COURSE DATA

Data Subject	
Code	34293
Name	Optical and optometric instruments
Cycle	Grade
ECTS Credits	12.0
Academic year	2021 - 2022

Study (s)

Degree	Center	Acad. year	Period
1207 - Degree in Optics and Optometry	Faculty of Physics	2	Annual

Subject-matter

Degree	Subject-matter	Character
1207 - Degree in Optics and Optometry	8 - Optics	Obligatory

Coordination

Name	Department
BARREIRO HERVAS, JUAN CARLOS	280 - Optics and Optometry and Vision Sciences
FURLAN, WALTER DANIEL	280 - Optics and Optometry and Vision Sciences

SUMMARY

Instruments The course integrates Opticians and Optometrists in Matter Optics Optometry Degree. This is an annual course, compulsory, whose contents are essential for the development of the profession of Optical optometrist, as it lays down the laws and mechanisms of formation of images in the instruments used in optometric practice. It presents theoretical aspects (6 ECTS credits) of supervised work in small groups (3 ECTS), practical laboratory apectos (3 ECTS). The contents of this course are related to many other's Degree in Optometry. Its development is based on geometrical optics in establishing the laws of image formation in optical systems and the physiological optics are studied in the human visual system characteristics and the imaging system. The subject is related to physical optics, especially in regard to resolving power of the instruments and the use of polarizing elements. Moreover, the instruments studied are useful for other materials as OPTOMETRY Required, Contact Lenses and Ophthalmic Optics or subject CLINICAL EXAMINATION METHODS. In addition, the subject has projected the following subjects Module Optional:, recording and processing of medical images, COMPUTER-AIDED DESIGN OPTICAL LOW VISION, orthoptics and vision therapy, CURRENT ISSUES OF OPTICS AND OPTOMETRY

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

The student must know and master the principles of geometrical optics and physiological optics

OUTCOMES

1207 - Degree in Optics and Optometry

- Knowing how to apply the knowledge acquired to professional activity, knowing how to solve problems and develop and defend arguments.
- Being able to gather and interpret relevant data to make judgments.
- Being able to transmit information, ideas, problems and solutions to both a specialized and non-specialized audience.
- Development of learning skills necessary to undertake further studies with a high degree of autonomy.
- To know and to calculate the parameters that characterize the image-forming elements.
- To know the principle of image formation and the properties of optical systems.
- To know the aberrations of optical systems.
- To know the characteristic phenomena of the wave nature of light, such as interference, diffraction and polarization.
- To know the principles, description and characteristics of the fundamental optical instruments, as well as the instruments used in optometric and ophthalmological practice.
- To know the elementary principles and characteristics of the optometric instruments.
- To know the propagation of light in isotropic media, light-matter interaction, light interferences, diffraction phenomena, the properties of monolayers and multilayers, and the principles of lasers and their applications.
- To know the fundamentals of radiometric and photometric laws.

LEARNING OUTCOMES

derstand and calculate the parameters that characterize the image forming elements. - Know the conjugation equations centered optical systems, including afocal systems.
- Know the aberrations of optical systems.
- Know the radiometric and photometric quantities and the basic laws of radiometry and photometry.
- Understand the principles, the description and characteristics of the fundamental optical instruments, both subjective type as the target type.

- Understand the principles, the description and characteristics of the instruments designed as low vision optical aids.
- Knowledge of the principles, the description and characteristics of the instruments used in optometry and ophthalmology practice, both in regard to the characterization of ophthalmic elements, inspection and measurement of ocular parameters, such as the determination of the refraction eye by objective and subjective methods.
- Apply the scientific method to solve problems of Optical Instrumentation and experimental work in the laboratory.
- Apply the knowledge acquired for construction in the laboratory of optical and optometric most representative elements from the
up and further characterization of its main parameters.
- Develop the capacity of analysis and synthesis in the field of instrumental optics.
- Learn to manage bibliographic sources, both scientific texts or other resources as disclosure Internet.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	60,00	100
Tutorials	30,00	100
Laboratory practices	30,00	100
Development of group work	10,00	0
Development of individual work	10,00	0
Study and independent work	40,00	0
Preparation of evaluation activities	20,00	0
Preparing lectures	20,00	0
Preparation of practical classes and problem	20,00	0
Resolution of case studies	60,00	0
TOTAL	**300,00**	

TEACHING METHODOLOGY

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The course will consist of three types of classes with different methodology:
(i) Theoretical and practical classes
(ii) The types of jobs safeguarded
(iii) laboratory sessions in small groups

Theoretical and practical classes (2 hours per week): It covers the conceptual and formal aspects of the subject. They are based mainly on lectures and using dialogic teaching tools as experimental demonstrations, animations or videos, presentations projection, etc.. Exercises also develop practical application of theoretical content.

Classes protected work (1 hour per week): In addition to the theoretical and practical classes or laboratory sessions, seminars have been included in small groups. These sessions are focused on student work and active participation of an individual or group in the resolution of questions arising from the theoretical and practical classes and will also serve to reinforce concepts more difficult. Besides being classes for problem solving for the exercise of the tools presented in the theoretical and practical classes. In this type of class may discuss complementary theoretical aspects which the group will seek interactivity through oral presentations.
Works protected classes are associated to a continuous assessment component, which values the student's progress in the field.
Laboratory practical sessions in small groups (12 practices 2.5 hours): In practice students do experimental work, taking measurements, and proceeded to record the data and analysis. Are conducted in small groups of up to 16 students are divided into pairs in 8 jobs.
Attendance at laboratory classes is mandatory.

EVALUATION

The course is assessed from two different types of qualifications. On one side is the written test, consisting of a series of theoretical and practical issues relating to the content taught in the lectures, which constitutes 50% of the course grade, and various issues related to practices laboratory, which constitutes 25% of the grade. Then there is the qualification of content related to the protected work, which continuously evaluates the activities of the students throughout the course and include problem solving in the classroom or outside and oral presentation assignments. The rating of these activities constitutes 25% of the grade. This evaluation scheme covers both the two exams to be held on the first call and the second call in which there will be a single exam ..

REFERENCES

Basic

- 10.1 Referencias Básicas

Referencia b1: M. Martínez Corral, W. Furlan, A. Pons y G. Saavedra, Instrumentos Ópticos y Optométricos. Teoría y Prácticas. Universitat de València (1998).
Referencia b2: J. Antó i N. Tomás, Òptica Instrumental, Universitat Politècnica de Catalunya, Barcelona (1994).
Referencia b3: D. Henson. Optometric Instrumentation. Butterworth & Heinemann (1996).).

Referencia b4 J. Arasa, M. Arjona I N. Tomás, Instrumentos Ópticos y Optométricos. Problemas, Universitat Politècnica de Catalunya, Barcelona (1995).

Additional

- 10.2 Referencias Complementarias

Referencia c1: A. H. Tunnacliffe and J.G. Hirst, Optics, Association of Dispensing Opticians (1998).
Referencia c2: G. Smith y D. Atchinson, The eye and visual optical instruments, Cambrigde University, Cambrigde (1997).
Referencia c3: W. Furlan, J. García Monreal y L. Muñoz Escrivá. Fundamentos de Optometría. Refracción ocular. Universitat de València (2ª edición, 2009).

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

In the event that the health situation requires a hybrid teaching model, the teaching modality approved in the Academic Degree Committee in a session of July 20, 2020 will be adopted, which consists of 100% presence of the students in all activities, but with a classroom capacity of 50% in theory classes.

If a total reduction in attendance is required, then the synchronous videoconference modality would be used, given at the time set by the subject and the group, during the period determined by the Health Authority.