

Thermodynamics

thermal machines

IDENTIFICATION

CODE : GEN-4-S2-EC-MTHM
ECTS : 3.0

HOURS

Lectures : 16.0 h
Seminars : 18.0 h
Laboratory : 24.0 h
Project : 0.0 h
Teacher-student
contact : 58.0 h
Personal work : 20.0 h
Total : 78.0 h

ASSESSMENT METHOD

Final exam 90 %
Practical works 10 %

TEACHING AIDS

Book in french (about 500 pages)
including the lecture and the
tutorials
Short book for practical works

TEACHING LANGUAGE

French

CONTACT

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AIMS

Understand the design principles of thermal machines and systems for the conversion of energy such as combined cycle or cogeneration.

Mastering the use of diagrams and thermodynamic modeling softwares.

Give a very good knowledge of theoretical and practical problems associated with gas compression, refrigeration equipments, gas and steam turbines, internal combustion engines and more generally energy systems (cogeneration, combined cycle).

CONTENT

- 1) Engines streaming: steam cycles (Rankine Hirn...), study of the steam turbine (velocity diagrams), power plants, gas turbine, combined cycle. Cogeneration.
- 2) Reciprocating internal combustion engines (spark ignition, diesel engines): thermodynamics applied to RICE, pollution and engine performance, technical generalities.

BIBLIOGRAPHY

1. L. BOERL, D. FAVRAT, Thermodynamique et Energétique - Ed. Polytechnique Romandes, 2005.
2. Y.A. CENGEL, M. A. BOLES, Thermodynamics, an engineering approach, Mc Graw Hill, 1998
3. R.E. SONNTAG, C. BORGNAKKE, Introduction to engineering Thermodynamics, Wiley, 2001

PRE-REQUISITE

GEN-4-mcthm-s1