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

ICM2213 ENERGY CONVERSION

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

Instructor's name: Rodrigo Escobar

Course coordinator's name To be defined

Textbook:
- Lira, I. Termotecnia: teoría y métodos en termodinámica aplicada. Santiago, Chile, Universidad Católica editions, 1992.
- Wark, K. Termodinámica. McGraw-Hill, any edition.

Course Catalog Description: The conversion processes from thermal energy to mechanical and electrical energy are very relevant for many industrial applications. The most important thermal energy source is fuel, when releasing its chemical energy. It is believed that fossil fuels will be our main energy source at least until half of XXI century. Environmental restrictions and the raise of fuel costs forces the continuous improvement of conversion process, which in turn allow the execution of renewable energy projects profitably. Therefore, it is necessary to know the modern energy conversion process to take technically appropriate, economically convenient and environmentally sustainable decisions.

Prerequisite Courses: IIQ1002 Thermodynamics, ICH1102 Fluids Mechanics

Co-requisite Courses: None

Status in the Curriculum: Required

Course Learning Outcomes:
1. To critically analyze, based on technical criterion, the available public information related to supply, consumption, and cost of energy.
2. To get familiar with, and use, the available resources from the main international agencies that study and monitor energy production and consumption globally.
3. To describe thermodynamically the energy conversion processes form primary sources to final consumption.
4. To evaluate thermodynamic power production cycles, to obtain relevant parameters from its working, and select the most appropriate cycle for a particular application based on technical criterion.
5. To use bibliographic revision as an useful tool to support problem resolution.

6. To get familiar with, and actively use, the available computer tools to characterize and solve thermodynamic cycles.

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
h. Broad education necessary for global, economic, environmental and societal context
j. Knowledge of contemporary issues
k. Techniques, skills, and modern tools for engineering practice.

Topics covered:

1. Energetic resources.
2. Thermodynamic fundaments of energy conversion
3. Thermal power stations.
4. Gas turbines.
5. Advanced thermal power stations.
6. Combustion principles.
7. Internal combustion energy.

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