

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. |

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|----------------------------|-----------------|
| 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

Students acquire the abilities to analyze physical systems through the lens of thermodynamics, statistical physics, and special relativity.

Content

The following subjects will be covered at an introductory level:

- Thermodynamic systems, state variables, functions of state
- First law of thermodynamics
- Second law of thermodynamics
- Thermodynamic cycles
- Heat transfer, Fourier's law, diffusion (one dimension)
- Perfect gas law, kinetic theory of gases
- Statistics: Boltzmann formula
- Maxwell-Boltzmann distribution, principle of equipartition, specific heat
- Van der Waals's gas and phase transitions
- Special relativity: Lorentz transformations, relativistic energy, relativistic Doppler effect

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 simplifying assumptions to describe an experience
- Estimate orders of magnitude
- Distinguish the theoretical models describing Natural phenomena
- Contextualise theoretical models in every day life
- Formulate physical models

Transversal skills

- Use a work methodology appropriate to the task.

Teaching methods

in-person and online lectures, in-person discussions, exercises

Assessment methods

written exam

Resources

Moodle Link

- https://go.epfl.ch/PHYS-106_en

Prerequisite for

General physics III