

## 30705 - Physics 2

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 30705 - Physics 2

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 470 - Bachelor's Degree in Architecture Studies

**ECTS:** 6.0

**Year:** 1

**Semester:** Second semester

**Subject type:** Basic Education

**Module:**

### 1. General information

Physics 2 is part of the basic training block of the Bachelor's Degree in Architectural Studies. It consists of 6 ECTS, is mandatory and is taught in the second semester. Together with Physics 1 it corresponds to an introductory subject in physics and aims to provide the student with the basic knowledge of some physical systems important for architecture and the tools to solve related problems:

- The **fundamentals of wave propagation** fundamentals of wave propagation, applied mainly to sound and light, to later delve deeper into areas such as architectural acoustics or light conditioning.
- The study of the **basic mechanisms of heat transfer and the** and the operation of thermal of thermal machines.
- The study of **electrical phenomena** will provide a basis in various aspects of electrical conditioning, consumptions, etc.

### 2. Learning results

The student, in order to pass this subject, must demonstrate the following results.

1. Analyse problems that integrate different aspects of physics, recognizing the various physical foundations that underlie a technical application, device or real system .
2. Know the units and orders of magnitude of the defined physical quantities and solve basic problems expressing the numerical result in the appropriate physical units.
3. Correctly use basic methods of experimental measurement and present and interpret the data obtained, relating them to the the data obtained, relating them to the appropriate physical magnitudes and laws.
4. Use bibliography and clear and precise language in their explanations of physics issues.
5. Know the principles of thermodynamics, acoustics and optics.
6. Know the basic fundamentals of electricity and electromagnetism related to Architecture.
7. Know the physical instruments necessary for the evaluation of the energy cost of buildings and the factors that influence the environmental conditioning of buildings.

### 3. Syllabus

1. **Wave motion.** Sound waves. Sound intensity. Wave superposition. Reverberation. Absorption of sound. Acoustic insulation
2. **Thermodynamics.** Heat and temperature. Thermal expansion. Thermal stresses. Specific heat. Mechanisms of heat transmission. Fundamentals of thermodynamics. First principle of thermodynamics: thermodynamic transformations . Second principle: thermodynamic cycles. Thermal machines.
3. **Electric field and current.** Coulomb's Law. Electrostatic field and potential. Gauss's theorem. Conductive and dielectric materials. Capacitors. Direct current. Ohm's Law. Joule effect. Fundamentals of the theory of circuits
4. **Light and color.** Nature of light. Electromagnetic waves. Reflection and refraction. Geometric optics. Polarization. Photometry and colorimetry.

### 4. Academic activities

Theory classes and problems the lectures will be complemented with problem sessions, in which the emphasis will be on the applications of the concepts. Participation will be encouraged through active consultation and . Some problems will be proposed for students to solve on the board.

Laboratory practicals the student will be provided with the scripts, as well as a guide on the correct presentation of the results. The program of practices is designed in synchrony with the development of the theory.

Works a previously authorized topic and with tutoring. It must be submitted in writing prior to the oral presentation.

## 5. Assessment system

### Evaluation activities:

1. Several partial tests may be taken, based on short or multiple-choice questions or problems.
2. A work will be proposed to be carried out in group under the supervision of the teacher. The written material and its oral presentation will be graded.
3. Continuous assessment of the laboratory.
4. In the official exam period there will be a written test with a part of problems and another part of theory and questions. Additionally, will have a part of laboratory practices for those who do not pass the continuous assessment

### The final grade for the subject:

a) Written tests: they will account for at least 75% of the grade.

If the student chooses not to do supervised work, the weight of this part will be 85%.

- i. Examination of problems: 65 % of the grade for this section.
- ii. Theory exam and questions: 35 % of the grade of this section.

Those who have passed the partial exams mentioned under point 1 above may choose not to take the corresponding part of the final exam, the grade obtained will be maintained.

b) Supervised work. Optional: 10% of the final grade.

c) Laboratory: the grade is 15% of the final grade. The student may pass all the practices by continuous assessment throughout the subject, or by means of a final practice exam if they fail one or more.

In order to pass, the following will be required:

- A minimum grade: 4 in section a) and 5 in each laboratory practice (or final exam) (or final exam of the same).

## 6. Sustainable Development Goals

4 - Quality Education