

370513 - MOTILITAT - Binocular Motility and Perception

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

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Degree competences to which the subject contributes

Specific:

1. Anatomy, histology, physiology, biochemistry and neurophysiology of the visual system and the process of vision
2. Technical english applied to optics and optometry
3. Understanding the mechanism of imaging and information processing in the visual system.
4. Do properly binocular and accommodative tests.
5. Know interpret functional and health test results of the visual system.
6. Being able to take, treat, represent and interpret experimental data. "Use basic laboratory equipment and techniques"
7. Being able to perform literature searches.
8. Value the effects (perceptual changes) caused by the glasses, optical aids and protection elements in the visual system.
9. Value the need to realize complementary tests. Realize and interpret correctly the results of these tests (visual field, layouts,...)

Generical:

10. Acquire communication techniques appropriate to ensure the success of teamwork
11. Define the general objectives and to carry out a specific group
12. Display information orally and in writing of reasonably and coherent.
13. Extract the main points of a text or any source of information (oral or written)
14. Encourage methodical work, rigorous, consistent and innovative
15. Reflect and be able to make a critic of the knowledge and developed skills and the level of achievement.
16. Synthesize and organize information to convey it effectively orally and / or written
17. Locate new information and the interpretation of it in its context.
18. Working with evidence, methodology and rigour.

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Teaching methodology

On the one hand the controlled learning hours consist of lectures (large group) in which the teachers make a brief introduction to the general learning objectives related to the basic concepts of matter. On the other hand, also consist of take classes of practice exercises and / or problems (group average) related to specific learning objectives of the content of the subject. It works, generally in groups of 3 or 4 students.

Through practical exercises we try to motivate and engage students to participate actively in their learning.

The support material to work the concepts of the course will be available on the platform Atenea.

In lab activities, presentation and exhibition of a specific subject and class exercises and problems are useful to incorporate some generic skills such as teamwork and cooperative learning, among others.

The lab can develop basic instrumental skills, and students started the application of scientific method in solving problems in the laboratory.

Usually after each proposed theoretical session and laboratory are proposed some tasks outside the classroom, to be working either individually or in groups.

Learning objectives of the subject

At the end of the course Binocular motility and perception, the student should be able to:

Deduct the actions of all the extra ocular muscles from any position of gaze.

-Know the different types of monocular and binocular movements.

-Understand all parameters related to binocular vision, in motor and perceptual level.

-Understand and manage equipment, instruments and techniques for the analysis of a binocular visual system.

-Understand the operation of any system of dissociation and properly interpret the perception of a patient with any heterophoria or heterotropia.

-Measuring and representing the relationship between convergence and accommodation of a healthy binocular visual system.

-Know all the systems for obtaining stereoscopic perception from flat images, and their use to obtain the stereoscopic acuity of a patient.

-Identify the different degrees of fusion.

-Describe the binocular summation models.

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 TO THE BINOCULAR VISION</p>	<p>Learning time: 12h Theory classes: 2h 30m Practical classes: 0h 30m Laboratory classes: 2h Guided activities: 0h Self study : 7h</p>
<p>Description: This content is worked:</p> <p>Conditions for binocular vision. Types of ocular stimulation. Binocular visual field. Binocular field of fixation. Neural transmission and fusion of the eye images. Degrees of view simultaneously. Visual space and physical space.</p> <p>Related activities: It carried out activities 1, 9, 11 and 12.</p>	
<p>2. MONOCULAR AND BINOCULAR MOTILITY</p>	<p>Learning time: 17h Theory classes: 5h 30m Practical classes: 0h 30m Laboratory classes: 2h Guided activities: 0h Self study : 9h</p>
<p>Description: This content is worked:</p> <p>Monocular motility: Position of the eyes in the head. Plans and reference axes. Ductions. Law Donders and Listing of law. Modeling the extrinsic muscles. Action of the extraocular muscles. Sinergistes antagonist muscles and dissection. Sherrington Law. Oculomotor diagrams.</p> <p>Binocular motility: Versions. Convergence. Normal binocular movements. Sinergistes contralateral muscles and antagonists. Law of equal innervation Hering.</p> <p>TYPES OF EYE MOVEMENTS: Functions of eye movements. Eye movements to maintain the look. Eye movements to shift gaze. Eye movements of fixation.</p> <p>Related activities: We carried out the activities 2, 9, 11 and 12</p>	

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<p>3. HETEROPHORIA AND ASTIGMATISM</p>	<p>Learning time: 12h</p> <p>Theory classes: 3h 30m Practical classes: 2h 30m Laboratory classes: 0h Guided activities: 0h Self study : 6h</p>
<p>Description: This content is worked:</p> <p>HETEROPHORIA: Positions of rest, fixation and fusion. Type of convergence. Definition and classification of heterofòries. Dissociadors systems. Perception of heterofòric. Quantification of heterofòries. Effect of prisms in the binocular visual system.</p> <p>ASTIGMATISM: Definition and classification of astigmatism. Detection of strabismus. Measure the angles of primary and secondary deviation. Effect of prisms in the binocular visual system.</p> <p>Related activities: It carried out activities 9 and 11.</p>	
<p>4. BINOCULAR CONVERGENCE AND ACCOMMODATION</p>	<p>Learning time: 27h 30m</p> <p>Theory classes: 4h Practical classes: 3h 30m Laboratory classes: 4h Guided activities: 0h Self study : 16h</p>
<p>Description: This content is worked:</p> <p>Distance interpupil up and baseline. Notations of convergence. Line demand. ACA Value: gradient method, the method of straight Foris. Value CPA. Zone Vision Binocular Simple and clear. Anomalies of convergence and divergence.</p> <p>Related activities: It carried out activities 3, 4, 10, 11 and 12.</p>	

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<p>5. VISUAL DIRECTIONS</p>	<p>Learning time: 23h 30m</p> <p>Theory classes: 5h Practical classes: 3h 30m Laboratory classes: 2h Guided activities: 0h Self study : 13h</p>
<p>Description:</p> <p>Del:</p> <p>Al:</p> <p>3. PROVES INDIVIDUALS D'AVALUACIÓ CONTÍNUA (CONTINGUT 1) volumetries acid-base Realització individual d'exercicis del contingut de bioquímica general que cobreixin part dels objectius específics d'aprenentatge del contingut. Exercicis de preguntes d'enunciat curt. Correcció per part del professorat. Guia d'apunts teòrics disponibles a través del campus virtual ATENEA i bibliografia recomanada (no utilitzables durant el moment de les proves). Resolució dels exercicis per part de l'estudiant, que el professor avaluarà. El conjunt de tots els exercicis representa una part de l'avaluació de l'assignatura (15%). En finalitzar l'activitat, l'estudiant ha de ser capaç de: - Definir i explicar en concepte de glícid i les seves principals funcions biològiques. - Classificar els diferents grups de glícids. - Descriure la estructura i les característiques dels principals grups de glícids i els seus derivats. - Definir el concepte d'aminoàcid. - Descriure l'estructura i les propietats dels diferents grups d'aminoàcids. - Definir i diferenciar entre el concepte de pèptid i el de proteïna. - Explicar els principis estructurals de les proteïnes i els factors que determinen el seu plegament tridimensional. Descriure les principals propietats físico-químiques de les proteïnes i explicar el concepte de desnaturalització. - Enumerar les principals funcions biològiques de les proteïnes. - Enumerar les modificacions postraduccional mes comunes de les proteïnes. - Descriure l'estructura, els tipus i les funcions dels col·làgens. - Definir el concepte de proteïna enzimàtica. - Explicar les característiques funcionals dels enzims. - Classificar els diferents tipus d'enzims. - Explicar i diferenciar entre el concepte de coenzim i el de cofactor - Descriure la influència de les concentracions del sostrat, del producte i de l'enzim, junt amb la temperatura i el pH, sobre la velocitat de las reacciones enzimàtiques. - Explicar els principals mecanismes moleculars d'inhibició enzimàtica. - Descriure el concepte i les característiques estructurals dels diferents grups de lípids. - Descriure la importància biològica dels diferents grups de lípids i els seus derivats. - Explicar i esquematitzar l'estructura bàsica de les biomembranes. - Explicar els principis bàsics del funcionament del metabolisme oxidatiu. - Descriure el significat biològic de la cadena respiratòria cel·lular i la utilització de l'energia metabòlica. - Descriure el significat fisiològic de la degradació de la glucosa per la via de la glucòlisi i per la via de les pentoses fosfat. - Descriure el destí metabòlic del piruvat i el seu significat fisiològic. - Calcular el balanç energètic de la degradació total o parcial d'una molècula de glucosa. - Descriure el significat fisiològic de la via del sorbitol. - Descriure el significat fisiològic del cicle dels àcids tricarboxílics.</p> <p>traducció del catalán al inglés</p> <p>5. VISUAL DIRECTIONS</p> <p>This content is worked:</p> <p>CORRESPONDENCE Retinal Location of objects in space. Local sign. Monocular visual direction. Oculocèntric system. Vernier acuity. Corresponding points. Egocentre visual. Binocular visual direction.</p> <p>HOROPTER AND SPACE Panum: Binocular Disparity. The geometric horòpter. Criteria for obtaining the empirical horòpter. Comparison between the geometric and empirical horòpter. Modelling of Ogle. Panum areas and space. Laws of visual direction. Effects of heterofòria or strabismus.</p> <p>Related activities:</p>	

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It carried out activities 5, 10, 11 and 12.

6. DISTANCE AND VISUAL STEREOPSIS

Learning time: 23h

Theory classes: 4h 30m
Practical classes: 3h 30m
Laboratory classes: 2h
Guided activities: 0h
Self study : 13h

Description:

This content is worked:

Depth empirical factors: ocular and monocular. Stereopsis. Estereoagudeses. Scope stereo. Chromatic stereopsis. Principle of operation of stereoscopes. Techniques for generating stereographs. Technical view stereographs. Measuring estereoagudeses with stereoscopes.

Related activities:

It carried out activities 6, 11 and 12.

7. ANISOMETROPIA AND ANISEIKONIA

Learning time: 23h

Theory classes: 4h 30m
Practical classes: 3h 30m
Laboratory classes: 2h
Guided activities: 0h
Self study : 13h

Description:

This content is worked:

Classification of anisometropia. Problems arising from neutralization of anisometropia. Definition and types of aniseiconia. Eiconometria direct comparison. Calculation of the ellipse anisoicònica. Neutralization of aniseiconia. Distortion in the perception of space: space eiconòmetre.

Related activities:

It carried out activities 7, 11 and 12.

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8. MERGER AND SUMMATION BINOCULAR	Learning time: 12h Theory classes: 2h 30m Practical classes: 0h 30m Laboratory classes: 2h Guided activities: 0h Self study : 7h
<p>Description: This content is worked:</p> <p>Fusion motor. Sensory Fusion. Central and peripheral fusion. Disparity of fixation. Anomalous retinal correspondence. Binocular rivalry. Monocular suppression. Binocular suppression. Types of ocular dominance. Models of binocular summation.</p> <p>Related activities: The activities carried out 8, 11 and 12.</p>	

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Planning of activities

1. LABORATORY. VISUAL FIELD AND BINOCULARS FIXING FIELD (CONTENTS 1)	Hours: 2h Laboratory classes: 2h
<p>Description: Practice should be done in the laboratory in groups of up to 3 guests, lasting 2 hours. The laboratory has carried out the experimental and data collection. As a self-directed learning are planned two activities: a pre-experiment, in which the student has a reading of the script in order to answer a series of oral questions which arise the teacher to identify learning prelaboratori (identification objectives) and the other after the experiment, in which the student must do a data processing and a summary report to identify learning postlaboratori (drawing of conclusions).</p> <p>Support materials: All materials for the realization of the experiment is specified in the script of practice available to Atenea.</p> <p>Descriptions of the assignments due and their relation to the assessment: Register by the teachers check the students' independent learning prelaboratori and laboratory work, checking with the experimental data. Delivery, the next meeting, in memory of practical conclusions and data processing. Be corrected and returned with feedback for the teachers in the same session. It represents half of the lab note.</p> <p>Specific objectives:</p> <p>At the end of practice the student or student should be able to:</p> <ul style="list-style-type: none"> - Distinguish between the concepts of visual field and binocular field binocular fixation. - Become familiar with the different methodologies for measuring the binocular field. - Mastering the graphic representation of data. 	
2. LABORATORY. OCULAR MOTILITY (CONTENT 2)	Hours: 2h Laboratory classes: 2h
<p>Description: Practice should be done in the laboratory in groups of up to 3 guests, lasting 2 hours. The laboratory has carried out the experimental and data collection. As a self-directed learning are planned two activities: a pre-experiment, in which the student has a reading of the script in order to answer a series of oral questions which arise the teacher to identify learning prelaboratori (identification objectives) and the other after the experiment, in which the student must do a data processing and a summary report to identify learning postlaboratori (drawing of conclusions).</p> <p>Support materials: All materials for the realization of the experiment is specified in the script of practice available to Atenea.</p> <p>Descriptions of the assignments due and their relation to the assessment: Register by the teachers check the students' independent learning prelaboratori and laboratory work, checking with the experimental data. Delivery, the next meeting, in memory of practical conclusions and data processing. Be corrected and returned with feedback for the teachers in the same session. It represents half of the lab note.</p>	

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Specific objectives:

At the end of practice the student or student should be able to:

- Understand the methodology used to obtain eye records.
- Identify the different types of eye movements obtained from the records.
- To clear the angle of false twisting.

3. LABORATORY. ACA RELATION (CONTENT 4)

Hours: 2h

Laboratory classes: 2h

Description:

Practice should be done in the laboratory in groups of up to 3 guests, lasting 2 hours. The laboratory has carried out the experimental and data collection. As a self-directed learning are planned two activities: a pre-experiment, in which the student has a reading of the script in order to answer a series of oral questions which arise the teacher to identify learning prelaboratori (identification objectives) and the other after the experiment, in which the student must do a data processing and a summary report to identify learning postlaboratori (drawing of conclusions).

Support materials:

All materials for the realization of the experiment is specified in the script of practice available to Atenea.

Descriptions of the assignments due and their relation to the assessment:

Register by the teachers check the students' independent learning prelaboratori and laboratory work, checking with the experimental data.

Delivery, the next meeting, in memory of practical conclusions and data processing. Be corrected and returned with feedback for the teachers in the same session.

It represents half of the lab note.

Specific objectives:

At the end of practice the student or student should be able to:

- Understand the routine measurement of horizontal heterofories.
- To show the relation between the parameters convergence and binocular accommodation.
- Justifying abnormal responses of the patient.
- Mastering the calculation of linear regression.

4. LABORATORY. SHARP AND SIMPLE BINOCULAR VISION AREA (CONTENT 4)

Hours: 2h

Laboratory classes: 2h

Description:

Practice should be done in the laboratory in groups of up to 3 guests, lasting 2 hours. The laboratory has carried out the experimental and data collection. As a self-directed learning are planned two activities: a pre-experiment, in which the student has a reading of the script in order to answer a series of oral questions which arise the teacher to identify learning prelaboratori (identification objectives) and the other after the experiment, in which the student must do a data processing and a summary report to identify learning postlaboratori (drawing of conclusions).

Support materials:

All materials for the realization of the experiment is specified in the script of practice available to Atenea.

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Descriptions of the assignments due and their relation to the assessment:

Register by the teachers check the students' independent learning prelaboratori and laboratory work, checking with the experimental data.

Delivery, the next meeting, in memory of practical conclusions and data processing. Be corrected and returned with feedback for the teachers in the same session.

It represents half of the lab note.

Specific objectives:

At the end of practice the student or student should be able to:

- Understand the routine measurement area binocular vision simple and clear.
- Decide what data correctly correspond to different lines limiting the area of binocular vision simple and clear.
- Justifying abnormal responses of the patient.
- Mastering the calculation of linear regression.

5. LABORATORY. VISUAL DIRECTIONS (CONTENT 5)

Hours: 2h

Laboratory classes: 2h

Description:

Practice should be done in the laboratory in groups of up to 3 guests, lasting 2 hours. The laboratory has carried out the experimental and data collection. As a self-directed learning are planned two activities: a pre-experiment, in which the student has a reading of the script in order to answer a series of oral questions which arise the teacher to identify learning prelaboratori (identification objectives) and the other after the experiment, in which the student must do a data processing and a summary report to identify learning postlaboratori (drawing of conclusions).

Support materials:

All materials for the realization of the experiment is specified in the script of practice available to Atenea.

Descriptions of the assignments due and their relation to the assessment:

Register by the teachers check the students' independent learning prelaboratori and laboratory work, checking with the experimental data.

Delivery, the next meeting, in memory of practical conclusions and data processing. Be corrected and returned with feedback for the teachers in the same session.

It represents half of the lab note.

Specific objectives:

At the end of practice the student or student should be able to:

- Distinguish between the concepts of monocular and binocular visual direction.
- Understand the experimental method used in determining the visual directions.
- Identify the different types of physiological diplopia.

6. LABORATORY. STEREOPSIS (CONTENT 6)

Hours: 2h

Laboratory classes: 2h

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Description:

Practice should be done in the laboratory in groups of up to 3 guests, lasting 2 hours. The laboratory has carried out the experimental and data collection. As a self-directed learning are planned two activities: a pre-experiment, in which the student has a reading of the script in order to answer a series of oral questions which arise the teacher to identify learning prelaboratori (identification objectives) and the other after the experiment, in which the student must do a data processing and a summary report to identify learning postlaboratori (drawing of conclusions).

Support materials:

All materials for the realization of the experiment is specified in the script of practice available to Athena.

Descriptions of the assignments due and their relation to the assessment:

Register by the teachers check the students' independent learning prelaboratori and laboratory work, checking with the experimental data.

Delivery, the next meeting, in memory of practical conclusions and data processing. Be corrected and returned with feedback for the teachers in the same session.

It represents half of the lab note.

Specific objectives:

At the end of practice the student or student should be able to:

- Recognize different systems to generate stereoscopic vision.
- Become familiar with the psychophysical method of constant stimuli to measure the estereoagudesas.
- Mastering the graphic representation of data and extracting results from them.

7. LABORATORY. ANISOIKONIA (CONTENT 7)

Hours: 2h

Laboratory classes: 2h

Description:

Practice should be done in the laboratory in groups of up to 3 guests, lasting 2 hours. The laboratory has carried out the experimental and data collection. As a self-directed learning are planned two activities: a pre-experiment, in which the student has a reading of the script in order to answer a series of oral questions which arise the teacher to identify learning prelaboratori (identification objectives) and the other after the experiment, in which the student must do a data processing and a summary report to identify learning postlaboratori (drawing of conclusions).

Support materials:

All materials for the realization of the experiment is specified in the script of practice available to Atenea.

Descriptions of the assignments due and their relation to the assessment:

Register by the teachers check the students' independent learning prelaboratori and laboratory work, checking with the experimental data.

Delivery, the next meeting, in memory of practical conclusions and data processing. Be corrected and returned with feedback for the teachers in the same session.

It represents half of the lab note.

Specific objectives:

At the end of practice the student or student should be able to:

- Confirm the distortion of perception of space in the presence of anisoiconia.
- Differentiate the perspective of the anisoiconia anisoiconia luminance.

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8. LABORATORY. MERGER (CONTENT 8)	Hours: 2h Laboratory classes: 2h
<p>Description: Practice should be done in the laboratory in groups of up to 3 guests, lasting 2 hours. The laboratory has carried out the experimental and data collection. As a self-directed learning are planned two activities: a pre-experiment, in which the student has a reading of the script in order to answer a series of oral questions which arise the teacher to identify learning prelaboratori (identification objectives) and the other after the experiment, in which the student must do a data processing and a summary report to identify learning postlaboratori (drawing of conclusions).</p> <p>Support materials: All materials for the realization of the experiment is specified in the script of practice available to Atenea.</p> <p>Descriptions of the assignments due and their relation to the assessment: Register by the teachers check the students' independent learning prelaboratori and laboratory work, checking with the experimental data. Delivery, the next meeting, in memory of practical conclusions and data processing. Be corrected and returned with feedback for the teachers in the same session. It represents half of the lab note.</p> <p>Specific objectives: At the end of practice the student or student should be able to: - To demonstrate the phenomena of fusion, suppression and binocular retinal rivalry. - Measure width of fusion.</p>	
9. CONTINUOUS ASSESSMENT TEST 1 (CONTENTS 1 TO 4)	Hours: 1h Practical classes: 1h
<p>Description: Individual written test conducted in the classroom, an hour, worked on the theoretical concepts to the contents 1, 2 and 3.</p> <p>Support materials: Provided by the Centre.</p> <p>Descriptions of the assignments due and their relation to the assessment: Resolution of the test. Represents 40% of the final grade for the course.</p> <p>Specific objectives: Assess the level of student learning.</p>	
10. CONTINUOUS ASSESSMENT TEST 2 (CONTENTS 5 TO 8)	Hours: 1h Practical classes: 1h
<p>Description: Individual written test conducted in the classroom, an hour, worked on the theoretical content to 4 and 5.</p> <p>Support materials: Provided by the Centre.</p>	

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Descriptions of the assignments due and their relation to the assessment:

Resolution of the test. Represents 40% of the final mark for the course.

Specific objectives:

Assess the level of student learning.

11. LABORATORY TEST

Hours: 1h

Practical classes: 1h

Description:

Individual written test conducted in the classroom, one hour, the concepts studied in the lab sessions.

Support materials:

Provided by the Centre.

Descriptions of the assignments due and their relation to the assessment:

Resolution of the test. Represents 20% of the final grade for the course.

Specific objectives:

Assess the level of student learning.

Qualification system

The final mark is the weighted sum of the following partial marks:

$$QF=0.4*PAC1+0.4*PAC2+0.2*PAL$$

QF: final results

PAC1: first test of continuous assessment

PAC2: second test of continuous assessment

PAL: laboratory test

Regulations for carrying out activities

- In case that PAC1's mark is < 4, it will be able to be recovered in the day of PAC2.
- It is an essential requirement that, previous to the laboratory sessions, the students read the practicals script. The lecturer will check it by means of an oral or written test. This positive evaluation of this issue does not score any mark while the negative will reduce the PAL mark. The attendance to the practicals is mandatory and each unattendance day will subtract PAL/n to the PAL's mark, being n the total amount of laboratory sessions.
- If any of the evaluation activities is not done it will be considered as non-rated.
- We control the attendance and student participation in the lectures.

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