INSA Campus LyonTech
8 allée Lumière - Batiment Louis NEEL - 69621 VILLEURBANNE
Phone 0472438960

Thermodynamics

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IDENTIFICATION

CODE :	PC-S4-TH-H1
ECTS :	2.0

HOURS

Lectures :	5.0 h
Seminars :	11.0 h
Laboratory :	6.0 h
Project :	0.0 h
Teacher-student contact :	22.0 h
Personal work :	15.0 h
Total :	37.0 h

ASSESSMENT METHOD

- 2 x 1,5 hours of written tests taking a big part in the tutorial grade

TEACHING AIDS

- Lesson and exercise handouts
- Moodle Internet interface

TEACHING LANGUAGE

French

CONTACT

M. DA SILVA Pedro
pedro.da-silva@insa-lyon.fr

AIMS

The main competencies covered by this chemical education are:
C11 - To split up a problem or a system into its component parts in interaction; C12 - To reduce a system or a problem by assumptions (hypothesis); C13 -To modelize a system or a problem by convenient dimensions or objects in relation ; C14 - To build a scheme of the system or the problem; C16 - To build a justification; C21 - To estimate errors induced by the model implementation; C23 - To estimate errors induced by the model implementation; C32 - To acquire experimental data by identifying and evaluating acquisition limits; C33 - To observe and report observations; C51 - To select and implement well-adapted tools to represent and analyze data; C54 - To interprate data in the context of a model; C61 - To structure a speech associated to a logical and argued reasoning, aiming at clearly identified objectives.

CONTENT

The engineering student will work and will be evaluated on the following knowledge:
-Thermodynamic potentials: free energy, Gibbs free energy
-Thermodynamics applied to phase transitions: Clapeyron's law
-Application to heat engines.
- Calorimetry

BIBLIOGRAPHY

P. ARNAUD, Cours de Chimie Physique, Eds Dunod
J.L.QUEYREL, J. MESPLEDE, Précis de Physique, Thermodynamique PC, Eds Bréal
J.L.QUEYREL, J. MESPLEDE, Précis de Physique, Thermodynamique Prépas MP SI PC SI, Eds Bréal
P. GRECIAS, Exercices et problèmes de Thermodynamique Physique, 2ème édition, Collection de sciences physiques, Eds Lavoisier Tec et Doc
H Prépa, Thermodynamique 2ème année MP-MP* PT-PT*, Eds Hachette Supérieur (Chapitre 1 pour le corps pur)
P. BONNET, Cours de Thermodynamique ; Eds Ellipses
J. P. PEREZ, Thermodynamique. Fondements et Applications. Eds Dunod
M. HULIN, N. HULIN, M. VEYSSIE. Thermodynamique. Eds Dunod

PRE-REQUISITE

-Several variable functions, differentials, partial derivatives (Math-Physics interdisciplinary teaching)
-Mastery of units
-General high school chemistry, physics and mechanics knowledge.
-Gaseous state
-System characterization and evolution
-The different forms of energy
-The first law: application to the transformations of an ideal gas and to thermo chemistry
-The second law as an evolution criterion
-Theoretical uses of the two laws to homogeneous physical systems. Thermodynamic coefficients.
-The two laws applied specifically to gases.