



# Faculté des sciences économiques, sociales et politiques

**ESPO**

INGE1122 **Physics 1**

[40h+20h exercises] 5 credits

**Teacher(s):** Jacques Lega, Piotr Sobieski  
**Language:** french  
**Level:** 1st cycle course

## Aims

Introductory course on Mechanics, the physics of waves and aspects of modern Physics.

## Main themes

The course is divided into three parts. The first covers the mechanics of points and simple systems. After an initial kinematic study of movements, Newtonian principles are introduced, the basic concepts of impulsion, quantity of movement, work, energy and power, and the principle of energy conservation. Within a systems dynamics framework, collisions and rotations of rigid bodies are investigated, introducing the concepts of moment of force and kinetic moment. These various concepts will be applied to the study of oscillating motion, simple oscillating systems and harmonic oscillation, the simple pendulum and gravitation. This part ends in an introduction to fluid mechanics and the laws of gases.

The second part introduces wave physics (mechanical and sound waves) and demonstrates some specific properties like the Doppler effect, interference and diffraction.

The last part deals with modern Physics, highlighting the contribution of restricted relativity and quantum Physics to our understanding of the structure of matter and basic interactions, and of the birth and development of the universe.

The course also introduces students to experimentation in Physics, focused on determining the orders of magnitude in simple mechanical systems

## Content and teaching methods

Part 1: Mechanics

Introduction - basic concepts - measures and measure error

Vectors

Kinematics

Dynamics of the material point

Dynamics of material systems

Oscillating motion

Gravitation

Fluid statics and dynamics

Heat, temperature and laws of gases

Part 2: Introduction to wave physics

General characteristics of waves - stationary and progressive waves

Sound waves - Doppler effect

Interference and diffraction

Part 3: Introduction to modern physics

Restricted relativity

Basic quantum physics

Structure of matter and basic interactions

Methods:

Lectures backed up by demonstrations and accompanied with practical exercises. Certain aspects of the subject-matter will be studied wholly or in more detail in the labs.

**Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)**

Course materials: BENSON Harris, Physics. Mechanical Volume 1 and Volume 3 Waves-Optical and modern Physics, French Translation, De Boeck Université. Students wishing to improve their English would do well to use the English version of this work.

**Other credits in programs**

<b>INGE11BA</b>	Première année de bachelier en ingénieur de gestion	(5 credits)	Mandatory
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