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

Ball Justin

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	3 weekly
Exercises	3 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 dyamics of point masses and solid bodies. Students will acquire the capacity to quantitatively analyze these effects with the appropriate theoretical tools.

Content

The course may contain, but not exclusively, the following elements:

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:

- 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 Natura
- Contextualise theoretical models in every day life
- Formulate a physical model
- Develop know-how to solve a problem
- Distinguish the theoretical models describing nature

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

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

Moodle Link

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

Prerequisite for

General physics II