

## 30002 - Physics I

### Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	436 - Bachelor's Degree in Industrial Engineering Technology
ECTS	6.0
Course	1
Period	Half-yearly
Subject Type	Basic Education
Module	---

### 1. Basic info

#### 1.1. Recommendations to take this course

#### 1.2. Activities and key dates for the course

### 2. Initiation

#### 2.1. Learning outcomes that define the subject

#### 2.2. Introduction

### 3. Context and competences

#### 3.1. Goals

#### 3.2. Context and meaning of the subject in the degree

#### 3.3. Competences

#### 3.4. Importance of learning outcomes

### 4. Evaluation

### 5. Activities and resources

#### 5.1. General methodological presentation

#### 5.2. Learning activities

#### 5.3. Program

Physics I course focuses on the basics of Mechanics and more applied aspects such as mechanical oscillations, elasticity and fluid mechanics. It also provides the basic concepts and principles of Thermodynamics. Being a basic training course, the acquired knowledge are intended as a starting point for other courses of the industrial engineering branch specific to the degree.

## 30002 - Physics I

1. Kinematics: position, velocity and acceleration vectors. Trajectory. Reference frames: Cartesian, polar and intrinsic coordinates. Relative movement.
2. Particle dynamics: Newton's laws. Inertial and non-inertial reference frames. Linear and angular momenta. Work and energy.
3. Dynamics of a system of particles: Introduction: collisions between two particles. Centre of mass. Equation of motion. Linear and angular momenta, conservation laws. Mechanical energy.
4. Rigid Bodies: Moments of inertia. Rotation dynamics about a fixed axis. Work and energy in rotational motion. Equilibrium conditions: Statics.
5. Mechanical vibrations: Simple harmonic motion. Damped oscillations. Forced oscillations: resonance. Anharmonic oscillations analysis.
6. Elasticity: Stress and strain. Hooke's law. Elastic moduli.
7. Fluid Mechanics: Introduction: ideal fluids, basic concepts. Statics: Pascal's and Archimedes' principles. Dynamics: Bernoulli's equation and applications.
8. Temperature and heat: Temperature: thermometers and thermometric scales. Thermal expansion. Heat and heat capacity. Heat transfer.
9. First Law of thermodynamics. Processes: internal energy, equilibrium states. State variables and equations of state. Ideal gases: state variables and internal energy. Thermodynamic processes for an ideal gas.
10. Second Law of thermodynamics. Heat Engines: Introduction: Entropy and second law. Carnot cycle. Thermal machines. Other cycles.

### 5.4.Planning and scheduling

### 5.5.Bibliography and recommended resources