



## Course guides

### 370006 - 370006 - Visual System Anatomy

Last modified: 04/09/2020

**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:** 2020    **ECTS Credits:** 6.0    **Languages:** Catalan, Spanish

#### LECTURER

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**Coordinating lecturer:** SARA LLUCH MARGARIT (<http://futur.upc.edu/SaraLluchMargarit>)

**Others:** SARA LLUCH MARGARIT (<http://futur.upc.edu/SaraLluchMargarit>)  
ANNA BOZZANO

#### PRIOR SKILLS

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The knowledge acquired in the subject of Anatomy and Histology of the Head, taught in the first semester of the Optics and Optometry degree, will be the essential basis for understanding the anatomical characteristics of the organ of vision and its annexes.

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

CE02. (ENG) Determinar la funció dels aparells i sistemes del cos humà. Conèixer els principis i les bases dels processos biològics implicats en el funcionament normal del sistema visual. Reconèixer amb mètodes macroscòpics i microscòpics la morfologia i estructura de teixits, òrgans i sistemes del cos humà. Conèixer i descriure macroscòpicament i microscòpicament les estructures que componen el sistema visual i els annexes oculars. Conèixer la estructura cel·lular, el desenvolupament embrionari i la organogènesis. Determinar el desenvolupament del sistema visual. Conèixer els diferents microorganismes involucrats en les malalties del sistema visual. Conèixer les propietats i funcions dels diferents elements que componen el sistema visual.

CE07. (ENG) Conèixer i gestionar material i tècniques bàsiques de laboratori.

**Generical:**

CG11. (ENG) Situar la informació nova i la interpretació de la mateixa en el seu context.

**Transversal:**

CT5. Efficient use of information 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

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#### LEARNING OBJECTIVES OF THE SUBJECT

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1. To know the basic anatomical concepts
4. To know the visual system and the ocular adnexa structures both macroscopically and microscopically.



## STUDY LOAD

Type	Hours	Percentage
Hours medium group	45,0	30.00
Hours small group	15,0	10.00
Self study	90,0	60.00

**Total learning time:** 150 h

## CONTENTS

### 1. INTRODUCTION

**Description:**

1. Introduction to the visual system organization:

- Basic Anatomical Terms
- Axes and parametrics of the eyeball
- Situation and anatomical features of the annexes, the eyeball and the visual pathway

**Specific objectives:**

Be aware of the need to understand the basic anatomical and histological terms to properly apply them on the visual system structures

**Related activities:**

Lab Session 1 (introduction to the visual system) which will individually assessed after the session.

**Full-or-part-time:** 12h 30m

Theory classes: 3h

Laboratory classes: 2h

Self study : 7h 30m

### 2. OCULAR ADNEXA

**Description:**

Anatomical and histological features of the different human ocular annexes

2. Eyelids
3. Conjunctiva
4. Lacrimal system
5. Oculomotor muscles
6. Innervation of the ocular adnexa
7. Vascularization of the ocular adnexa

**Specific objectives:**

- Locate, identify and describe anatomically and histologically the different annexes that constitute the visual organ.
- List and define the structures of the vascular and nervous system related to the ocular annexes.
- Be aware of the importance of the concepts acquired in order to understand that any anomaly in both the histological and anatomical structure of the organ of vision can influence its proper functioning.

**Related activities:**

Lab sessions 2-4, which will be performed in groups of 2-3 students, and will be individually assessed after each session

**Full-or-part-time:** 67h 30m

Practical classes: 21h

Laboratory classes: 6h

Self study : 40h 30m



### 3. EYEBALL AND VISUAL PATHWAY

**Description:**

Anatomical and histological features of the human eye and the visual pathways

8 Outer coat (cornea, sclera and corneal limbus)

3.2 Middle coat (coroide, ciliary body and iris)

3.3 Lens, chambers and humors

3.4 Internal coat (retina)

3.5 Optical pathway (nerve, chiasm and optic tract; extrageniculate and geniculate pathways)

3.6 Ocular irrigation and innervation

**Specific objectives:**

- Locate, identify and describe anatomically and histologically the coats and intraocular structures that constitute the human eye.
- List and define the structures of the vascular and nervous system related to the eyeball.
- Know and describe both macroscopically and microscopically the structures that form the visual pathways.
- Be aware of the importance of the concepts acquired in order to understand that any anomaly in both the histological and anatomical structure of the organ of vision can influence its proper functioning.

**Related activities:**

Lab Sessions 5-7, which will be performed in groups of 2-3 students, and will be individually assessed after each session.

**Full-or-part-time:** 67h 30m

Practical classes: 21h

Laboratory classes: 6h

Self study : 40h 30m



## ACTIVITIES

### LABORATORY OF INTRODUCTION AND OF OCULAR ADNEXA

**Description:**

Laboratory sessions 1-4, related to the introductory concepts and to the ocular annexes, previously studied in the theoretical part.

The sessions will be held in groups of 2-3 students, lasting 2 hours, using histological sections, slides and / or anatomical models. As an autonomous learning and to facilitate the achievement of the objectives proposed, the student will find in Athena the workbook that must be filled out before the session.

At the end of the session, the student will be evaluated by an individual test, the result of which will be taken into account to calculate the final mark

**Specific objectives:**

Strengthening and assimilate the knowledge previously acquired in the theoretical classes, related to the eye annexes.

**Material:**

AVAILABLE IN ATENEA

- Detailed workbook with the questionnaire that the student must complete before the lab session
- Collections of images of the different annexes

AVAILABLE IN THE LABORATORY

- Histological sections
- Slides with anatomical and histological images
- Anatomical models
- Histological and anatomical atlas of the organ of vision

**Delivery:**

At the beginning of each session, the student must submit the pre-filled workbook.

**Full-or-part-time:** 20h

Laboratory classes: 8h

Self study: 12h



## EYEBALL LAB

### Description:

Laboratory sessions 5-7, related to the anatomical and histological aspects of the eyeball, studied in the theoretical part. The sessions will be held in groups of 2-3 students, lasting 2 hours, using histological sections, slides and / or anatomical models. As an autonomous learning and to facilitate the achievement of the objectives proposed, the student will find in Athena the workbook that must be filled out before the session. At the end of the session, the student will be evaluated by an individual test, the result of which will be taken into account to calculate the final mark

### Specific objectives:

Strengthening and assimilate the knowledge previously acquired in the theoretical classes, related to the eyeball.

### Material:

AVAILABLE IN ATENEA

Detailed workbook with the questionnaire that the student must complete before the lab session

Collections of images of the different annexes

AVAILABLE IN THE LABORATORY

Histological sections

Slides with anatomical and histological images

Anatomical models

Histological and anatomical atlas of the organ of vision

### Delivery:

At the beginning of each session, the student must submit the pre-filled workbook

### Full-or-part-time: 15h

Laboratory classes: 6h

Self study: 9h

## OPTIONAL EXERCISES

### Description:

The student will have in Athena a series of theoretical and / or practical exercises, optional and not evaluable, of autonomous learning, to strengthen the knowledge acquired in the theoretical classes.

### Specific objectives:

Strengthen the knowledge acquired in the theoretical classes.

### Material:

Optional exercises that will not count in the final mark of the subject.

### Full-or-part-time: 6h

Self study: 6h



### LABORATORY TESTS

**Description:**

Individual test in the laboratory.  
Resolution of questions and images of the aspects analyzed in the 7 laboratory sessions.  
The average of the scores of the seven tests represents 20% of the final mark of the subject.

**Specific objectives:**

Evaluate the knowledge gained in the laboratory sessions.

**Material:**

Workbook and images available at ATENEA  
Learning material available in the lab

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

Laboratory classes: 3h 30m

### THEORETICAL EVALUATION TESTS

**Description:**

Individual test in the classroom  
Completion of two exercises (VF test with penalty for wrong answer) related to the contents of the thematic blocks that will contain all the general learning objectives of the subject, thus demonstrating the solvency in the use of the information resources available to the student (transversal competence)  
The resolution of the tests represents 70% (35% + 35%) of the final mark of the subject.  
Specific, generic and transversal competences will be obtained provided that the final grade for the course is equal or superior than 5

**Specific objectives:**

- Demonstrate the ability to apply the anatomical and histological knowledge of the head and face acquired during the theoretical sessions.

**Material:**

Learning material available at ATENEA.  
Recommended bibliography.

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

Practical classes: 3h

### EUROPEAN DIPLOMA COMPETENCE

**Full-or-part-time:** 1h

Theory classes: 1h

## GRADING SYSTEM

There will be two theoretical exams: T1 and T2 (70%)  
Theoretical exam T1 (VF test with penalty for wrong answers; 35%)  
Theoretical exam T2 (VF test type with penalty for wrong answers; 35%)  
There will be seven practical tests: L (20%)  
Laboratory tests L1 to L6 (recognition of anatomical structures of the visual system; 2.85% each one)  
Participation in optional activities: PA (10%)  
$$\text{Nota final} = 0.35 \cdot T1 + 0.35 \cdot T2 + 0.2 \cdot L + 0.1 \cdot PA$$



## EXAMINATION RULES.

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- Attendance in both theory and laboratory sessions is mandatory.
- Attendance in all assessable activities is required.
- If any of the assessable activities is not performed, it will be considered as not scored (0).

## BIBLIOGRAPHY

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### Basic:

- Pipe, DM & Rapley LJ. Ocular anatomy and histology. 3rd ed. London: The Association of British Dispensing Opticians, 2008. ISBN 0900099224.
- Freddo, Thomas F. & Chaum, Edward. Anatomy of the Eye and Orbit. The clinical essentials. 1rta ed. Philadelphia: Wolters Kluwer Health, 2018. ISBN 978-1469873282.
- Remington, Lee Ann. Clinical anatomy of the visual system. 3rd ed. Oxford: Butterworth-Heinemann, 2012. ISBN 978-1-4377-1926-0.
- Forrester, John V. [et al.]. The eye: basic sciences in practice. 3rd ed. London: Saunders Elsevier, 2016. ISBN 9780702028410.
- Wilson-Pauwels, Linda [et al.]. Nervios craneales: en la salud y en la enfermedad. 3rd. Buenos Aires: Médica Panamericana, 2013. ISBN 9786077743811.
- Ansari, Mohammad Wakeel; Nadeem, Ahmed. Atlas of ocular anatomy . [Basel] : Springer International Publishing, 2016. ISBN 9783319427805.