COURSE DATA

DATA SUBJECT

Code: 34304
Name: Contactology
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

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

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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-Básic concepts in contactology

In this topic, the essential functions of contact lenses are introduced and the different fitting types are studied: ideal or parallel, open, and closed. It explains how to vary lens parameters to achieve the ideal fit and, finally, examines the role of the tear meniscus formed between the lens and the cornea.

2-Anatomy and physiology of the ocular surface

In this topic, the anterior segment of the eye is studied, as it is the zone of contact with the lens and its proper understanding is essential for a successful fitting. The anatomy and functions of the cornea are analyzed, including its morphology and the most relevant shape descriptors; next, the metabolism and mechanisms that maintain its 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 examined.

3-Anterior segment assessment in contactology

This topic introduces the techniques and protocols for a comprehensive assessment of the eye¿s anterior segment in the context of contact lens fitting. It begins with slit-lamp biomicroscopy to evaluate corneal and conjunctival health, reviews the most appropriate illumination methods for contactology, and underscores the need for detailed documentation to support optimal decision-making. Next, corneal morphometry is covered, comparing the benefits of topography versus keratometry and explaining the interpretation of axial, tangential, and elevation maps. Finally, a brief introduction to aberrometry in contactology is provided.

4-Contact lens materials

This topic introduces the two main categories of contact lenses ¿ rigid and soft ¿ outlining the materials used in each: silicone acrylates, fluorosilicone acrylates, and fluoroacrylates for rigid lenses, and conventional hydrogel and silicone hydrogel for soft lenses. It emphasizes the critical need for adequate oxygen delivery to the cornea to prevent edema, distinguishing between permeability (a material characteristic) and transmissibility (a lens design characteristic). Furthermore, it explores the importance of wettability for wearer comfort and deposit resistance, and covers the key manufacturing processes for contact lenses.

5-Contact lens design and geometry

his topic delves into the geometry of contact lenses by examining their key parameters: power, base curve radius, and overall diameter. It outlines how to derive the anterior curvature radius from the base curve and lens power, and explores the impact of altering the overall diameter on corneal coverage and wearer comfort. The concept of equivalent lenses is introduced to facilitate comparisons between different designs, emphasizing the importance of edge clearance to prevent localized pressure. Finally, the chapter covers rotational stability in toric lenses, which is critical for ensuring consistent and precise refractive correction.

6-Contact lens optics

This topic covers the optical principles of contact lenses, starting with the neutralization principle provided by the compensating lens that replaces the cornea¿s refractive function. It then examines lens power and distometry, explaining how measurements by meridians assess true optical effectiveness. The role of the tear meniscus in refraction is highlighted for its critical impact on image quality. The discussion continues with the retinal image size produced by contact lenses and its effect on visual acuity. Next, the effects on accommodation and vergences during lens wear are explored, along with potential alterations in the visual field. Finally, the topic compares how different refractive errors¿myopia, hyperopia, and astigmatism¿influence and are compensated by contact lenses to optimize visual performance in each case.

7-General protocol for contact lens fitting

This topic provides a detailed explanation of the general contact lens fitting protocol, beginning

with the patient¿s anamnesis and followed by refraction and meridional distometry. Next, the relevant ocular measurements are taken 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 establish the definitive fitting parameters.

8-Soft spherical contact lens fitting

This topic delves into the fitting of soft contact lenses, starting with the selection of the most suitable lens type based on the patient¿s ocular characteristics and lifestyle. It outlines the concept of the ideal fit and strategies to achieve optimal lens alignment on the cornea. Next, the full fitting protocol is presented, covering initial parameter trials through the assessment of visual performance and comfort. Once the proper fit is confirmed, the patient delivery process is detailed, including usage guidelines and care instructions. Finally, scheduled follow-up is discussed to monitor long-term tolerance and manage any necessary adjustments.

9-Rigid spherical contact lens fitting

This topic outlines the complete fitting process for spherical rigid contact lenses, starting with the selection of the most suitable material and design parameters based on corneal topography and refractive requirements. It explains the concept of the ideal fit for rigid lenses and techniques to achieve stable lens positioning on the cornea. The chapter then presents the trial and evaluation protocol, covering oxygen permeability assessment, tear meniscus distribution, and visual quality testing. Once the optimal fit is confirmed, the patient delivery procedure is detailed¿complete with wear and care instructions¿and a follow-up schedule is established to monitor tolerance and make necessary parameter adjustments.

10-Soft toric contact lens fitting

This topic covers the design options for toric soft lenses used to correct astigmatism, including external-torus, internal-torus, and dual-torus configurations. It explains that the fitting procedure parallels that of spherical soft lenses but requires ensuring rotational stability through specific stabilization systems, each with its pros and cons. The chapter also examines the impact of lens rotation on toric correction and introduces the DRIS rule for vector calculation of the final cylinder power and axis when ordering the custom lens.

11-Rigid toric contact lens fitting

This topic covers the fitting of toric rigid lenses, building on the fundamentals of spherical rigid lenses while incorporating specific procedures for astigmatism correction. The key ocular parameters (overall diameter, base curve radius, and spherical and toric powers with axis) are reviewed, and the characteristic fluorescein patterns of this fitting method are described.

12-Contact lens care systems

This topic reviews the components and functions of various contact lens care systems, covering cleaning, disinfecting, rinsing, and storage solutions. It highlights the superiority of manual rubbing over simple rinsing to remove protein and lipid deposits. Disinfection methods are analyzed, with oxidative systems emphasized as the optimal choice, and occasional use of an enzymatic cleaner to tackle stubborn buildup. The importance of rigorous case hygiene and regular case replacement is discussed, along with the early detection of adverse reactions to ensure wearer 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 components:

1. Exam (8 points)
2. Seminars (2 points)

To pass the course, students must achieve at least half of the points in each component:

- Exam almost 4/8
- Seminars almost 1/2

First sitting

- If a student fails only the exam (score < 4/8), they may retake it in the second sitting without further requirements.
- If they fail only the seminars component (score < 1/2), they must complete a written assignment on a topic proposed by the instructor; submission and defense of this assignment will replace the seminar grade.
- If they fail both components, they must both submit the seminar assignment and retake the exam in the second sitting.

Second sitting

- The same weighting applies (8 + 2).
- The second-sitting exam covers only the exam component.
- The written assignment (for those who did not pass seminars) replaces the seminar component.

To pass in the second sitting, the same minimum scores are required: exam almost 4/8 and seminars/assignment almost 1/2.

REFERENCES

Basic references:

- Phillips A.J., Speedwell L. *Contact Lenses.* Elsevier - 2019 - ISBN 9780702071683
- 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 9780702066603