

## 26820 - Optical Technology III

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 26820 - Optical Technology III

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

**Degree:** 297 - Degree in Optics and Optometry

**ECTS:** 6.0

**Year:** 4

**Semester:** First semester

**Subject type:** Compulsory

**Module:**

### 1. General information

One of the main objectives of the subject is the analysis and design of different types of compensation and the study of those that currently exist in the market. The aim is for the student to understand the benefits and limitations of the existing compensations in order to be able to deal with the prescription of a compensation in a real case.

The contents seen in Optometry Laboratory, Visual Optics II, Optical Technology II and Optical and Optometric Instruments are required to follow this subject.

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 3: Health and wellness

Goal 9: Industry, Innovation and Infrastructure

### 2. Learning results

Handle real ray tracing programs to calculate the performance of lenses (in contact lenses) as image-forming elements associated to the eye, as well as to calculate the performance of phakic and pseudo phakic eyes also as image-forming systems.

Know how to detect and solve refractive or binocular adaptation problems with optical compensation.

Master the techniques for measuring pupillary centration in glasses and orientation of the visual axes with respect to the design conditions of the lenses mounted in glasses.

Complete the whole process of prescription, order, assembly, delivery and follow-up of a compensation in glasses.

Decide on the type of centration best suited to single vision for single vision lenses according to conditions of use and non-ideal refractive behaviour of the lenses

Find the most suitable monofocal ophthalmic lens/es on the market to be used as refractive compensation in each particular case.

Recognize the most relevant characteristics of each of the ophthalmic lenses available in the market.

Analyse in depth the data obtained in an optometric examination.

Correctly decide the appropriate compensation for any particular case of normal vision.

Assess the potential problems of a given optical compensation and relate them to possible symptoms.

Demonstrate knowledge of the real possibilities of the market to compensate refractive problems mainly from an optical point of view.

Communicate correctly in writing the results obtained in any of the roles used during the elaboration of a prescription.

Demonstrate a correct handling and understanding of real ray tracing programs to predict the optical behaviour of the lens-eye system.

Know how to place orders for lenses to commercial companies.

Know how to manipulate and adapt the shape of glasses to the patient's physiognomy.

### 3. Syllabus

## THEORY:

Topic 1: Review of surfaces and paraxial optics

Topic 2: Lens design with spherical surfaces

Topic 3: Lens design with aspherical surfaces

Unit 4: Astigmatic lens design

Topic 5: Progressive lens design

Topic 6: Free-form

Topic 7: Monofocal lenses on the market

Topic 8: Progressive lenses on the market

## PRACTICES:

Real ray tracing practices (OSLO):

- OSLO ray tracing software basics

- Image quality analysis tools

- Performance analysis of decentred and tilted ophthalmic lenses

- Analysis of the behaviour of ophthalmic lenses in an oblique gaze position

Practice with a real patient:

- Patient refraction

- Choice of ophthalmic compensation and its mounting conditions

- Ordering, assembly and testing

## 4. Academic activities

Activity 1:

Prescription, fitting and follow-up of refractive compensation in glasses (1 ECTS)

(Individual practice with real subject)

Activity 2:

Learning how to use programs for real ray tracing in lens-eye systems. (2.5 ECTS)

(Guided individual practice and exercises)

Activity 3:

Acquisition of knowledge for the characterization, design and prescription of ophthalmic spectacle lenses. (1.5 ECTS)

(Participative lectures in large groups)

Activity 4:

Contact with ophthalmic industry professionals (0.5 ECTS).

(Seminars and guided visits to ophthalmic sector factories)

Activity 5:

Acquisition of knowledge about ophthalmic lenses on the market (0.5 ECTS).

(lectures, Telegram exercises, group work, defence and debate)

## 5. Assessment system

### FACE-TO-FACE EVALUATION

1. Theoretical exam (40%)

2. Practical examination of actual ray tracing on computer (40%)

3. Real subject practices (20%): the activity developed, and the reports will be taken into account.

It is necessary to obtain at least 4.5 points in each of the exams, 1 and 2, in order to average the different parts.

If averaging is not possible, the grade that will appear in the records will be that of the failed part. In case there are several failed

parts, the lowest grade will be shown..

In addition, students who have obtained a grade higher than 5 out of 10 in each of the parts of the subject can obtain a bonus to reward continuous work: To qualify for these additional points the student must have completed all the tasks proposed during the term. If the average grade of the exercises is between 9 and 10, 2 points will be added. If the grade is between 8 and 9, 1.5 points will be added and if the grade is between 7 and 8, 1 point will be added.

#### NON-FACE-TO FACE EVALUATION

1. Theoretical exam (40%)
2. Practical examination of actual ray tracing on computer (40%)
3. Examination with practical cases of refraction process and prescription of lenses and frames (20%)

It is necessary to obtain at least 4.5 points in 1 and 2 in order to average the different parts.

If averaging is not possible, the grade that will appear in the records will be that of the failed part. In case there are several failed parts, the lowest grade will be shown..