Course guide
370013 - FONAMVB - Binocular Vision Bases

Last modified: 04/07/2025

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: 2025   **ECTS Credits:** 6.0   **Languages:** Catalan

LECTURER

Coordinating lecturer: José Luis Alvarez Muñoz. Titular d'Escola Universitària.
https://futur.upc.edu/JoseLuisAlvarezMunoz

Others: Pujol Ramo, Jaume. Catedràtic d'Universitat. https://futur.upc.edu/JaumePujolRamo

PRIOR SKILLS

Having studied Geometric Optics and Visual Optics.

REQUIREMENTS

Having studied Geometric Optics and Visual Optics.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE06. (ENG) The ability to recognise the eye as an optical system. The ability to understand the basic models of vision. The ability to understand ocular models and parameters.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.

Generical:
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.

Transversal:
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

TEACHING METHODOLOGY

MD1 (Participatory lecture on theoretical and practical content): 30 h
MD3 (Practical class on solving practical cases and/or exercises related to the subject content with the participation of students): 15 h
MD4 (Laboratory practices): 15 h
MD5 (Reading of teaching materials, texts and articles related to the subject content): 3 h
MD6 (Completion of problems, exercises, assignments and resolution of doubts through the Atenea virtual campus): 5 h
MD7 (Tutorials): 5 h

Self-learning tasks:
- Prior preparation of laboratory practices: 7 h
- Resolution and processing of data from laboratory practices: 14 h
- Resolution of proposed problems: 10 h
- Study of theoretical and practical content: 43 h
- Search for information to answer an Atenea questionnaire to assess CT5: 3h

To access the laboratory it will be necessary to It is compulsory to fill out a form for the corresponding practice. 10% of the grade obtained with these forms will be added to the grade for the laboratory test as bonus points.

To follow the subject well, it is necessary to look at Athena frequently.

LEARNING OBJECTIVES OF THE SUBJECT

. Knowledge of the principles and competence to diagnose and recommend treatment
for accommodative, binocular vision and ocular motility abnormalities.

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

T1.- INTRODUCCIÓ A LA VISIÓ BINOCULAR

Description:
Condicions per a la visió binocular. Tipus d'estimulacions del sistema visual binocular. Camp visual binocular. Camp de fixació binocular. Transmissió neural i camp visual conjunt. Graus de visió simultània. Espai visual i espai físic

Specific objectives:
OE3 Understand all parameters related to binocular vision, both at the motor and perceptual level.
OE4 Know and handle basic materials, instruments and techniques for the analysis of a binocular visual system.
OE8 Identify the causes of loss of fusion.

Related activities:
P1, PAT1, PAL, IP

Related competencies :
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 15h
Practical classes: 4h
Laboratory classes: 2h
Self study : 9h

T2.- MONOCULAR MOTILITY

Description:
Position of the eyes in the head. Planes and axes of reference. Ductions.
Action of the extraocular muscles. Synergistic and antagonistic homolateral muscles.
Donders' law and Listing's law.

Specific objectives:
OE2 Know the different types of monocular and binocular movements.
OE3 Understand all the parameters related to binocular vision, both at the motor and perceptual levels.

Related activities:
PAT1

Related competencies :
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision.
Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 10h
Practical classes: 4h
Self study : 6h

T3.- BINOCULAR MOTILITY

Description:
Versions and vergences. Diagnostic field of action. Contralateral synergistic muscles.
Hering's law of equal innervation. Habitual binocular movements.

Specific objectives:
OE2 Know the different types of monocular and binocular movements.
OE3 Understand all the parameters related to binocular vision, both at the motor and perceptual levels.

Related activities:
PAT1

Related competencies :
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision.
Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 10h
Practical classes: 4h
Self study : 6h

T4.- HETEROPHORIAS AND STRABISMUS.

Description:
Resting, fixation and fusion positions. Types of convergences. Definition and classification of heterophorias.
Dissociative systems and perception of the heterophoric. Effect of prisms on the binocular visual system.
Anisophoria. Strabismus.

Specific objectives:
OE3 Understand all parameters related to binocular vision, both at the motor and perceptual level.
OE4 Know and handle basic materials, instruments and techniques for the analysis of a binocular visual system.
OE5 Understand the functioning of any dissociation system and adequately interpret the perception of a patient with any type of heterophoria or heterotropia.

Related activities:
P2, PAT1, PAL, IP

Related competencies :
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 17h 30m
Practical classes: 5h
Laboratory classes: 2h
Self study : 10h 30m

T5.- BINOCULAR CONVERGENCE AND ACCOMMODATION.

Description:
Interpupillary distance and baseline. Convergence notations. Donders line. ACA ratio and CPA ratio.
Zone of simple and sharp binocular vision. Comfort conditions for prism prescription.
Effect of refractive error neutralization on VB.

Specific objectives:
OE3 Understand all parameters related to binocular vision, both at the motor and perceptual level.
OE4 Know and handle basic materials, instruments and techniques for the analysis of a binocular visual system.
OE6 Measure and represent the relationship between convergence and accommodation of a healthy binocular visual system.

Related activities:
P3, PAT2, PAL, IP

Related competencies :
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 25h
Practical classes: 8h
Laboratory classes: 2h
Self study : 15h

T6.- VISUAL DIRECTIONS.

Description:
Adreça visual monocular. Correspondència retinal o binocular. Adreça visual binocular. Tipus de dominància.
Disparitat binocular. Correspondència retinal geomètrica. L'horòpter geomètric o teòric. L'horòpter empíric.

Specific objectives:
OE3 Understand all parameters related to binocular vision, both at the motor and perceptual level.
OE7 Know and interpret the parameters that assess the perception of objects in space
OE8 Identify the causes of loss of fusion.

Related activities:
P4, PAT3, PAL, IP

Related competencies :
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision.
Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in
communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of
results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment
tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests
relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients.
Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of
types of clinical care. Describe the protocols that are applied to patients.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of
vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the
retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement.
Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained
from an assessment of visual perception.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization,
analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 16h 30m
Practical classes: 4h 30m
Laboratory classes: 2h
Self study : 10h

T7.- PANUM AREA, FUSION AND FIXATION DISPARITY.

Description:
Panum's area and space. Laws of visual direction. Type of fusion. Binocular rivalry.
Binocular suppression. Monocular suppression. Fixation disparity.

Specific objectives:
OE3 Understand all parameters related to binocular vision, both at the motor and perceptual level.
OE7 Know and interpret the parameters that assess the perception of objects in space
OE8 Identify the causes of loss of fusion.

Related activities:
P5, PAT3, PAL, IP

Related competencies :
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 21h
Practical classes: 6h 30m
Laboratory classes: 2h
Self study : 12h 30m

T8.- VISUAL DISTANCE AND STEREOPSY.

Description:
Empirical factors of depth perception. Binocular factors of depth perception.
Operating principle of stereoscopes. Stereoacuity and stereotests. Stereopsis under special stimulation conditions.

Specific objectives:
OE3 Understand all parameters related to binocular vision, both at the motor and perceptual level.
OE7 Know and interpret the parameters that assess the perception of objects in space
OE9 Know all the systems for obtaining stereoscopic perception from flat images and their use to obtain a patient's stereoacuity.

Related activities:
P6, PAT3, PAL, IP

Related competencies :
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 16h 30m
Practical classes: 4h 30m
Laboratory classes: 2h
Self study : 10h

TT9.- ANISOMETROPIA AND ANISOICONIA.

Description:
Classification of anisometropia. Problems arising from the neutralization of anisometropia.
Definition and types of anisoiconia. Eiconometry of direct comparison. Neutralization of anisoiconia. Distortion in the perception of space.

Specific objectives:
OE3 Understand all the parameters related to binocular vision, both at the motor and perceptual level.
OE8 Identify the causes of fusion loss.
OE10 Identify anisoiconia and know its neutralization systems.

Related activities:
P7, PAT3, PAL, IP

Related competencies :
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CE06. (ENG) The ability to recognise the eye as an optical system. The ability to understand the basic models of vision. The ability to understand ocular models and parameters.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 18h 30m
Practical classes: 5h 30m
Laboratory classes: 2h
Self study : 11h

ACTIVITIES

P1.- Binocular visual field and binocular fixation field.

Description:
Practice to be carried out in the laboratory, in groups of up to 3 people, with a duration of 2 hours. The experimental part and the data collection must be carried out in the laboratory
as directed autonomous learning, two activities are planned:
- one prior to the experiment, in which the student has read the script in order to answer a series of oral questions
that the teacher will ask to identify the pre-laboratory learning (identification of the objectives);
and the other, after the experiment, in which the student must carry out a data processing and a summary report,
to identify the post-laboratory learning (drawing conclusions).

Specific objectives:
At the end of the practice, the student should be able to:
- Differentiate between the concepts of binocular visual field and binocular fixation field.
- Become familiar with the different methodologies for measuring binocular fields.
- Master the graphical representation of data.

Material:
All the material for carrying out the experiment is specified in the practice script, available at ATENEA.

Delivery:
Teachers record the verification of students' pre-laboratory independent learning and laboratory work,
with verification of experimental data.
The laboratory report is handed in at the following session, with conclusions and data processing.
It is returned corrected and with the corresponding feedback from the teachers in the same session.
It represents half of the laboratory grade.

Related competencies :
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CE06. (ENG) The ability to recognise the eye as an optical system. The ability to understand the basic models of vision. The ability to understand ocular models and parameters.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 2h
Laboratory classes: 2h

P2.- ACA relation.

Description:
Practice to be carried out in the laboratory, in groups of up to 3 people, with a duration of 2 hours.
The experimental part and the obtaining of data must be carried out in the laboratory.
As directed autonomous learning, two activities are planned: one prior to the experimentation,
in which the students have read the script in order to answer a series of oral questions that
they will ask the teaching staff to identify the pre-laboratory learning (identification of the objectives);
and the other, after the experimentation, in which the student must carry out a data processing and a summary report,
to identify the post-laboratory learning (drawing conclusions).

Specific objectives:
En finalitzar la pràctica l'estudiant o estudianta ha de ser capaç de:
- Conèixer la rutina de mesura de les heterofòries horitzontals.
- Posar de manifest la relació entre els paràmetres convergència i acomodació binocular.
- Justificar respostes anòmales del pacient.
- Dominar el càlcul de regressió lineal.

Material:
All the material for carrying out the experiment is specified in the practice script, available at ATENEA.

Delivery:
Registre per part del professorat de la comprovació de l'aprenentatge autònom prelaboratori de l'estudiant i del treball al laboratori, amb la comprovació de les dades experimentals.
Lliurament, la següent sessió, de la memòria de pràctiques amb les conclusions i el tractament de les dades. Es torna corregit i amb la correspondent retroalimentació del professorat a la mateixa sessió.
Representa la meitat de la nota de laboratori.

Related competencies :
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CE06. (ENG) The ability to recognise the eye as an optical system. The ability to understand the basic models of vision. The ability to understand ocular models and parameters.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 2h
Laboratory classes: 2h

P3.- Zone of simple and clear binocular vision.

Description:
Practice to be carried out in the laboratory, in groups of up to 3 people, with a duration of 2 hours.
The experimental part and the obtaining of data must be carried out in the laboratory.
As directed autonomous learning, two activities are planned:
- one prior to the experiment, in which the students have read the script in order to answer a series of oral questions that
will be asked to the teaching staff to identify the pre-laboratory learning (identification of the objectives);
and the other, after the experiment, in which the students must carry out a data processing and a summary report,
to identify the post-laboratory learning (drawing conclusions).

Specific objectives:
At the end of the practice, the student must be able to: - Conèixer the measurement routine of the simple and clear binocular vision zone.
- Decide correctly which details correspond to the different straight limits of the area of â□□â□□simple and clear binocular vision.
- Justify the patient's abnormal responses.
- Master the calculation of linear regression.

Material:
All the material for carrying out the experiment is specified in the practice script, available at ATENEA.

Delivery:
Teachers record the verification of students' pre-laboratory independent learning and laboratory work, checking the experimental data.
The laboratory report is handed in at the following session with the conclusions and data processing.
It is returned corrected and with the corresponding feedback from the teachers in the same session.
It represents half of the laboratory grade.

Full-or-part-time: 2h
Laboratory classes: 2h

P4.- The horopter.

Description:
Practice to be carried out in the laboratory, in groups of up to 3 people, with a duration of 2 hours.
The experimental part and the data collection must be carried out in the laboratory as directed autonomous learning, two activities are planned:
one prior to the experiment, in which the students have read the script in order to answer a series of oral questions that will be posed to the teaching staff
in order to identify the pre-laboratory learning (identification of the objectives);
and the other, after the experiment, in which the students must carry out a data processing and a summary report, to identify the post-laboratory learning (drawing conclusions).

Specific objectives:
At the end of the practice, the student should be able to:
- Differentiate the concepts of monocular and binocular visual direction.
- Understand the experimental method used to determine visual directions.
- Identify the different types of physiological diplopia.

Material:
All the material for carrying out the experiment is specified in the practice script, available at ATENEA.

Delivery:
Teachers record the verification of students' pre-laboratory independent learning and laboratory work, checking the experimental data.
The laboratory report is handed in at the following session with the conclusions and data processing.
It is returned corrected and with the corresponding feedback from the teachers in the same session.
It represents half of the laboratory grade.

Full-or-part-time: 2h
Laboratory classes: 2h

P5.- Panum areas.

Description:
Practice to be carried out in the laboratory, in groups of up to 3 people, with a duration of 2 hours.
The experimental part and the data collection must be carried out in the laboratory as directed autonomous learning, two activities are planned:
one prior to the experiment, in which the student has read the script in order to answer a series of oral questions that will be posed to the teacher
in order to identify the pre-laboratory learning (identification of the objectives);
and the other, after the experiment, in which the student must carry out a data processing and a summary report, to identify the post-laboratory learning (drawing conclusions).

Specific objectives:
At the end of the practice, the student should be able to:
- Understand the mechanism of fusion.
- Understand the origin of the Panum space.
- Understand the experimental method used in determining the Panum areas.

Material:
All the material for carrying out the experiment is specified in the practice script, available at ATENEA.

Delivery:
Teachers record the verification of students' pre-laboratory independent learning and laboratory work, checking the experimental data.
The laboratory report is handed in at the following session with the conclusions and data processing.
It is returned corrected and with the corresponding feedback from the teachers in the same session.
It represents half of the laboratory grade.

Related competencies :
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CE06. (ENG) The ability to recognise the eye as an optical system. The ability to understand the basic models of vision. The ability to understand ocular models and parameters.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 2h
Laboratory classes: 2h

P6.- Stereoacuity.

Description:
Practice to be carried out in the laboratory, in groups of up to 3 people, with a duration of 2 hours.
The experimental part and the data collection must be carried out in the laboratory as directed autonomous learning, two activities are planned:
one prior to the experiment, in which the students have read the script in order to answer a series of oral questions that will be posed
to the teaching staff in order to identify the pre-laboratory learning (identification of the objectives);
and the other, after the experiment, in which the students must carry out a data processing and a summary report, to identify the post-laboratory learning (drawing conclusions).

Specific objectives:
At the end of the practice, the student should be able to:
- Recognize different systems for generating stereoscopic vision.
- Become familiar with the psychophysical method of constant stimuli for measuring stereoacuity.
- Master the graphical representation of data and the extraction of results from them.

Material:
All the material for carrying out the experiment is specified in the practice script, available at ATENEA.

Delivery:
Teachers record the verification of students' pre-laboratory independent learning and laboratory work, checking the experimental data.
The laboratory report is handed in at the following session with the conclusions and data processing.
It is returned corrected and with the corresponding feedback from the teachers in the same session.
It represents half of the laboratory grade.

Related competencies :
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CE06. (ENG) The ability to recognise the eye as an optical system. The ability to understand the basic models of vision. The ability to understand ocular models and parameters.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 2h
Laboratory classes: 2h

P7.- Merger.

Description:
Practice to be carried out in the laboratory, in groups of up to 3 people, with a duration of 2 hours.
The experimental part and the data collection must be carried out in the laboratory as directed autonomous learning, two activities are planned: one prior to
the experiment, in which the students have read the script in order to answer a series of oral questions that will be posed to the teaching staff
in order to identify the pre-laboratory learning (identification of the objectives); and the other,
after the experiment, in which the students must carry out a data processing and a summary report, to identify the post-laboratory learning (drawing conclusions).

Specific objectives:
At the end of the practice, the student should be able to:
- Recognize the different parameters that affect fusion.
- Measure the fusion amplitude.

Material:
All the material for carrying out the experiment is specified in the practice script, available at ATENEA.

Delivery:
Teachers record the verification of students' pre-laboratory independent learning and laboratory work, checking the experimental data.
The laboratory report is handed in at the following session with the conclusions and data processing.
It is returned corrected and with the corresponding feedback from the teachers in the same session.
It represents half of the laboratory grade.

Related competencies :
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CE06. (ENG) The ability to recognise the eye as an optical system. The ability to understand the basic models of vision. The ability to understand ocular models and parameters.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 2h
Laboratory classes: 2h

First Continuous Assessment Test (CAT1)

Description:
Individual written test carried out in the classroom, on the theoretical concepts worked on in contents 1, 2, 3, 4 and 5.

Specific objectives:
Assess the student's level of learning.

Material:
Provided by the Center.

Delivery:
Resolution of the test.
It represents 37.5% of the final grade for the subject.

Related competencies :
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CE06. (ENG) The ability to recognise the eye as an optical system. The ability to understand the basic models of vision. The ability to understand ocular models and parameters.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 2h
Practical classes: 2h

Second Continuous Assessment Test (CAT2)

Description:
Individual written test carried out in the classroom, on the theoretical concepts worked on in contents 6, 7, 8 and 9.

Specific objectives:
Assess the student's level of learning.

Material:
Provided by the Center.

Delivery:
Resolution of the test.
It represents 37.5% of the final grade for the subject.

Related competencies :
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CE06. (ENG) The ability to recognise the eye as an optical system. The ability to understand the basic models of vision. The ability to understand ocular models and parameters.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 2h
Practical classes: 2h

Laboratory Evaluation Test (LET)

Description:
Individual written test carried out in the classroom, on the concepts worked on in the laboratory sessions.

Specific objectives:
Assess the student's level of learning.

Material:
Provided by the Center.

Delivery:
Resolution of the test.
It represents 15% of the final grade for the subject.

Related competencies :
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CE06. (ENG) The ability to recognise the eye as an optical system. The ability to understand the basic models of vision. The ability to understand ocular models and parameters.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 1h 30m
Practical classes: 1h 30m

Internship Reports (IR)

Description:
Delivery of reports with the results and conclusions of the laboratory practices.

Specific objectives:
Assess the student's level of learning.

Material:
By students.

Delivery:
The week after the internship.
These reports have a weight of 10%.

Related competencies :
CG13. Demonstrate and interpret methods for critical analysis and theory development and apply them to the field of optometry.
CG4. Critically reflect on the clinical, scientific, ethical and social issues involved in the professional practice of optometry, understand the scientific foundations of optics and optometry and critically evaluate terminology, clinical trials and research methods related to optics and optometry.
CE06. (ENG) The ability to recognise the eye as an optical system. The ability to understand the basic models of vision. The ability to understand ocular models and parameters.
CE13. Understand the factors that limit retinal image quality. Demonstrate knowledge of the spatial and temporal aspects of vision. Carry out psychophysical tests to determine levels of visual perception. Demonstrate knowledge of the functioning of the retina as a receptor of radiant energy. Demonstrate knowledge of the basic models of vision of colour, shape and movement. Demonstrate knowledge of age-related changes in perceptual processes. Measure and interpret psychophysical data obtained from an assessment of visual perception.
CE20. Measure, interpret and treat refractive errors. Describe the sensory and oculomotor mechanisms of binocular vision. Identify the principles of and measure, interpret and treat accommodative and binocular vision anomalies. Demonstrate skills in communication, recording data and writing clinical histories. Demonstrate skills in the interpretation and clinical judgement of results of vision tests, to establish the most suitable diagnosis and treatment. Demonstrate skills in instrumental assessment tests of visual function and eye health. Carry out a complete medical history. Identify, apply and interpret instrumental tests relating to visual health problems. Demonstrate the clinical skills required for the examination and treatment of patients. Examine, diagnose and treat visual anomalies with an emphasis on differential diagnosis. Describe the nature and organisation of types of clinical care. Describe the protocols that are applied to patients.
CT5. Efficient use of informacion resources. To manage data and technical and scientific information adquisition, organization, analysis and visualization and to provide a critical appraisal of the results of this management

Full-or-part-time: 14h
Self study: 14h

EUROPEAN DIPLOMA IN OPTOMETRY COMPETENCES

Description:
This module contributes to the European Diploma in Optometry competencies indicated in the following link:
https://drive.google.com/drive/folders/1bwmHBsvkrGnY63DfXAnWZB_i0I2pXa-I?usp=drive_link

Full-or-part-time: 1h
Practical classes: 1h

GRADING SYSTEM

PEC1: First Continuous Assessment Test, which has a weight of 37.5%
PEC2: Second Continuous Assessment Test, which has a weight of 37.5%
IP: Handing in Practice Reports, which has a weight of 10%
PEL: Laboratory Assessment Test, which has a weight of 15%

The final grade for the course (CF) results from applying the following formula:
CF = 0.35 PEC1 + 0.35 PEC2 + 0.1 IP + 0.15 PEL

CT5 EVALUATION (Solvent use of information resources): Students will have to answer an Atenea questionnaire, prepared by the Library Service, about searching for information on a specific topic.

EVALUATION OF THE EUROPEAN DIPLOMA COMPETENCES: The competences will be evaluated with the theory and practical tests of the course.

The REEVALUATION consists of a written test that includes all the theoretical content and problems of the subject, as well as the contents of the laboratory practices, which has a weight of 100%.

EXAMINATION RULES.

In order to be assessed for the practical part, attendance at all laboratory sessions is mandatory. 16.67% of the overall practical grade (Practical Reports and Laboratory Assessment Test) will be deducted for each absence.

In the event of partial or total cheating in any of the assessment acts of the subject, the provisions of the Academic Regulations for Undergraduate and Master's Degree Studies at the UPC will apply:

"Irregular actions that may lead to a significant variation in the grade of one or more students constitute fraudulent performance of an assessment act. This action entails a descriptive grade of fail and a numerical grade of 0 for the assessment act and for the subject, without prejudice to the disciplinary process that may arise as a consequence of the acts carried out.
If the student considers the decision to be incorrect, he or she may file a complaint with the director or dean of the teaching centre and, if the response does not satisfy him or her, he or she may lodge an appeal with the rector.
The total or partial reproduction of academic or research works, or their use for any other purpose, must have the explicit authorization of the authors.
It is the responsibility of the director or dean of the teaching center to resolve objections regarding aspects not included in the regulations."

BIBLIOGRAPHY

Basic:
- Steinman, Scott B.; Steinman, Barbara A.; Garzia, Ralph P. Foundations of binocular vision: a clinical perspective. New York: McGraw-Hill, cop. 2000. ISBN 0838526705.
- Benjamin, William J.; Borish, Irvin M. Borish's clinical refraction [on line]. 2nd edition. St. Louis, MO: Butterworth Heinemann/Elsevier, cop. 2006 [Consultation: 11/06/2024]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=4635135. ISBN 0750675241.
- Rabbetts, Ronald B.; Bennett, Arthur G. Clinical visual optics. 4th ed. Edinburgh [etc.]: Elsevier/Butterworth Heinemann, 2007. ISBN 9780750688741.
- Goss, David A.; Hofstetter, Henry W. Ocular accommodation, convergence, and fixation disparity: a manual of clinical analysis [on line]. 2nd edition. Boston [etc.]: Butterworth-Heinemann, cop. 1995 [Consultation: 18/06/2024]. Available on: https://www-sciencedirect-com.recursos.biblioteca.upc.edu/book/9780750694971/ocular-accommodation-convergence-and-fixation-disparity. ISBN 0750694971.
- Scheiman, Mitchell; Wick, Bruce. Clinical management of binocular vision: heterophoric, accommodative, and eye movement disorders [on line]. 5th ed. Philadelphia, PA: Wolters Kluwer Health, 2020 [Consultation: 24/07/2024]. Available on: https://oce-ovid-com.recursos.biblioteca.upc.edu/book?SerialCode=02148837. ISBN 9781496399731.