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

ICM2243 FUNDAMENTALS OF COMPRESSIBLE FLUID MECHANICS

Credits and contact hours:	10 UC credits / 10 hours (3 hours in lectures and 7 individual work hours per week)
Instructor's name:	Juan de Dios Rivera
Course coordinator's name	To be defined
Textbook:	Bar-Meir, Genick, "Fundamentals of Compressible Fluid Mechanics", Potto Project, 2007
Course Catalog Description:	Traditional courses of engineering sciences in Chile consider fluids as incompressible. Even though this assumption may simplify calculations in many practical situations, this may not be always true and thus it is necessary to use concepts from compressible fluid mechanics. This course covers this gap, delivering tools that allow the student to solve real, simple problems related to subjects like gas turbines, propulsion, shock waves, supersonic vehicles, industrial gases and others.
Prerequisite Courses:	ICH1102 Fluid mechanics, IIQ1002 Thermodynamics
Co-requisite Courses:	None
Status in the Curriculum:	Minimum course
Course Learning Outcomes:	1. To understand the assumptions and physical meaning of the fundamental equations of compressible fluids and the main related concepts. 2. To calculate the flow effects related to compressibility in pipes and open flow. 3. To interpret diagrams and schematics, related to this discipline.
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 d. Multidisciplinary teams e. Identify, formulate, and solve engineering problems g. Effective communication i. Recognition of the need for, and an ability to engage in life-long learning

j. Knowledge of contemporary issues
k. Techniques, skills, and modern tools for engineering practice.

Topics covered:

1. Fundamental equations.
2. Wave propagation in a compressible medium.
3. Isentropic flow in an ideal gas.
4. Normal shock waves.
5. Adiabatic flow with friction.
6. Flow with gain or loss of heat.
7. Applications, flow in one dimension.
8. Oblique shockwave
9. Prandtl-Meyer expansion.
10. Characteristics methods.
11. Measures in compressible fluids.

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