Course guide
370022 - CONBASICA - Basic Contact Lens

Last modified: 02/12/2022

Unit in charge: Terrassa School of Optics and Optometry
Teaching unit: 731 - OO - Department of Optics and Optometry.
Degree: BACHELOR’S DEGREE IN OPTICS AND OPTOMETRY (Syllabus 2020). (Compulsory subject).
Academic year: 2022  ECTS Credits: 6.0  Languages: Catalan, English

LECTURER

Coordinating lecturer: Cardona Torradeflot, Genis (http://futur.upc.edu/GenisCardonaTorradeflot)

Others:

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE11. Describe the physical and chemical properties of the materials used in the field of optics and optometry.

CE23. Describe the properties of the types of contact lenses and ocular prostheses. Describe the geometry and physical-chemical properties of contact lenses and associate them with specific ocular and refractive characteristics. Identify and use clinical and instrumental protocols associated with fitting contact lenses. Identify the solutions used for maintenance, diagnosis and treatment and associate them with lenticular and ocular characteristics. Apply the clinical procedures associated with contact lens fitting to various refractive and ocular dysfunctions. Apply the controlled modification techniques of corneal topography with the use of contact lenses. Detect, assess and resolve abnormalities associated with the use of contact lenses. Adapt contact lenses and ocular prostheses to improve vision and the outer appearance of the eye.

Generical:
CG1. Demonstrate knowledge of, design and apply prevention and maintenance programmes relating to the population’s visual health.
CG2. Carry out each stage of visual examinations effectively: medical history, selection and implementation of diagnostic tests, establishment of a prognosis, selection and execution of treatment and, if necessary, preparation of referral reports that establish levels of collaboration with other professionals, to ensure the best possible care for the patient.
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CG8. Plan and carry out research projects that contribute to the production of knowledge in the field of optometry and disseminate this scientific knowledge via the typical communication channels.

Transversal:
CT6. Independent learning. Identify and overcome gaps in one’s knowledge by thinking critically and choosing the best approach to extending one’s knowledge.
CT7. Foreign language. Demonstrate knowledge of a foreign language, preferably English, at an oral and written level that is consistent with graduates’ future needs.

CT3. Teamwork. To be able to work as a member of a multidisciplinary team, either as a base member or undertaking managerial decisions aiming at developing projects from a practical and responsible standpoint, adopting commitments given the available resources.
TEACHING METHODOLOGY

Teaching methods include:

MD1 - Lecture including theoretical and practical content
MD3 - Problem resolution session in which students participate to solve clinical cases and/or calculi related to the contents of the subject
MD4 - Lab session
MD6 - Problem resolution, tasks and doubts developed through the virtual campus Atenea
MD7 - Seminars

The subject consists of 15 sessions of 2 hours each of lectures and 15 sessions of 2 hours each of practice in the laboratory. In addition, several tasks shall be programmed to be worked individually or in groups by the students.

It is necessary to follow the directions and deadlines that are described via the digital campus ATENEA.

LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course Basic contact lenses, the student should be able to:

- Understand the features and functionality of different types of contact lenses.
- Know the geometry of the contact lens and the physicochemical properties of the materials used for their manufacture and relate them to the refractive and ocular characteristics of each patient.
- Understand and use clinical protocols and instrumentation for the exploration of the eye related with contact lens fitting.
- Understand the liquids used for care and maintenance and their safety in the contact lens field.
- Understand the procedures for the fitting and assessment of rigid corneal and soft spherical contact lenses.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Hours small group</td>
<td>30,0</td>
<td>19.87</td>
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<tr>
<td>Self study</td>
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<td>59.60</td>
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<tr>
<td>Guided activities</td>
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<td>0.66</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>30,0</td>
<td>19.87</td>
</tr>
</tbody>
</table>

Total learning time: 151 h

CONTENTS

T1. Introduction to contact lenses

Description:
1.1 Terminology used in contact lens
1.2 History of contact lens

Full-or-part-time: 5h
Theory classes: 1h
Self study: 4h
## T2. Ocular surface exploration

**Description:**
2.1 Anatomy and physiology of the cornea and annexes  
2.2 Keratometry and topography  
2.3 Qualitative and quantitative assessment of the tear film  
2.4 Corneal aesthesiometry

This content includes:
An anatomical description of the anterior ocular structures and a detailed explanation of the tools and methodologies used to measure their main parameters as a basis for a future choice of contact lens that is most suitable for each patient.

**Related activities:**
Lab Session 1: Keratometry and Topography (P1)  
Lab Session 6: Slit-lamp (P6)

**Full-or-part-time:** 20h  
Theory classes: 3h  
Laboratory classes: 3h  
Self study: 14h

## T3. Contact lens materials and maintenance solutions

**Description:**
3.1 Materials used in the manufacture of contact lenses  
3.2 Deposits in contact lenses  
3.3 Systems of care and maintenance of contact lenses

This content includes:
A description of the different materials used to manufacture contact lenses and their characteristics, as well as the deposits that may form on the surface of the lenses and the care and maintenance systems used to clean and disinfect these lenses.

**Related activities:**
Lab sessions 7 and 8 related to contact lens parameters and to cleaning and maintenance solutions (P7, P8)

Following this content a first evaluation of theoretical concepts shall be programmed (E1)

**Full-or-part-time:** 32h  
Theory classes: 5h  
Practical classes: 3h  
Self study: 24h
## T4. Geometry and parameters of contact lenses

### Description:
4.1 Geometry and design of rigid corneal lenses  
4.2 Geometry and design of hydrogel contact lenses  
4.3 Verification of contact lens parameters rigid corneal  
4.4 Verification parameters of hydrogel contact lenses  
4.5 Manufacture of rigid corneal lenses  
4.6 Production of hydrogel contact lenses  

This content includes:  
Description of the different designs of rigid corneal contact lenses and hydrogel, as well as the methods used to verify their parameters. A few general remarks on the manufacture of hydrogel lenses and rigid corneal lenses.  

### Related activities:
Lab sessions 2 and 3 related to the verification of the parameters of rigid corneal lenses and soft lenses (P2, P3)  

**Full-or-part-time:** 18h  
Theory classes: 3h  
Laboratory classes: 1h  
Self study : 14h

## T5. Contact lens optics and preliminary exams

### Description:
5.1 Optical system formed by the eye and the contact lens  
5.2 Preliminary tests for the fitting of different types of contact lenses  

This content includes:  
It brings together all the knowledge worked on the above topics to discuss the optical effect of fitting a contact lens in different patients refractive errors. Initial approach to the preliminary tests necessary for any contact lens fitting.  

### Related activities:
Lab sessions 4 and 5 related to the assessment and measurement of anterior ocular parameters and tear film (P4, P5), and lab sessions 9 and 10 related to fitting rigid corneal lenses and soft lenses (P9, P10)  

**Full-or-part-time:** 36h  
Theory classes: 5h  
Laboratory classes: 7h  
Self study : 24h

## T6. Fitting of rigid corneal and soft spherical lenses

### Description:
6.1 Fitting and assessment of rigid corneal spherical lenses.  
6.2 Fitting and assessment of soft spherical lenses.  

### Related activities:
Lab sessions 9 and 10 related to fitting rigid corneal lenses and soft lenses (P9, P10)  

Final written examen (E2)  

**Full-or-part-time:** 39h  
Theory classes: 13h  
Laboratory classes: 16h  
Self study : 10h
### Lab1. Keratometry, Topography and Slit-lamp examination

**Description:**  
P1. Measurement and critical assessment of the keratometry and topographical parameters of the cornea  
P6. Anterior ocular exam with the slit-lamp

**Specific objectives:**  
- To undertake correct measurements of corneal radii with the keratometry and topography instrumentation available at the lab.  
- To be comfortable with the different illumination techniques employed for the exploration of the anterior segment with the slit-lamp.

**Material:**  
Keratometers, topographers and slit-lamps  
Handout

**Delivery:**  
Completed handout

**Full-or-part-time:** 11h  
Laboratory classes: 5h  
Self study: 6h

### Lab2. Contact lens parameters

**Description:**  
P2. Measurement and verification of the parameters (radius, diameter, power, etc.) of rigid corneal lenses.  
P3. Measurement and verification of the parameters (radius, diameter, power, etc.) of soft lenses.

**Specific objectives:**  
- To know the methods and limitations in the measurement and verification of rigid corneal lenses parameters.  
- To know the methods and limitations in the measurement and verification of soft lenses parameters.

**Material:**  
Instrumentation for the measurement of contact lens parameters  
Contact lenses of different materials and designs  
Handout

**Delivery:**  
Completed handout

**Full-or-part-time:** 7h  
Practical classes: 3h  
Self study: 4h
Lab3. Contact lens materials and cleaning and maintenance solutions

Description:
P7. Review different types of current contact lenses to determine and compare their properties (oxygen permeability, water content, rigidity, etc.).
P8. Assessment of several types of cleaning and disinfecting solutions to explore their components and mode of action.

Specific objectives:
- To know the physico-chemical properties of current contact lens materials
- To know the composition and mode of action of current cleaning and disinfecting solutions

Material:
Current contact lenses
Current cleaning and maintenance solutions
Handout

Delivery:
Completed handout

Full-or-part-time: 9h
Laboratory classes: 3h
Self study: 6h

Lab4. Ocular parameters and contact lens fitting

Description:
P5. Qualitative and volumetric assessment of the tear film.
P9. Rigid corneal lens fitting and initial assessment.
P10. Soft contact lens fitting and initial assessment.

Specific objectives:
- To know the techniques for the measurement of anterior segment and tear film parameters and to know how these parameters influence the initial selection of a contact lens.
- To develop the manual skills required for the insertion and removal of rigid corneal and soft contact lenses and for their care and maintenance.
- To acquire skills for the assessment of the fit of rigid corneal and soft spherical lenses.

Material:
Contact lenses, instrumentation for the assessment of anterior segment and tear film parameters, cleaning and maintenance solutions.
Handout.

Delivery:
Completed handout.

Full-or-part-time: 33h
Laboratory classes: 19h
Self study: 14h
**Written exams**

**Description:**
- E1. First written exam (T1, T2 and T3)
- E2. Second written exam (T1, T2, T3, T4, T5 and T6)

**Full-or-part-time:** 9h
- Theory classes: 3h
- Self study: 6h

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**European Diploma Skills and Knowledge**

**Full-or-part-time:** 54h
- Theory classes: 24h
- Laboratory classes: 30h

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**Cross-sectional Skills Evaluation**

**Full-or-part-time:** 4h
- Theory classes: 3h
- Practical classes: 1h

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**GRADING SYSTEM**

Two exams shall be programmed E1 and E2 (total 70%) assessing the whole syllabus in both.
- First written exam E1 (30%)
- Second written exam E2 (40%)

Lab sessions will be assessed according to the work of the students (20%) and several tasks will be programmed (total 10%)

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**EXAMINATION RULES.**

- Required attendance to all activities requiring evaluation.
- Any of the activities without attendance shall be graded a 0.
- The subject will not passed if the lab qualification is less than 5 (over 10).
BIBLIOGRAPHY

Basic:

RESOURCES

Hyperlink:
- Web cursos formació Conòptica. https://www.youtube.com/channel/UCtoCqCIKK1eg6KbVMPwAG7Q
- Youtube Tear Film Ocular Surface (TFOS). https://www.youtube.com/user/TearFilmSociety/videos
- Revista Contact Lens Anterior Eye Abril 2021 CLEAR Report. CLEAR Report with up-to-date scientific evidence of all aspects of contact lens fitting