

PHYS-101(en) **General physics : mechanics (English)**

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Cursus	Sem.	Type
Chemistry and chemical engineering	BA1	Obl.
Civil Engineering	BA1	Obl.
Communication systems	BA1	Obl.
Computer science	BA1	Obl.
Electrical and Electronical Engineering	BA1	Obl.
Environmental Sciences and Engineering	BA1	Obl.
Life Sciences Engineering	BA1	Obl.
Materials Science and Engineering	BA1	Obl.
Mechanical engineering	BA1	Obl.
Microtechnics	BA1	Obl.

Language of teaching	English
Coefficient	6
Session	Winter
Semester	Fall
Exam	Written
Workload	180h
Weeks	14
Hours	6 weekly
Lecture	4 weekly
Exercises	2 weekly
Number of positions	370

Summary

Students will learn the principles of mechanics to enable a better understanding of physical phenomena, such as the kinematics and dynamics of point masses and solid bodies. Students will acquire the capacity to quantitatively analyze these effects with the appropriate theoretical tools.

Content

The course contains the following elements (not exclusively):

Mechanics**Introduction and kinematics**

Reference frames, trajectories, velocity, acceleration, and Cartesian, spherical, and cylindrical coordinates.

Dynamics of the point mass and solid body

Momentum, Newton's laws, fundamental forces, empirical forces, constraints, oscillatory motion, and angular momentum.

Work, power, energy

Kinetic energy, potential energy, conservation laws, gravitational motion, collisions.

Keywords

General physics, point masses, coordinates, kinematics, energy, work

Learning Prerequisites**Recommended courses**

Math level required for "maturité fédérale", which indicates the level of math appropriate for a good start at EPFL.

Learning Outcomes

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

- Formulate models of basic physical systems
- Structure models in terms of differential equations
- Apply simplifying assumptions to describe a phenomenon

- Estimate orders of magnitude
- Distinguish the theoretical models describing nature
- Contextualise theoretical models in every day life
- Develop the know-how to solve a problem

Transversal skills

- Use a work methodology appropriate to the task.

Teaching methods

Lectures and exercises

Assessment methods

The course concludes with a written exam

Resources

Bibliography

- Serway, Physics for Scientists and Engineers.
- Douglas Giancoli. Physics for Scientists and Engineers. 4th Edition.
- D. Halliday, R. Resnick, K. S. Krane. Physics, Volume 1.

Ressources en bibliothèque

- [Serway, Physics for Scientists and Engineers.](#)
- [D. Halliday, R. Resnick, K. S. Krane. Physics, Volume 1](#)
- [Douglas Giancoli. Physics for Scientists and Engineers. 4th Edition](#)

Moodle Link

- https://go.epfl.ch/PHYS-101_en

Prerequisite for

General physics II