PHYS-106(en)

General physics : thermodynamics (English)

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Cursus	Sem.	Type
Chemistry and chemical engineering	BA2	Obl.
Civil Engineering	BA2	Obl.
Electrical and Electronical Engineering	BA2	Obl.
Environmental Sciences and Engineering	BA2	Obl.
Life Sciences Engineering	BA2	Obl.
Materials Science and Engineering	BA2	Obl.
Mechanical engineering	BA2	Obl.
Microtechnics	BA2	Obl.

Language of teaching	English
Coefficient	6
Session	Summer
Semester	Spring
Exam	Written
Workload	180h
Weeks	14
Hours	**6 weekly**
Lecture	3 weekly
Exercises	3 weekly
Number of positions	**214**

Summary

Give the student the basic notions that will allow him or her to have a better understanding of physical phenomena, such as the mechanic of point masses. Acquire the capacity to analyse quantitatively the consequences of these effects with appropriate theoretical tools.

Content

The following subjects will be approached, in an order which will be chosen by the teacher:
- Thermodynamic systems, state variable, function of state, historical perspective …
- First principle
- Second principle
- Thermodynamic cycles
- Equation of the diffusion, transfer of heat, Fourier's law, diffusion (one dimension)
- Perfect gas, kinetic theory of gases
- Statistics: Boltzmann formula
- Maxwell-Boltzmann distribution, principle of equipartition, calculation of specific heat
- Van der Waals's gas and phase transitions

Supplementary materials (depending on the sections)
The course can also treat the following subjects:
- Supplements in mechanics (if they have not been studied in the first semester or will be in physics 2nd year), such as special relativity or lagrangian mechanics
- Thermodynamic potentials (fonctions)
- Chemical potential and chemical reactions
- Thermodynamics of out of equilibrium processes (Onsager, Eckart, Prigogine, ...), modeling of transport phenomena

Keywords

Rigid body, relativity, energy, entropy

Learning Prerequisites

Required courses

General Physics I

Learning Outcomes

By the end of the course, the student must be able to:

- Formulate a physical model

- Develop a know-how to solve a problem
- Structure models in terms of differentials equations
- Apply simpliflying assumptions to describe an experience
- Estimate orders of magnitude
- Distinguish the theoretical models describing Natural phenomena
- Contextualise theoretical models in every day life

Transversal skills

- Use a work methodology appropriate to the task.

Teaching methods

Ex cathedra and exercises in class

Assessment methods

written exam

Resources

Ressources en bibliothèque

- Physics / Halliday
- Physics for scientists and engineers / Giancoli

Prerequisite for

General physics III