

## 370546 - INTERAC - Interactions Between Microorganisms and Contact Lenses

Coordinating unit: 370 - FOOT - Terrassa School of Optics and Optometry  
Teaching unit: 731 - OO - Department of Optics and Optometry  
Academic year: 2019  
Degree: BACHELOR'S DEGREE IN OPTICS AND OPTOMETRY (Syllabus 2009). (Teaching unit Optional)  
ECTS credits: 3 Teaching languages: Catalan, Spanish

### Teaching staff

Coordinator: Morato Farreras, Jordi (<http://futur.upc.edu/JordiMoratoFarreras>)

### Prior skills

To follow the course smoothly, students must have previous knowledge acquired during biology courses taken in high school and should have studied general and ocular microbiology matter.

### Requirements

Should have studied general and ocular microbiology matter.

### Degree competences to which the subject contributes

Specific:

- 0.4. Being able to relate the structure with the properties of inorganic and organic compounds and biomolecules
- 1.2.5. Advise the patient in the correct administration of the ocular medicines and their effects.
- 2. Examine the visual system to value his state and functionality
- 3a.3.1. Distinguish between the characteristics of materials and designs of various types of ophthalmic lenses (including prisms and filters) and frames, and understand the basic principles of optics and not optical systems used for low vision.
- 3c.0.2. Choosing the appropriate therapy for that case, evaluating the different alternatives.
- 0. Applying the scientific basis needed for the development of the profession.

Generical:

- T1. Ethical and social commitment and sustainability.
- T2.2.2. Interpret and use non-verbal language
- T2.3.2. Judgments (ratings) reports and surveys
- T3.0.1. Being able to participate in multidisciplinary working groups, multicultural and multilingual
- T3.2.1. Define the general objectives and to carry out a specific group
- T4.1.3. Encourage methodical work, rigorous, consistent and innovative
- T3. Teamwork
- T3.0.2. Be able to organize the work of a group of people to attain a previously determined aim in the due terms

## 370546 - INTERAC - Interactions Between Microorganisms and Contact Lenses

T3.3.2. Acquire communication techniques appropriate to ensure the success of teamwork

T4.0.1. Analyze and relate the knowledge and acquired skills.

T3.1.2. Flexibility to integrate into dynamic environments, multidisciplinary and multicultural.

T3.2.2. Capacity to assume different roles within the team, leadership, coordination with other members

T4.1.1. Assessing the acquisition of the course objectives.

T4.3.1. Reflect and be able to make a critic of the knowledge and developed skills and the level of achievement.

T4.2.3. Working with evidence, methodology and rigour.

T2.3.1. Display information orally and in writing of reasonably and coherent.

### Teaching methodology

15 hours of theory in large group + 24 hours of practical sessions in small group (12 hours per group) + 4 hours of presentation of work.

27 hours of cooperative learning.

Complementing and recalling the knowledge gained in General and Ocular Microbiology, recalling aseptic techniques, sterilization and disinfection will affect all aspects of this subject in general hygiene, especially those that refer to the contact lenses.

To facilitate the acquisition of these skills, students are required to work in groups. In small groups (two people), the work will be supervised and managed by teachers, as previously explained the basics of the presentations and the structure must have jobs.

Students must develop the ability to work in teams, searching and managing information optimally, defending their point of view and making critical reasoning, planning working hours and ultimately laying the foundations to become a good professional optics and optometry, especially in the field of contact lenses.

### Learning objectives of the subject

Describe the interactions of microorganisms with contact lenses in the processes of adhesion, changes in the structure eye contact-lens and resistance to antimicrobial treatments (disinfectants) and address a comprehensive approach to risk prevention microbial the use of contact lenses.

### Study load

Total learning time: 75h	Hours medium group:	24h	32.00%
	Hours small group:	6h	8.00%
	Self study:	45h	60.00%

## 370546 - INTERAC - Interactions Between Microorganisms and Contact Lenses

### Content

#### Part A. MICROBIAL INTERACTIONS WITH EYE STRUCTURES AND CONTACT LENSES

Learning time: 38h

Theory classes: 7h  
Laboratory classes: 16h  
Self study : 15h

##### Description:

- A1 ST. Microorganisms and health. Review of structure and pathogenesis.
- A2 ST. Epidemiology: Risk epidemiology. Epidemiological surveillance and prevention.
- A3 ST. Environmental health and environmental factors. Air quality and environmental quality.
- A4 ST. Mechanisms of pathogenesis and eye infection. Immunological defense mechanisms of the eye.
- A5 ST. Biofilms. Bacterial biofilms.
- A6 ST. Mechanisms of microbial adhesion and interaction with CL. Inhibition of adhesion.
- A7 ST. Diagnostic methods for quantification of microorganisms. Molecular methods.

##### Related activities:

- Act. 1. Initial survey course. Allocation of different projects (research work).
- Act. 2. Bibliographic Research Work (keywords and 10 references).
- Act. 3. Presentation previous work (maximum 15 slides)
- Act. 4. Epidemiological Models / DPSIR Model. Exercises.

#### Part B. INTERACTIONS OF MICROORGANISMS WITH CONTACT LENS SOLUTIONS

Learning time: 14h

Theory classes: 3h  
Laboratory classes: 4h  
Self study : 7h

##### Description:

- B8 ST. Concept of sterilization and disinfection.
- B9 ST. Mechanisms of antimicrobial resistance.
- B10 ST. Contact lens solutions
- B11 ST. Interactions microorganisms-contact lens-solution

##### Related activities:

- Act. 5. Design of survey for CL users

## 370546 - INTERAC - Interactions Between Microorganisms and Contact Lenses

<p><b>PART C. RISK PREVENTION, HEALTH AND SAFETY IN CONTACTOLOGY</b></p>	<p>Learning time: 18h Theory classes: 9h Laboratory classes: 4h Self study : 5h</p>
<p>Description: ST C12. Microorganisms-contact lenses interaction and risk of infection. Risk factors and health contactology. ST C13. Comprehensive prevention of microbial risk in contact lens practice ST C14. Conclusions of Survey</p> <p>Related activities: Act. 6. Conclusions of survey for users. Act. 7. Presentations by each group.</p>	

### Qualification system

The final grade is calculated by weighting the work done by each student in each of the tests, as detailed below:

1. Review 1 (all topics). 40%
2. Teamwork. 40%
3. Complementary tests (class tests). 20%

### Regulations for carrying out activities

It is necessary to attend a minimum of 90% of practices.

It is necessary to have completed all the activities uploaded to ATENEA. Deliveries must follow the instructions given.  
UPC regulations in case of copying of exams.

## 370546 - INTERAC - Interactions Between Microorganisms and Contact Lenses

### Bibliography

#### Basic:

An, Y.H.; Friedman, R.J. Handbook of bacterial adhesion: principles, methods and applications. Totowa, NJ: Humana, 2000. ISBN 0896037940.

Efron, N. Contact lens complications. 3rd ed. Edinburgh [etc.]: Elsevier, 2012. ISBN 9780702042690.

Fader, Robert C.; Engelkirk, Paul G.; Duben-Engelkirk, Janet L. Burton's microbiology for the health sciences. 11th ed. Philadelphia: Wolters Kluwer Health, 2015. ISBN 9781975100643.

Fos, Peter J. Epidemiology foundations: the science of public health. San Francisco: Jossey-Bass, 2011. ISBN 9780470402894.

Madigan, M.T. [et al.]. Brock biology of microorganisms [on line]. 15th ed. New York: Pearson Education, 2017 [Consultation: 22/10/2018]. Available on: <<https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=5203166>>. ISBN 9781292235196.

Murray P.R.; Rosenthal, K.S.; Pfaller, M.A. Medical microbiology. 8th ed. Philadelphia: Mosby/Elsevier, 2016. ISBN 9780323299565.

Romeo, Tony. Bacterial biofilms. Berlin: Springer-Verlag, 2008. ISBN 9783642094699.

#### Complementary:

Block, Seymour S. Disinfection, sterilization and preservation. 5th ed. Lippincot Williams & Wilkins, 2000. ISBN 9780683307405.

Aschengrau, A.; Seage, G.R. Essentials of epidemiology in public health. 4th ed. Burlington: Jones & Bartlett Learning, 2019. ISBN 9781284128352.

Carré, A.; Mittal, K.L. Surface and interfacial aspects of cell adhesion. Boca Raton: CRC Press, 2011. ISBN 9781138116214.

Donelli, Gianfranco. Biofilm-based healthcare-associated infections. Cham [etc.]: Springer, 2015.

Hernández-Aguado, I. [et al.]. Manual de epidemiología y salud pública: para grados en ciencias de la salud. 2a ed. Madrid [etc.]: Panamericana, 2011. ISBN 9788498353587.

Linke, D.; Goldman, A. Bacterial adhesion: chemistry, biology and physics. Dordrecht: Springer, 2011. ISBN 9789400736054.

Piédrola, G. Medicina preventiva y salud pública. 12ª ed. Barcelona: Elsevier Masson, 2016. ISBN 9788445826058.

Sihota, R.; Tandon, R. Parson's diseases of the eye. 22nd ed. New Delhi: Elsevier, 2015. ISBN 9788131238189.

Tortora, G.; Funke, B.R.; Case, C.L. Microbiology: an introduction. 12th ed. Essex: Pearson, 2016. ISBN 9781292099149.