

26805 - Chemistry and Optical Materials

Información del Plan Docente

Academic Year	2017/18
Faculty / School	100 - Facultad de Ciencias
Degree	297 - Degree in Optics and Optometry
ECTS	9.0
Year	1
Semester	Annual
Subject Type	Basic Education
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The process of learning design for this matter is based on the following

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The main goal of this subject is to explain basic concepts, models and theories of chemistry (in special inorganic and organic chemistry) including their relation with the optical properties of the materials, which will allow to the student to apply structural knowledge in order to understand the physical and chemical properties of optical materials (frames, ophthalmic lens and contact lens). For this reason the main methodology is based on lectures and tutorial sessions.

On the other hand, a methodology based on problems resolution will be used for strengthening the learning process. Besides, laboratory practice sessions will be programmed to apply the theoretical knowledge and get laboratory skills.

5.2. Learning tasks

Training activity 1: Acquisition of chemistry and optical materials basic knowledge (5 ECTS)

Methodology: Plenary lectures. Self-learning: view videos and web pages about matter.

Training activity 2: Classroom sessions for resolution of problems and case analysis (2 ECTS)

Methodology: Learning based on resolution of problems and questions. Teaching performed in small groups promoting the interactive discussion with the students and between them.

Training activity 4: Acquisition of practical knowledge, skills and abilities in chemistry and material chemistry.

Methodology: Laboratory practice sessions. Teamwork: Preparation of reports of experimental work. Individual work: resolution of a questionnaire at the end of each practice session.

5.3. Syllabus

The program of the matter is as follow:

BLOCK I: Chemistry basic concepts. Materials study introduction

1. Atomic structure. Periodic table y periodic properties.
2. Chemical bonds.
3. Solids and intermolecular forces. Relationship between composition-bond-structure and properties.
4. Inorganic oxides.

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BLOCK II. Optics materials: basic concepts. Inorganic optical materials.

5. Optical materials, basic concepts.
6. Lens materials. Inorganic glass: nature, fabrication and properties.

BLOCK III. Organic optical materials.

7. Introduction to organic chemistry.
8. Introduction to polymer materials.
9. Fabrication of polymer materials.
10. Properties of organic materials.
11. Applications of polymers as optical materials: frames and ophthalmic lens.
12. Applications of polymers as optical materials: contact lenses.

5.4.Course planning and calendar

Calendar for classroom sessions and date of delivery of written works

Calendar for classes:

The lectures and the seminar sessions (70 hours) will be taught along the entire academic course in one hour sessions. The specific schedule of these classes, established by the Faculty Board, will be provided to the students at the beginning of the academic year.

The specific schedule of the practical classes will be established by the coordinator of the degree. The schedule of the laboratory sessions will be announced well in advance. The laboratory classes will consist in 3-4 hours sessions.

Date of delivery of written works:

Throughout the course individual or group works will be proposed to the students. The dates of delivery of these works will be communicated well in advance.

5.5. Bibliography and recommended resources

- BB** Atkins, Peter William. Principios de química : los caminos del descubrimiento / Peter Atkins, Loretta Jones . - 3ª ed. Buenos Aires : Editorial médica panamericana, cop. 2006
- BB** Callister, William D., jr.. Introducción a la ciencia e ingeniería de los materiales / William D. Callister, jr ; [versión española por Pere Molera Solà y Marc J. Anglada Gomila] . - [1ª] ed. en español, reimp. Barcelona [etc.] : Reverté, 2007
- BB** Fernández Navarro, José María. El vidrio : [constitución, fabricación, propiedades] / José María Fernández Navarro . - 3ª ed. Madrid : Consejo Superior de Investigaciones Científicas : Sociedad Española de Cerámica y Vidrio, 2003
- BB** López Alemany, Antonio. Lentes de contacto : teoría y práctica / Antonio López Alemany [... et al.] . Xàtiva : Ulleye, 2008
- BB** Navarro Sentanyes, Antonio. Materiales ópticos inorgánicos / A. Navarro S.. - 5ª ed. Barcelona : [A. Navarro Sentanyes], 2006
- BB** Navarro Sentanyes, Antonio. Materiales ópticos orgánicos / Antonio Navarro Sentanyes, Manuel Blanco Fernández, Gloria Rico Arnaiz de las Revillas [Barcelona : Los autores], D.L. 1989
- BB** Química : la ciencia central / Theodore L. Brown ... [et al.] ; con la colaboración de Patrick Woodward ; traducción, Laura Fernández Enríquez ; revisión técnica, María Aurora Lanto Arriola . 11ª ed. México : Pearson Educación, 2009
- BB** Química general : principios y aplicaciones modernas / Ralph H. Petrucci ... [et al.] ; traducción, Concepción Pando García-Pumarino, Nerea Iza Cabo ; revisión técnica, Juan A. Rodríguez Renuncio . 10ª ed. Madrid [etc.] : Prentice

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Hall : Person educación, 2011

BB Shackelford, James F.. Introducción a la ciencia de materiales para ingenieros / James F. Shackelford ; traducción, adaptación y revisión técnica, Alfredo Güemes, Nuria Martín . - 6ª ed., reimp. Madrid [etc.] : Pearson Prentice Hall, 2008

BB Tecnología óptica : lentes oftálmicas, diseño y adaptación / Jesús Caum Aregay ... [et al.] . - 1ª ed. Politecnos Barcelona : Edicions UPC, 2001

BC Contact lens practice / edited by Nathan Efron . - 1st publ., repr. Edinburgh [etc.] : Butterworth-Heinemann, 2007