

26809 - Optical Physics

Syllabus Information

Academic year: 2023/24

Subject: 26809 - Optical Physics

Faculty / School: 100 - Facultad de Ciencias

Degree: 297 - Degree in Optics and Optometry

ECTS: 6.0

Year: 2

Semester: First semester

Subject type: Compulsory

Module:

1. General information

Visible light is the essential vehicle of the mechanism of vision. Therefore, the graduate must know and understand the physical models to describe the phenomena of light propagation as an electromagnetic wave and its applications, starting from the basic knowledge acquired in the first year..

It is recommended to have taken the first year subjects "Mathematics", "Physics" and "Visual Optics I", and to take this subject simultaneously with "Optical and Optometric Instruments".

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: Goal 9: Industry, Innovation and Infrastructure

2. Learning results

To understand wave phenomena from oscillations and mechanical waves.

To identify light with an electromagnetic wave in most of its manifestations.

To relate the quantities that characterize a harmonic wave, amplitude and frequency, to qualities of visible light, intensity and colour.

To understand the main applications of Fourier analysis in optics.

To know the basic concept of coherence of light, and its relation with interferential phenomena.

To understand the basis of diffraction phenomena and their influence on the resolution limit of optical systems, in particular the human eye.

To recognize and know how to characterize the devices that affect the polarization of light.

To know how to calculate the reflected and refracted energy at a boundary between two dielectric media, depending on the characteristics of the incident light.

To understand the physical fundamentals of anti-reflective deposits in ophthalmic lenses.

To demonstrate and implement methods of critical analysis, theory development and their application to the disciplinary field of Optometry.

3. Syllabus

THEORETICAL PROGRAM

1. Waves

2. Electromagnetic waves

3. Interference

4. Diffraction

5. Polarization

6. Reflection and refraction of plane waves.

INTERNSHIP PROGRAM

- P1: Interference
- P2: Diffraction
- P3: Diffraction gratings
- P4: Polarization
- P5: Fourier Transform

4. Academic activities

Development and progressive discussion of the program of the subject through lectures, based on the written notes provided by the teacher (2.5 ECTS)

Resolution of practical cases (problems) in the classroom, with the active participation of students (2 ECTS).

Laboratory practices in groups of two students (1.5 ECTS).

5. Assessment system

Block 1: laboratory practices (20% of the total).

The interest and skill in its realization, and the precision and accuracy of the results will be continuously evaluated, which will be presented in the form of brief reports in the laboratory, at the end of each practice (60%). In addition, at the end of each practice students will solve a multiple-choice questionnaire (40%).

Students who have not completed all the laboratory practices, or who have not achieved a grade of 4 out of 10, will be summoned to an exam on the official call. In it, they will have to individually demonstrate their knowledge and skills .

Block 2: theory and problems (80% of the subject).

The evaluation of this block will consist of two tests:

-Midterm exam, which will account for 25% of the final grade for block 2.

-Final exam at the end of the term (theory and problems), on the official exam dates published by the faculty.

It will account for 75% of the final grade for block 2.

The voluntary collaboration of students in the resolution of previously proposed problems in the classroom will be positively valued. Both the active participation and the quality of these collaborations will be valued, with up to one point added to the grade for block 2.

In order to be able to average a grade greater than or equal to 4 must be obtained in each of the two blocks (1 and 2). If this does not occur, the final grade for the subject will be the lowest of the two blocks.

The global test for students who cannot follow the subject regularly will consist of a practice exam (20%) and a theory and problems exam in June (80%). In order to be able to average a grade greater than or equal to 4 must be obtained in each one of the two blocks (1 and 2). If this does not occur, the final grade for the subject will be the lowest of the two blocks.