

## 27002 - General physics

### Syllabus Information

**Academic Year:** 2022/23

**Subject:** 27002 - General physics

**Faculty / School:** 100 - Facultad de Ciencias

**Degree:** 453 - Degree in Mathematics

**ECTS:** 12.0

**Year:** 1

**Semester:** Annual

**Subject Type:** Basic Education

**Module:**

## 1. General information

### 1.1. Aims of the course

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the learning outcomes of the module provides training and competence to contribute to some extent to their achievement: (4) Quality education, (5) Gender equality, (8) Decent work and economic growth, (9) Industry, innovation and infrastructure, (10) Reducing inequality, (17) Partnerships for the goals.

## 2. Learning goals

## 3. Assessment (1st and 2nd call)

## 4. Methodology, learning tasks, syllabus and resources

### 4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, problem-solving sessions, laboratory sessions and tutorials.

### 4.2. Learning tasks

This course is organized as follows:

- **Lectures:** The professor will present the essential aspects of the course, including the resolution of numerous practical cases.
- **Problem-solving sessions:** The students solve the proposed problems with several teachers in the classroom. Also, some problems will be proposed to the students who will present the solution to the professor in tutoring sessions, either in small groups or individually.
- **Laboratory sessions:** Experiments sessions, measurement process, statistical analysis of the results and preparation of the corresponding reports.
- **Assignments:** Voluntarily chosen by the students in accordance with the professor. They must present a report and perform an oral presentation.
- **Tutorials:** Personalized attention to the students at office hours.

The teaching activities and assessment tasks will take place in a face-to-face mode, except in the case that, due to the

health situation, the dispositions emitted by the competent authorities and by the University of Zaragoza compel to take them to a greater or lesser extent in a telematic form.

### 4.3. Syllabus

- **Topic 1.** Kinematics.
- **Topic 2.** Dynamics of a particle. Newton's laws. Work and mechanical energy.
- **Topic 3.** Dynamics of systems of particles. Conservation laws. Collisions.
- **Topic 4.** Dynamics of rigid bodies.
- **Topic 5.** Mechanics of deformable solids and fluids.
- **Topic 6.** Gravitational interactions. Orbits.
- **Topic 7.** Electrostatics.
- **Topic 8.** Stationary electrical currents.
- **Topic 9.** Magnetostatics.
- **Topic 10.** Time-dependent electromagnetic fields.
- **Topic 11.** Waves.
- **Topic 12.** Introduction to the theory of relativity.

### 4.4. Course planning and calendar

Calendar of sessions, exams and submission deadlines:

- The course has 4 face-to-face sessions one hour each per week. At least one weekly session will be dedicated to problem solving, with several lecturers in attendance that will guide the students in the solution of the problems.
- The laboratory sessions will be programmed during the academic year.
- There will be a midterm exam at the end of the first semester, as well as final exams in June and September. Their dates will be determined by the center.
- The deadlines for submission of the assignments reports and problems will be announced in due time.

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Sciences website and Moodle.

### 4.5. Bibliography and recommended resources

1. Sears & Zemansky's University Physics, Vol. 1 and 2, Addison-Wesley.
2. Tipler, P..A, Mosca, G., Physics for Scientists and Engineers, Vol. 1 and 2, W. H. Freeman.
3. Alonso, M., Finn, E., Physics, Addison-Wesley.
4. French, A. P., Newtonian Mechanics, W. W. Norton & Company.
5. Crawford, F. S. Jr., Waves, McGraw-Hill.
6. Kittel, C., Knight, W. D., Mechanics, McGraw-Hill.
7. Purcell, E. M., Electricity and Magnetism, McGraw-Hill.

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=27002>