHANICAL SYSTEMS

Credits and contact hours: 10 UC credits / 10 hours (3 hours in lectures and 7 individual work hours per week)

Instructor's name: Luciano Chiang

Course coordinator's name To be defined

Textbook: Fitzgerald, A.E., Kingsley, C. & Electric Machinery, 6th Edition. McGraw-Hill, 2002.

Course Catalog Description: Electromechanics relates knowledge from electromagnetism, electrical engineering, electronic and mechanics. This course delivers the concepts and fundamental principles of electromechanics.

Prerequisite Courses: ICM2803 Dynamics of Mechanical Systems
FIS1533 Electricity & Magnetism

Co-requisite Courses: None

Status in the Curriculum: Required

Course Outcomes:	Learning	1. To know the basic components of electromechanical systems. 2. To understand the operation of practical power electronic circuits. 3. To apply Ampere law of magnetic circuits. 4. To calculate reluctance magnitudes and inductance in magnetic circuits with coils and/or permanent magnets. 5. To apply Lorentz law to obtain electromechanical machine models. 6. To understand the electrical power - electromagnetic - mechanical conversion. 7. To know the operation principles of electrical machines in steady state.
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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 j. Knowledge of contemporary issues k. Techniques, skills, and modern tools for engineering practice.
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Topics covered:

1. Basic components of electrical and electromechanical circuits: resistance, inductance, capacitance, impedance, operational amplifiers, diodes, thyristors, transistors, triacs.
2. Electromechanical system analysis: electrical circuits, electric analogy of mechanical systems, magnetic circuits, power control.
3. Electromagnetic energy conversion principles: transformer effect, magnetic energy, magnetic forces, Lorentz law, solenoid.
4. Electrical machines in steady state: DC motor, AC induction motor, generators, alternators.

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