Last update: 03-07-2018

370710 - BIOINTER - Biointerfaces, Tear Film and Biomaterials

Coordinating unit: 370 - FOOT - Terrassa School of Optics and Optometry

Teaching unit: 713 - EQ - Department of Chemical Engineering

Academic year: 2018

Degree: MASTER'S DEGREE IN OPTOMETRY AND VISION SCIENCES (Syllabus 2012). (Teaching unit Optional)

ECTS credits: 3 Teaching languages: Spanish

Teaching staff

Coordinator: JOAN TORRENT BURGUES (http://futur.upc.edu/JuanTorrentBurgues)
ESTER GUAUS GUERRERO (http://futur.upc.edu/EsterGuausGuerrero)

Others: CARME SERÉS REVÉS (http://futur.upc.edu/CarmenSeresReves)

Degree competences to which the subject contributes

Transversal:

1. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

Teaching methodology

Lectures will be combined with seminar classes, in which students' work will be done in small groups, and laboratory practices.
In the seminary classes will be used learning techniques based on problems and case studies. In the laboratory practices will work in team.

Learning objectives of the subject

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Study load

Total learning time: 75h	Hours large group:	0h	0.00%
	Hours medium group:	15h 54m	21.20%
	Hours small group:	8h 06m	10.80%
	Guided activities:	0h	0.00%
	Self study:	51h	68.00%

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Content

(ENG) -Molecular interactions and biointerfaces	Learning time: 11h Practical classes: 3h Self study : 8h

Description:
(ENG) Intermolecular forces and molecular interactions in aqueous medium. Interfacial Properties and phenomena. Biological Interfaces: Ocular biointerfaces.

(ENG)-Inferfaces of biomaterials	Learning time: 12h Practical classes: 3h Self study : 9h

Description:
Biomaterials and biocompatibility. Surface of biomaterials for contact lenses (CL). New materials for CL and their surface treatments: improvement of biocompatibility. Surface of materials for ophthalmology and ocular pharmacology.

(ENG) -Transport phenomena in biointefaces and biomembranes.	Learning time: 8h Practical classes: 2h Self study : 6h

Description:
(ENG) Types of transport. Transport through membranes. Transport through ocular tissues and tear film.

(ENG) -Techniques of study and characterization of interfaces.	Learning time: 15h 30m Practical classes: 2h 30m Laboratory classes: 4h Self study : 9h

Description:
(ENG) Physical characterization techniques. Nanoscale techniques. Techniques Measuring Interfacial properties. Techniques for the study and simulation of biomimetic films

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(ENG) -Clinical and physicochemical studyl of tear film. The lipid layer	Learning time: 19h 30m Practical classes: 2h 30m Laboratory classes: 4h Self study : 13h

Description:
(ENG) Methods for study the tear film. Assessment of the tear film stability.The tear film lipid layer. Artificial tears. Influence of contact lenses in the stability of the tear film. Clinical observation of the tear and the tear-ocular surface and tear-LC interfaces

(ENG) -Methods of surface modifications. Applications.	Learning time: 8h Practical classes: 2h Self study : 6h

Description:
(ENG) Methods for modification and functionalization of surfaces: Modifying biomaterials. Applications: Superhidrofobicity / hydrophilicity antiadhesion / adhesión, biocompatibility

(ENG) Final Test	Learning time: 1h Practical classes: 1h

Description:
content english

Planning of activities

Exercises	Hours: 12h Self study: 12h

Self-assessment questionnaires	Hours: 3h Self study: 3h

Lab practices	Hours: 16h Laboratory classes: 8h Self study: 8h

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Qualification system

50% of Continuous assessment marks (Different activities along the course will be proposed and different reports and exercises will be delivered) + 50 % mark of the final exam of all the subject.
Reassessment: It will be a single final exam covering all the subjects of the course . Reassessment mark (NR): NR= 0,75* mark of reassessment exam + 0,25* Mark of the continuous assessment of the subject. According to the assessment normative of the School, the maximum grade is equal to 5.

Bibliography

Basic:

Yeagle, P.L. The structure of biological membranes. 2nd ed. Boca Raton: CRC Pres, 2005. ISBN 0849314038.

Blitz J.P.; Gun'ko V.M. Surface chemistry in biomedical and environmental science. Dordrecht: Springer, 2006. ISBN 9781402047404.

Barnes, G.T.; Gentle, I.R. Interfacial science: an introduction. 2nd ed. Oxford; New York: Oxford University Press, 2011. ISBN 9780199571185.