

370522 - MICRO - General and Ocular Microbiology

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 Compulsory)
ECTS credits: 6 Teaching languages: Catalan

Teaching staff

Coordinator: Triviño Ibañez, Sonia

Degree competences to which the subject contributes

Specific:

- 1.0.1. Prevent problems with visual health
- 0.9. Being able to perform literature searches.

Generical:

- T4.0.1. Analyze and relate the knowledge and acquired skills.
- T3. Teamwork
- T4.2.3. Working with evidence, methodology and rigour.
- T3.2.1. Define the general objectives and to carry out a specific group
- T2.2.1. Synthesize and organize information to convey it effectively orally and / or written
- T2.1.1. Extract the main points of a text or any source of information (oral or written)
- T3.1.1. Develop methods to encourage teamwork participation of its members, critical thinking, mutual respect, the ability to negotiate to achieve common goals
- T4.1.1. Assessing the acquisition of the course objectives.

Teaching methodology

Lectures - Lectures will be explanations according to the school schedule and the official timetable. The last part of the course (microorganisms of eye disorders) will be through tutored work. Each group (3-4 students) must make a presentation in class for 15-20 min. explaining the topic assigned. The material should be presented preferably using one of the programs available for presentations (PowerPoint or similar). Once the lectures has finished the student must submit the presentation, the annexes with the bibliography and a summary with a maximum of three pages that will be evaluated.

Laboratory - The practices were designed to reinforce learned concepts during lectures, especially the concept of disinfection, transmission of infectious diseases and the structure and characteristics of each group of microorganisms. They will be made in pairs and each one will have to provide a report with the results.

Learning objectives of the subject

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Provide students with the basic knowledge of general microbiology, to understand how different microorganisms can affect the eye. Introduce microorganisms causing eye infections.

At the end of the subject of General and Ocular Microbiology, the student must have achieved the following objectives:

- Distinguish the structure and general characteristics of the main groups of microorganisms (bacteria, viruses, fungi and protozoa).
- Compare the general mechanisms of infection from microorganisms in the human body and immune system response.
- Set the different types of existing treatments for control of infections, either with antibiotics or biocides.
- Differentiate the microorganisms that cause eye infections.
- Use basic microbiological techniques to grow, observe and differentiate the main groups of microorganisms that cause eye infections.

And the specific objectives:

Knowledge

In lectures, students must acquire basic knowledge of microbiology and describe the structure and general characteristics of the main groups of microorganisms (bacteria, fungi and viruses). They have also to understand the mechanisms that presents the human body to fight infections caused by microorganisms, especially by causing eye infections. Laboratory sessions aim that students master all the concepts studied in the theoretical classes.

Skills

It is intended that the students reach the knowledge necessary to grow and manipulate, safely, bacteria and fungi in the laboratory. In this respect, it has to familiarize in using aseptic techniques, sterilization and disinfection, and the use of the optical microscope, since it is necessary to perform observations of microorganisms. Oral expression and ability to synthesize will be valued.

Competences

To facilitate the acquisition of these skills, students will have to make a group work on the last part of the course, microorganisms that cause eye infections. In small groups (3-4 people), the work will be conducted by teachers previously explaining the basics of both the presentations and their structure. Students will have to develop the ability to work in teams, become familiar with the use of bibliographic databases, search and manage information, defend their views and make critical reasoning, plan working and set the basis to being a good professional.

Study load

Total learning time: 144h	Hours large group:	0h	0.00%
	Hours medium group:	48h	33.33%
	Hours small group:	12h	8.33%
	Guided activities:	0h	0.00%
	Self study:	84h	58.33%

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Content

<p>1. Introduction and methods</p>	<p>Learning time: 14h 30m</p> <p>Theory classes: 0h Practical classes: 5h Laboratory classes: 2h Guided activities: 0h Self study : 7h 30m</p>
<p>Description:</p> <ul style="list-style-type: none"> 1.1- The microbiological science 1.2- The world of the microorganisms 1.3- Sterilization techniques of microorganisms 1.4- Culture techniques of microorganisms <p>Related activities:</p> <ul style="list-style-type: none"> - Laboratory sessions: <ul style="list-style-type: none"> Practice 1.- Presentation and explanation of the laboratory sessions. Preparation of culture media. Pure and mixed cultures 	
<p>2. Structure and physiology of the bacterial cell</p>	<p>Learning time: 34h</p> <p>Theory classes: 0h Practical classes: 12h Laboratory classes: 4h Guided activities: 0h Self study : 18h</p>
<p>Description:</p> <ul style="list-style-type: none"> 2.1- Bacterial cell 2.2- Cytoplasm and motility 2.3- Cellular division and differentiation forms 2.4- Bacterial metabolism 2.5- Growth and development of microorganisms 2.6- Biofilms <p>Related activities:</p> <ul style="list-style-type: none"> - Laboratory sessions: <ul style="list-style-type: none"> Practice 2 and 3.- Presence of microorganisms in our environment. Colonial and cellular morphology of bacteria 	

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<p>3. Viruses, fungi and protozoa</p>	<p>Learning time: 21h 30m</p> <p>Theory classes: 0h Practical classes: 7h Laboratory classes: 4h Guided activities: 0h Self study : 10h 30m</p>
<p>Description:</p> <p>3.1- Morphology, structure and composition of viruses. Relationship of the viruses-host cell, and clasification of viruses</p> <p>3.2- Microscopic fungi. General characteristics and cell structure. Filamentous fungi, yeasts and dimorphic fungi</p> <p>3.3- Colonization of contact lenses by fungi</p> <p>3.4- Protozoa. General characteristics. Life cycle of Acanthamoeba</p> <p>Related activities:</p> <p>- Laboratory practices:</p> <p>Practice 5.- Morphology of fungi. Observation of the colonies and the fungal structures. Microscopic observation of the contact lenses colonized by fungi</p> <p>Practice 6.- Morphology of aquatic protozoa. Microscopic observation of protozoa.</p>	
<p>4. Pathogenesis and immunology</p>	<p>Learning time: 27h</p> <p>Theory classes: 0h Practical classes: 10h Laboratory classes: 2h Guided activities: 0h Self study : 15h</p>
<p>Description:</p> <p>4.1- Infectivity and pathogenesis</p> <p>4.2- Innate immune response</p> <p>4.3- Adaptative immune response</p> <p>4.4- Antimicrobial agents</p> <p>Related activities:</p> <p>- Laboratory practices:</p> <p>Practice 4.- Liquid disinfection effectiveness of hydrophilic contact lenses</p>	

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5. Microorganisms that cause eye infections	Learning time: 17h Theory classes: 0h Practical classes: 6h Laboratory classes: 2h Guided activities: 0h Self study : 9h
<p>Description:</p> <ul style="list-style-type: none"> 5.1- Bacteria that cause ocular infections 5.2- Viruses that cause ocular infections 5.3- Fungi that cause ocular infections 5.4- Surgery and ocular infections <p>Related activities:</p> <ul style="list-style-type: none"> Oral presentation of the teamworks about microorganisms and ocular infections 	

Planning of activities

1. ACTIVITY: LABORATORY PRACTICES	Hours: 6h Laboratory classes: 6h
(ENG) 2. ACTIVITAT: TUTORITZACIÓ DELS TREBALLS	Hours: 0h Guided activities: 0h

Qualification system

The evaluation will be based on continuous assessment.

The evaluation of the course is distributed between the theory sessions (T), teamwork (Tr) and lab (L).

The theory grade will be based on two tests (T1 + T2). The laboratory grade will be based on a test (L)

The final grade (N) will be obtained by the formula: $N = 0.3 T1 + 0.3 T2 + 0.2 Tr + 0.2 L$

Regulations for carrying out activities

In case of partial or total copy of any evaluations of the course will apply the provisions of General Academic Regulations UPC: perform any act of fraudulently assessment involves, at least a score of 0 in that evaluation, and possibly more severe disciplinary processes.

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Bibliography

Basic:

Madigan, Michael T. *Biología de los microorganismos*. 14a. ed. Madrid: Prentice Hall, 2015. ISBN 8420536792.

Murray, Patrick R. *Microbiología médica*. 8a ed. Madrid: Harcourt Brace, 2017. ISBN 8481741620.

Ingraham, J.L. & C.A. Ingraham, 2000. . *Introduction to microbiology*, Brooks/Cole. Thomson Learningibre. 2nd. ed. 2000.

Tortora G.J. et al. *Introducción a la Microbiología* . 12a ed. Médica Panamericana, 2017.

Complementary:

Durand Marlene L. "Introduction to Eye Infections, Pp. 1388-1391". Mandell, Douglas, and Bennett's. *Principles and Practice of Infectious Diseases* . Saunders Co, 2015.

Durand Marlene L. "Periocular Infections, Pp. 1432-1438". Mandell, Douglas, and Bennett's. *Principles and Practice of Infectious Diseases*. Saunders Co, 2015.

Renneberg R. *Biología para principiantes*. Reverte, 2008.

Stagner AM, Jakobiec F.A, Eagle RC, Charles N.C. *Infections of the Eye and Its Adnexa. Diagnostic Pathology of Infectious Disease*. 2a ed. Elsevier, 2018.

Gardner, Joan F. *Introduction to sterilization, disinfection and infection control*. 2nd ed. Melbourne: Churchill Livingstone, 1991. ISBN 0443042861.

Others resources: