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 may contain, but not exclusively, the following elements:

Mechanics

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

Dynamics of the point mass and solid body
Momentum, Newton’s laws, fundamental forces, empirical forces and constraints. Oscillatory motion, 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", see on the left the hyperlinks and the book, indicative of 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 everyday life
• Formulate a physical model

Transversal skills
• Use a work methodology appropriate to the task.

Teaching methods
Lectures + exercises

Assessment methods
The course concludes with a written exam

Resources
Bibliography
• Serway, Physics for Scientists and Engineers.

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

Prerequisite for
General physics II