

25206 - Physical foundations of the environment

Syllabus Information

Academic year: 2023/24

Subject: 25206 - Physical foundations of the environment

Faculty / School: 201 - Escuela Politécnica Superior

Degree: 571 - Degree in Environmental Sciences

ECTS: 6.0

Year: 1

Semester: Second Four-month period

Subject type: Basic Education

Module:

1. General information

The teaching of this subject provides scientific explanations to physical phenomena directly related to the environment, especially those corresponding to the fields of fluids, thermodynamics, wave motion and electromagnetism. To adequately follow this subject it is very convenient to have taken the subjects of Physics and Mathematics in the 2nd year of Baccalaureate. On the other hand, during the semester, continuous study and work is essential.

This subject establishes the necessary foundations to be able to take subjects in later years, such as Meteorology and Climatology, Environmental Engineering Basics, Radioactive, Acoustic and Vibration Pollution, Environmental Hydrology, and Clean Technologies-Renewable Energies.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement: 6, 7, 12 and 13".

2. Learning results

1. -State, synthesize, analyse, relate and apply the basic principles and fundamentals of Fluid Physics, Thermodynamics, Waves, Electricity and Magnetism.
2. -Interpret quantitatively and qualitatively the results obtained in the satisfactory resolution of certain cases based on phenomena and processes related to the environment
3. -Express adequately, in substance and form: clarity, organization..., both orally and in writing, the methods, processes, results obtained and their analysis in the cases entrusted for their study.
4. -Produce works and laboratory reports making an adequate use of ICT (word processing, spreadsheet, bibliographic searches on the internet...) in relation to the previous phenomena
5. -Execute laboratory work in which the student demonstrates that they is able to make an adequate use of basic instrumentation in Physics
6. -Relates certain practical cases, within the scope of the subject, to environmental sustainability and adequately contextualizes them in the framework of the SDGs of the 2030 Agenda, especially those already mentioned in section 1: 6 (Ensure availability and sustainable management of water and sanitation for all), 7 (Ensure access to affordable, safe, sustainable and modern energy), 12 (Ensure sustainable consumption and production patterns), and 13 (Take urgent action to fight climate change and its impacts).

3. Syllabus

Block I. Fluid Physics

Topic 1: Fluid Statics

Topic 2: Fluid Dynamics

Block II. Thermodynamics

Topic 3: Temperature and Heat

Topic 4: First Principle of Thermodynamics

Topic 5: Second Principle of Thermodynamics

Block III. Waves

Topic 6: Oscillatory Motion

Topic 7: Wave Motion

Block IV. Electromagnetism

Topic 8: Electrostatics

Topic 9: Electrokinetics

Topic 10: Magnetism

Topic 11: Electromagnetic induction

Topic 12: Alternating Current

Topic 13: Electromagnetic Waves

4. Academic activities

Participative master class: 35 hours. The contents of the subject will be explained, encouraging the participation of the students.

Problem solving: 15 hours. Several problems of each topic will be solved in the classroom.

Laboratory practices: 10 hours. Completion of 5 practices in pairs, related to the contents of the subject. Practical work: 6 hours. Relating physics content to the environment, and indirectly to the SDGs mentioned above.

Individual and group independent study / work: 80 hours. It includes preparation of practice reports, preparation of the paper, study of theory and problem solving.

Assessment test: 4 hours.

5. Assessment system

The subject will be evaluated only in the global evaluation modality by means of the following activities:

1.	Written examination: 70% of the final grade. It will include problems and multiple-choice questions. A grade of 4.5/10 must be obtained to pass the subject..
2.	Practice reports and previous questionnaires: 20% of the final grade A grade of 5/10 is required to pass the subject.
3.	Practical work: 10% of the final grade. The presentation and defence of the work in the classroom is included. It is a voluntary activity but in any case it will account for 10% of the final grade.

The subject will be passed if the final grade is ≥ 5.0 if the conditions of tests 1 and 2 are met. If the final grade is ≥ 4.5 but these conditions are not met simultaneously, the subject will be failed with a 4.5 as the final grade. The detailed definition of the evaluation system will be explained in the presentation of the subject.

Success rates in previous years:

2018/19	2019/20	2020/21	2021/22
66,67%	73,91%	55,81%	71,43%

The practical work has themes related to one or more of the SDG targets listed above. In addition, the global exam assesses content that lays the foundation for other subjects in later years mentioned in section 1, which are more directly related to the SDGs .