Course guide
370006 - ANATOSV - Visual System Anatomy

Unit in charge: Terrassa School of Optics and Optometry
Teaching unit: 731 - OO - Department of Optics and Optometry.

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

Academic year: 2022 ECTS Credits: 6.0 Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: ANNA BOZZANO
Others: ANNA BOZZANO CARME MALLOFRÉ LAURA DYSON ENRICO CASTROFLORIO

PRIOR SKILLS

The knowledge acquired in the Head Anatomy and Histology course, offered during the first semester of the bachelor’s degree in Optics and Optometry, provide the necessary foundation for understanding the anatomical characteristics of the visual system and ocular adnexa.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE02. Determine the functions of systems in the human body. Demonstrate knowledge of the principles and foundations of the biological processes involved in the normal functioning of the visual system. Recognise, with macroscopic and microscopic methods, the morphology and structure of the tissues, organs and systems in the human body. Demonstrate knowledge of and describe, macroscopically and microscopically, the structures that make up the visual system and ocular adnexa. Demonstrate knowledge of the structure of the cell, embryonic development and organogenesis. Describe the development of the visual system. Demonstrate knowledge of the microorganisms involved in visual system disorders. Demonstrate knowledge of the properties and functions of the various parts that make up the visual system.
CE07. (ENG) The ability to understand and manage basic laboratory materials and techniques.

Generical:
CG11. Locate new information and interpret it in context.

Transversal:
CTS. Efficient use of informacion resources. To manage data and technical and scientific information acquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

TEACHING METHODOLOGY

MD1 - Participatory lecture on theory and problems.
MD3 - Practical problem-solving class requiring student participation in exercises on topics related to the subject matter.
MD6 - Completing problems, exercises and assignments, and resolving doubts via the ATENEA virtual campus.
MD7 - Tutorials.
In order to be able to participate in the laboratory practicals, students must first hand in the completed script (independent learning).
In order to benefit from the course, students must follow the indications that will appear on the ATENEA virtual campus.
LEARNING OBJECTIVES OF THE SUBJECT

1. To understand basic anatomical concepts.
4. To understand, macroscopically and microscopically, the structures that make up the visual system and ocular adnexa.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>15,0</td>
<td>10.00</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>45,0</td>
<td>30.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

1. INTRODUCTION

Description:
1. Basic concepts related to the organisation of the visual system.
   - Basic anatomical terminology.
   - Eyeball axes and parameters.
   - Anatomical location and characteristics of the adnexa, the eyeball and the visual pathway.

Specific objectives:
To become aware of the importance of understanding basic anatomical and histological concepts to be able to properly apply them to structures in the visual system.

Related activities:
Laboratory session 1 (introduction to the visual system) will be graded individually after each session.

Full-or-part-time: 12h 30m
   Theory classes: 3h
   Laboratory classes: 2h
   Self study: 7h 30m
2. OCULAR ADNEXA

Description:
1. Anatomical and histological structure of the ocular adnexa.
2. Eyelids.
3. Conjunctiva.
4. Tears and the lacrimal apparatus.
5. Oculomotor muscles.
6. Innervation of the ocular adnexa.
7. Vascularisation of the ocular adnexa.

Specific objectives:
- To anatomically and histologically locate, identify and describe the ocular adnexa.
- To list and define the structures of the vascular and nervous system related to the ocular adnexa.
- To become aware of the importance of the concepts acquired so as to be able to understand that any abnormality, whether in the histology or anatomy of the ocular adnexa, can affect their proper functioning.

Related activities:
Laboratory sessions 2-4 will be completed in groups of 2-3 students but will be individually graded after each session.

Full-or-part-time: 67h 30m
Practical classes: 21h
Laboratory classes: 6h
Self study: 40h 30m

3. THE EYEBALL AND VISUAL PATHWAY

Description:
8. Outer layer (cornea, sclera and sclerocorneal limbus).
9. Middle layer (choroid, ciliary body, iris).
10. Intraocular structures (lens, chambers and humours).
11. Inner layer (retina).
13. Vascularisation and innervation of the eyeball.

Specific objectives:
- To anatomically and histologically locate, identify and describe the different intraocular structures and layers that make up the human eye.
- To list and define the structures of the vascular and nervous system related to the eyeball.
- To understand and describe, macroscopically and microscopically, the structures that make up the visual pathways.
- To become aware of the importance of the concepts acquired so as to be able to understand that any abnormality, whether in the histology or anatomy of the visual organ, can affect its proper functioning.

Related activities:
Laboratory sessions 5-7 will be completed in groups of 2-3 students but will be individually graded after each session.

Full-or-part-time: 67h 30m
Practical classes: 21h
Laboratory classes: 6h
Self study: 40h 30m
ACTIVITIES

INTRODUCTION AND OCULAR ADNEXA LABORATORY

Description:
Laboratory sessions 1-4 are related to introductory concepts and the ocular adnexa, which will be previously covered in the theoretical part of the course. Students will complete the 2-hour sessions in groups of 2-3, using histological preparations, slides and/or anatomical models. As independent learning and to facilitate attaining the proposed objectives, students have available to them on ATENEA the script that must be filled in before coming to the session. To finish, students will be graded on an individual exam, the results of which will be used to calculate their final marks in the course.

Specific objectives:
To reinforce and integrate the knowledge previously acquired in the theoretical part of the course regarding the ocular adnexa.

Material:
AVAILABLE ON ATENEA
- Detailed script of the session with questions. Students must fill in the question sheet before the laboratory session.
- Set of images of the ocular adnexa.

AVAILABLE IN THE LABORATORY
- Histological preparations.
- Slides with anatomical and histological images.
- Anatomical models.
- Histological and anatomical atlases of the visual organ.

Delivery:
Students must hand in the previously completed script at the beginning of each session.

Full-or-part-time: 20h
Laboratory classes: 8h
Self study: 12h
**EYES BALL LABORATORY**

**Description:**
Laboratory sessions 5-6 are related to the anatomical and histological structure of the eyeball previously covered in the theoretical part of the course. Students will complete the 2-hour sessions in groups of 2-3, using histological preparations, slides and/or anatomical models. As independent learning and to facilitate attaining the proposed objectives, students have available to them on ATENEA the script that must be filled in before coming to the session. To finish, students will be graded on an individual exam, the results of which will be used to calculate their final marks in the course.

**Specific objectives:**
To reinforce and integrate the knowledge previously acquired in the theoretical part of the course regarding the eyeball.

**Material:**
- AVAILABLE ON ATENEA
  - Detailed script of the session with questions. Students must fill in the question sheet before the laboratory session.
- AVAILABLE IN THE LABORATORY
  - Set of images of the ocular adnexa.
  - Histological preparations.
  - Slides with anatomical and histological images.
  - Anatomical models.
  - Histological and anatomical atlases of the visual organ.

**Delivery:**
Students must hand in the previously completed script at the beginning of each session.

**Full-or-part-time:** 15h
- Laboratory classes: 6h
- Self study: 9h

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**OPTIONAL EXERCISES**

**Description:**
Students will find a set of optional, theoretical and/or practical exercises to strengthen their knowledge on matters covered in the course in ATENEA. These exercises will not be graded.

**Specific objectives:**
To reinforce the knowledge acquired during face-to-face sessions.

**Material:**
Optional exercises that will not count towards students' final marks.

**Full-or-part-time:** 6h
- Self study: 6h
LABORATORY EXAMS

**Description:**
Laboratory exam (individual).
Solving questions and images related to the topics covered during the seven laboratory sessions.
The average of the marks received on the seven exams will account for 20% of final marks in the course.

**Specific objectives:**
To assess the knowledge gained during the laboratory sessions.

**Material:**
Script and images available on ATENEA.
Equipment available in the laboratory.

**Full-or-part-time:** 3h 30m
Laboratory classes: 3h 30m

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THEORY EXAMS

**Description:**
Individual in-class exam.
Completion of two exercises (VF exam with penalisations for incorrect answers) related to the topics seen in the subject areas that will cover all of the course's general learning objectives. This will demonstrate students' ability to make use of information resources (cross-disciplinary competency).
Exam results will make up 70% (35% + 35%) of students' final marks in the course.
The specific, generic and cross-disciplinary competencies will be considered to have been achieved if a student receives a final mark of 5 or greater.
Students who fail the subject with a mark greater than or equal to 3 have the option to pass it by taking a resit examination. This resit examination will be conducted under the conditions established by the Academic Regulations for Bachelor's and Master's Degrees at the UPC (NAGRAMA) and the specific conditions established by the Terrassa School of Optics and Optometry. It consists of an exam on all of the topics covered throughout the course. Students who pass the resit exam are given a final mark of 5 in the course. Otherwise, they keep the highest mark of the two received previously.

**Specific objectives:**
To demonstrate the ability to apply the anatomical and histological knowledge of the head and face that was acquired in lectures.

**Material:**
Teaching material available on ATENEA.
Recommended reading list.

**Full-or-part-time:** 3h
Practical classes: 3h

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EUROPEAN DIPLOMA COMPETENCIES

**Description:**
The course in Visual System Anatomy contributes fully or partially to Competency 8. Refractive error. Knowledge, which is worked on in Topic 1. Knowledge of the anatomical structure of the eye and its functions, with a weight of 6 ECTS credits.

**Full-or-part-time:** 1h
Theory classes: 1h
GRADING SYSTEM

There will be two exams on theoretical knowledge: T1 and T2 (70%).
Theory exam T1 (VF exam with penalisations for incorrect answers: 35%).
Theory exam T2 (VF exam with penalisations for incorrect answers: 35%).
There will be seven exams on practical laboratory knowledge: L (20%).
Laboratory exams L1 to L7 (recognising the anatomical structures of the visual system: 2.85% each).
Participation in optional activities: PA (10%).
Final mark = 0.35 · T1 + 0.35 · T2 + 0.2 · L + 0.1 · PA

EXAMINATION RULES.

- Attendance at lectures and practicals is compulsory.
- Attendance at all graded activities is compulsory.
- If any of the graded activities are not completed, students will be given a mark of 0 for the subject.
- If copying (either partial or total) is found to have taken place on any course assessment, that which is stipulated in the Academic Regulations for Bachelor’s and Master’s Degrees at the UPC will apply:
  "Irregular actions potentially leading to a significant variation of the marks obtained by one or more students will be considered a breach of the assessment regulations. Such behaviour will result in a descriptive mark of "Fail" and a numerical mark of 0 for the examination in question and for the subject, without prejudice to any disciplinary proceedings that may result from that behaviour. If students disagree with this decision, they may file a complaint with the dean or director of the school. If students are not satisfied with the response, they may lodge an appeal with the rector.
The total or partial reproduction of academic and research works, or their use for any other purpose, must have the express permission of the author or authors of the works.
The director or dean of the school makes decisions regarding allegations about any aspects not covered in the regulations."

BIBLIOGRAPHY

Basic: