



## Course guide

# 370010 - MATERIALS - Optical Materials

Last modified: 20/03/2024

**Unit in charge:** Terrassa School of Optics and Optometry  
**Teaching unit:** 713 - EQ - Department of Chemical Engineering.

**Degree:** BACHELOR'S DEGREE IN OPTICS AND OPTOMETRY (Syllabus 2020). (Compulsory subject).

**Academic year:** 2023    **ECTS Credits:** 6.0    **Languages:** Catalan, Spanish

### LECTURER

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**Coordinating lecturer:** Garriga Solé, Pere (<http://futur.upc.edu/PereGarrigaSole>)  
Tzanov, Tzanko (<http://futur.upc.edu/TzankoTzanov>)

**Others:** Torrent Burgués, Joan (<http://futur.upc.edu/JuanTorrentBurgues>)  
Guaus Guerrero, Ester (<http://futur.upc.edu/EsterGuausGuerrero>)  
Ramon Portés, Eva (<http://futur.upc.edu/EvaRamonPortes>)

### PRIOR SKILLS

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- Chemistry: formulation and elemental bases of inorganic and organic chemistry.
- Chemical and electrochemistry balance.
- Organic functions.

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

CE05. (ENG) The ability to understand the structure of matter, the chemical processes of solutions and the structure, properties and reactivity of organic compounds. The ability to understand the composition and structure of the molecules that make up living beings. The ability to understand the transformation of certain biomolecules into others. The ability to study the molecular basis of the storage and expression of biological information. The ability to apply biochemical knowledge to the eye and the process of vision.

CE07. (ENG) The ability to understand and manage basic laboratory materials and techniques.

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:**

CG6. Assess and incorporate the technological improvements necessary to properly carry out professional activities.

CG11. Locate new information and interpret it in context.

CG12. (ENG) The ability to understand the general structure of optometry and its connection to other specific disciplines and other complementary ones.

CG16. Participate effectively in both single-discipline and multidisciplinary work groups on projects related to optometry.

**Transversal:**

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

CT7. Foreign language. Demonstrate knowledge of a foreign language, preferably English, at an oral and written level that is consistent with graduates' future needs.

**TEACHING METHODOLOGY**

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**LEARNING OBJECTIVES OF THE SUBJECT**

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En acabar l'assignatura Materials Òptics, l'estudiant o estudianta ha de ser capaç de:

1. Utilitzar material i tècniques bàsiques de laboratori, i prendre, tractar, representar i interpretar dades experimentals.
2. Relacionar l'estructura amb les propietats dels compostos inorgànics, orgànics i biomolècules i les seves aplicacions com a materials òptics.
3. Conèixer les característiques dels materials emprats en la fabricació de lents oftàlmiques, lents de contacte i muntures per a ulleres.

**STUDY LOAD**

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Type	Hours	Percentage
Hours small group	15,0	10.00
Self study	90,0	60.00
Hours medium group	45,0	30.00

**Total learning time:** 150 h



## CONTENTS

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### 1. INORGANIC MATERIALS

**Description:**

English contents

**Full-or-part-time:** 75h

Practical classes: 22h 30m

Laboratory classes: 7h 30m

Self study : 45h

### 2. ORGANIC MATERIALS

**Description:**

content english

**Full-or-part-time:** 75h

Practical classes: 22h 30m

Laboratory classes: 7h 30m

Self study : 45h

## ACTIVITIES

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### 2. LABORATORY PRACTICE

**Full-or-part-time:** 12h

Laboratory classes: 12h

### 2. APPLICATION EXERCICES

**Full-or-part-time:** 14h

Practical classes: 14h

### 3. BIBLIOGRAPIC REPORT

**Full-or-part-time:** 2h

Practical classes: 2h

### 4. PARTIAL EXAMS

**Full-or-part-time:** 4h

Practical classes: 4h

### 5. FINAL EXAM

**Full-or-part-time:** 2h

Practical classes: 2h



## 6. LABORATORY TEST

**Full-or-part-time:** 2h

Laboratory classes: 2h

name english

## GRADING SYSTEM

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## BIBLIOGRAPHY

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### Basic:

- Navarro Sentanyes, Antonio. Materiales ópticos inorgánicos. Terrassa: el Departament, D.L. 1997. ISBN 849225081X.
- Navarro Sentanyes, Antonio. Materiales ópticos orgánicos : monturas y lentes. [Barcelona?]: l'autor, cop. 2007. ISBN 9788492250851.
- Navarro Sentanyes, Antonio; Garriga Solé, Pere. Cuestiones de materiales ópticos. Barcelona: els autors, DL 1998. ISBN 8492250836.

### Complementary:

- Mari, Eduardo Ambrosio. Los vidrios : propiedades, tecnologías de fabricación y aplicaciones. Buenos Aires: América Lee, 1982. ISBN 9500066173.
- Ahluwalia, V. K.; Mishra, Anuradha. Polymer science : a textbook. Boca Raton: CRC/Taylor & Francis, 2008. ISBN 9781420068191.
- Pethrick, Richard A. Polymer science and technology : for scientists and engineers [on line]. Dunbeath: Whittles, cop. 2010 [ Consultation : 13/05/2022 ]. Available on : <https://web-p-ebsohost-com.recursos.biblioteca.upc.edu/ehost/ebookviewer/ebook?sid=b121c3cc-0998-4b7c-a6f1-ce145574e660%40redis&vid=0&format=EB>. ISBN 9781904445401.