COURSE DATA

DATA SUBJECT

Code: 34304
Name: Contactology
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
1207 - Degree in Optics and Optometry	Facultat de Física	3	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1207 - Degree in Optics and Optometry	Contactology	COMPULSORY

COORDINATION

ALBARRAN DIEGO CESAR ANTONIO

SUMMARY

The course provides fundamental knowledge on contact lenses, including their interaction with the ocular surface, the materials and geometries used in their manufacture, and the optical principles involved. It covers the protocols for fitting soft and rigid contact lenses, both spherical and toric, as well as the procedures for pre-fitting ocular assessment, post-fitting follow-up, and maintenance and replacement systems.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

It is recommended that students have completed and passed Optometry I and II, and possess knowledge of ocular anatomy and physiology.

COMPETENCES / LEARNING OUTCOMES

1207 - Degree in Optics and Optometry

To adapt contact lenses and ocular prostheses to improve vision and the external appearance of the eye.

To apply the clinical procedures associated with the adaptation of contact lenses to different refractive and ocular dysfunctions.

To detect, to assess and to solve anomalies associated with the wearing of contact lenses.

To know and to use clinical and instrumental protocols in the exploration associated with the adaptation of contact lenses.

To know the geometry and physicochemical properties of the contact lens and to associate them with the ocular and refractive characteristics.

To know the maintenance, diagnosis and treatment solutions and to associate them with the lenticular and ocular characteristics.

To know the properties of the types of contact lenses and ocular prostheses.

DESCRIPTION OF CONTENTS

1-Basic concepts in contactology

This topic introduces the essential functions of contact lenses and studies the different types of fitting: ideal or parallel, flat, and steep. It explains how to modify lens parameters to achieve the ideal fit and finally analyzes the role of the tear meniscus formed between the lens and the cornea.

2-Anatomy and physiology of the ocular surface

This topic studies the anterior segment of the eye, as it is the area in contact with the lens and its proper understanding is essential for successful fitting. The anatomy and functions of the cornea are analyzed, including its morphology and the most relevant shape descriptors; next, corneal metabolism and the mechanisms that maintain corneal transparency are addressed. The functions of the limbus and the importance of the conjunctiva in ocular surface health are reviewed, as well as the structure and dynamics of the eyelids in relation to blinking and corneal protection. Finally, the factors influencing tear film stability and their role in the comfort and performance of contact lenses are studied.

3-Anterior segment assessment in contactology

This topic presents the techniques and protocols used to comprehensively assess the anterior segment of the eye in the context of contact lens fitting. It begins with slit-lamp biomicroscopy to assess corneal and

conjunctival health, reviews the illumination techniques most appropriate for contactology, and emphasizes the need to document findings in detail to ensure appropriate decision-making. Corneal morphometry is then addressed, comparing the advantages of topography over keratometry and explaining the interpretation of axial, tangential, and elevation maps. Finally, a minimal introduction to aberrometry in contactology is provided.

4-Contact lens materials

This topic presents the two main groups of contact lenses, rigid and soft, detailing the materials used in each: silicone acrylates, fluorosilicone acrylates, and fluoroacrylates in rigid lenses, and conventional hydrogel and silicone hydrogel in soft lenses. The importance of ensuring an adequate oxygen supply to the cornea to prevent edema is highlighted, differentiating between permeability, as a material property, and transmissibility, as a lens design property. In addition, the relevance of wettability for user comfort and resistance to deposit formation is examined, as well as the main contact lens manufacturing processes.

5-Contact lens design and geometry

This topic explores contact lens geometry through the study of its essential parameters: power, base curve radius, and total diameter. The procedure for calculating the anterior radius of curvature from the power and base curve radius is detailed, and the consequences of adjusting the total diameter on corneal pressure distribution and user comfort are examined. The concept of equivalent lenses is introduced to evaluate different designs on a comparative basis, and the relevance of edge clearance to avoid compression areas is highlighted. Finally, the rotational stability of toric lenses is addressed, as it is essential for maintaining clear and stable vision.

6-Contact lens optics

This topic addresses the optical principles of contact lenses, beginning with the principle of neutralization by means of the compensating lens that replaces the refractive function of the cornea. Next, lens power and distometry are studied, detailing their application by meridians to assess optical effectiveness. The importance of the tear meniscus in refraction and its influence on image quality is highlighted. In addition, the size of the retinal image formed with contact lenses and its impact on visual acuity are analyzed. The effects on accommodation and vergence during lens wear are then examined, as well as possible changes in the visual field. Finally, the effects on the visual system are compared according to the type of refractive error, myopia, hyperopia, and astigmatism, and how lenses contribute to optimizing perception in each case.

7-General protocol for contact lens fitting

This topic explains in detail the general protocol for contact lens fitting, beginning with patient history-taking and continuing with refraction and meridional distometry. Next, the relevant ocular dimensions are measured and tear film quality is assessed. With this information, the lens type and trial parameters are selected, and after an initial trial, final decisions are made to define the definitive fitting parameters.

8-Soft contact lens fitting

This topic explores soft contact lens fitting, beginning with the selection of the most appropriate lens type according to the patient's ocular characteristics and lifestyle. The concept of ideal fitting and the strategies to achieve optimal lens alignment on the cornea are described. Next, the complete fitting protocol is presented, ranging from the trial of initial parameters to the assessment of visual performance and comfort. After confirming the appropriate fit, the process of lens delivery to the patient is detailed, including instructions for use and care. Finally, scheduled follow-up is addressed to monitor long-term tolerance and manage possible adjustments.

9-Spherical rigid contact lens fitting

This topic details the process of fitting spherical rigid contact lenses, beginning with the choice of the most appropriate material and design parameters according to corneal topography and refractive needs. The concept of ideal fitting for rigid lenses and the techniques to achieve stable lens alignment on the cornea are explained. Next, the trial and fitting assessment protocol is presented, including control of oxygen supply, tear meniscus distribution, and assessment of visual quality. Once the optimal fit has been confirmed, lens delivery to the patient is described, including instructions for use and care, and follow-up is planned to monitor tolerance and make adjustments if necessary.

10-Soft toric contact lens fitting

This topic analyzes soft lenses designed to correct astigmatism, including front-toric, back-toric, and bitoric designs. It details how the fitting process is similar to that of spherical soft lenses, but requires ensuring rotational stability through specific systems, with their respective advantages and disadvantages. In addition, the implications of lens rotation for toric correction are examined, and the DRIS rule is presented for the final calculation of power and axis when ordering the customized lens.

11-Rigid toric contact lens fitting

This topic addresses the fitting of rigid toric lenses, sharing many of the principles of spherical rigid lenses but adding specific procedures for astigmatism correction. The key ocular parameters, total diameter, base curve radius, and spherical and toric powers together with the axis, are reviewed, and the fluorographic patterns associated with this type of fitting are described.

12-Contact lens care systems

This topic presents the components and functions of the different contact lens care systems, including solutions for cleaning, disinfection, rinsing, and storage. The importance of manual rubbing compared with simple rinsing to remove protein and lipid deposits is emphasized. Disinfection methods are analyzed, highlighting oxidative systems as the optimal option, as well as the occasional use of an enzymatic cleaner to prevent difficult accumulations. The need for strict case hygiene and frequent case replacement is also addressed, as well as the early identification of adverse reactions to ensure user safety and comfort.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	15,00
Theory	45,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	5,00
Individual or group project	10,00
Independent study and work	60,00
Preparation of lessons	15,00
Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

The course combines theoretical lectures and practical seminar activities to promote both knowledge acquisition and active students participation.

Lectures:
An expository approach (lectures) is used, supplemented by in-class questions to encourage student engagement and classroom debate. These sessions are supported by audiovisual materials (images, videos, and diagrams) projected to facilitate content comprehension.

Seminars:
In parallel, seminars are organized in small groups. In these sessions, students work collaboratively to:

- Prepare presentations on assigned topics, subsequently presenting them to the rest of the class.
- Complete self-assessment questionnaires designed as practice for the exam.

Complementary Activities:
In addition to regular seminars, the department schedules two mandatory training events, each counted as a seminar:

1. World Vision Day, featuring talks by industry professionals.
2. Technical Contact Lens Workshop, where invited experts present clinical cases and technological advances.

These activities enable students to connect theory with professional practice and broaden their understanding of the field of contactology.

EVALUATION

The final grade consists of two parts:
Exam: 8 points.

Seminars: 2 points.

To pass the course, students must obtain a minimum final grade of 5/10 and, in addition, achieve at least half of the score in each part:
Exam ≥ 4/8.
Seminars ≥ 1/2.

The seminar grade, with a maximum of 2 points, will include group presentations, self-assessment questionnaires, and the completion/participation in the complementary activities scheduled by the department. All seminars will have the same weight and will be graded out of 10. The average grade obtained will be proportionally converted into a maximum score of 2 points in the final grade.
The seminar component will be recoverable. If the minimum score of 1/2 is not achieved in the first examination period, it may be recovered in the second examination period by completing a monographic assignment proposed by the teaching staff, whose grade will replace the seminar grade.

First examination period
If students fail only the exam, that is, if they obtain a grade below 4/8, they may retake it in the second examination period without any further requirements.
If students fail only the seminar component, that is, if they obtain a grade below 1/2, they must complete a monographic assignment proposed by the teaching staff on a topic related to the course. The grade for this assignment will replace the seminar grade.
If students fail both parts, they must submit the seminar recovery assignment and retake the exam in the second examination period.

Second examination period
The same weighting is maintained: exam, 8 points; seminars/assignment, 2 points.
The second-examination-period exam recovers only the exam component.
The monographic assignment recovers only the seminar component.
To pass in the second examination period, the same conditions are required: minimum final grade of 5/10, exam ≥ 4/8 and seminars/assignment ≥ 1/2.

REFERENCES

Basic references

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• Efron N. Contact Lens Practice (3rd ed.). Elsevier - 2018 - ISBN 9780702066603
• López Alemany A. Lentes de contacto: teoría y práctica. Ulleye - 2019 - ISBN 9788494949562

Complementary references

• González-Cavada Benavides J. Atlas de lámpara de hendidura. ICM - 2015 - ISBN 9788493965686
• Gellrich M.M. The Slit Lamp. Springer - 2014 - ISBN 9783642397929
• Kilic A., Roberts C.J. Corneal Topography: From Theory to Practice. Elsevier - 2018 - ISBN 9789062992300