VNIVERSITAT DE VALÈNCIA

Course Guide
43872 Optical and psychophysical methods of ocular evaluation

COURSE DATA

Data Subject	
Code	43872
Name	Optical and psychophysical methods of ocular evaluation
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
2175 - Master's Degree in Advanced Optometry and Vision Sciences	Faculty of Physics	1	First term

Subject-matter

Degree	Subject-matter	Character
2175 - Master's Degree in Advanced Optometry and Vision Sciences	8 - Optical and psychophysical methods of ocular evaluation	Obligatory

Coordination

Name	Department
FURLAN, WALTER DANIEL	280 - Optics and Optometry and Vision Sciences
LUQUE COBIJA, M JOSEFA	280 - Optics and Optometry and Vision Sciences

SUMMARY

The contents are organized into two basic blocks, with the following content:

Optical Methods: Principles of optical coherence tomography. Comparison with other techniques. Application to the anterior segment and the posterior segment.

Psychophysical Methods: Principles of psychophysical test design for the evaluation of the visual system. Psychophysical methods in clinical practice. Standard observer and result analysis. Implementation of psychophysical measurement methods. Review of psychophysical tests for research and clinical settings.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

The students need to be familiar with the contents of the subjects "Optometry", "Geometrical Optics" , "Physical Optics", "Visual Perception", Pathology, Biostatistics and Clinical Exploration Methods belonging to the study plan of the degree in Optics and Optometry.
It is advisable to have completed the subjects Shape and Color Vision and Vision of Movement and Depth.
Vector calculus, derivatives and primitives of elementary functions and elementary linear systems theory are required.

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

2175 - Master's Degree in Advanced Optometry and Vision Sciences

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Know how to work in multidisciplinary teams reproducing real contexts and contributing and coordinating their own knowledge with that of other branches and participants.
- Participate in, lead and coordinate debates and discussions, be able to summarize them and extract the most relevant conclusions accepted by the majority.
- Use different presentation formats (oral, written, slide presentations, boards, etc.) to communicate knowledge, proposals and positions.
- Proyectar sobre problemas concretos sus conocimientos y saber resumir y extractar los argumentos y las conclusiones más relevantes para su resolución.
- Tener capacidad de análisis crítico de la información especializada en los ámbitos propios del máster.

- Tener un compromiso ético y responsabilidad social, tanto en lo que compete a la componente asistencial ligada a la profesión de óptico-optometrista como a lo que respecta a la investigación clínica.
- Tener capacidad de trabajo en equipos multidisciplinares en el área de las ciencias de la salud.
- Manejo de técnicas de generación y control de estímulos por ordenador.
- Manejo de técnicas de control de respuesta de un observador en la aplicación de un test psicofísico.
- Conocer la legislación aplicable en el ejercicio profesional, con especial atención a las materias de de igualdad de género entre hombre y mujeres, derechos humanos, solidaridad, protección del medio ambiente y fomento de la cultura de la paz.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

The student should be able to:

1.Apply the correct criteria to define the characteristics of adapting stimulus, test stimulus, psychophysical task and measurement methods required to study a certain part of the visual system.

2. Generate and control simple stimuli in a colorimetrically characterized device.

3. Test real observers under the right conditions.

4. Analyze the results of a psychophysical test for detection of visual anomalies.

5. Understand the basis of the new techniques for anterior and posterior segment assessment.

6. Provide information on the technical characteristics of recently emerging instruments, especially optical coherence tomography.

7. Show comparatively the usefulness of the different exploring techniques that are used to analyze the ocular segments.

DESCRIPTION OF CONTENTS

1. Optical Coherence Tomography

Generalities. Types of scanning. Domains. Resolution and sensitivity.
Interpretation of images. Applications in retinal image and previous segment.

2. Optical quality measurement by double pass technique

Operating principle and applications.

3. Methods for clinical psycophysical test design

Hypothesis guiding test design. Clinical psychophysical methods. Combination of psychophysical and functional imaging techniques. Result analysis methods.

4. Revision of recent psychophysical techniques

Color vision tests. Pulsed and stationary paradigms. Perimetry tests.

WORKLOAD

ACTIVITY	Hours	% To be attended
Seminars	8,00	100
Theory classes	8,00	100
Laboratory practices	8,00	100
Preparation of evaluation activities	10,00	0
Preparing lectures	28,00	0
Preparation of practical classes and problem	7,00	0
TOTAL	**69,00**	

TEACHING METHODOLOGY

Lectures: exposition of the theoretical content, either in the classroom or online. Audiovisual methods will serve to illustrate the contents the examples.

Task-oriented sessions (seminars): group sessions when the students will solve, discuss and analyse real cases. Discussion among the members of the group will be encouraged, and the tasks will compute in the final evaluation. Online students will use the resources for group discussion in the "Aula Virtual".

Individual tutorials with the teacher. The "Aula Virtual" can be used for all the students.

Laboratory sessions, to apply theoretical content in practice, both in the laboratory and in the computer room.

EVALUATION

Written exam, 70% of the final marks.

Resolution of different tasks proposed to the students, either individually or in group, in any lab modality, 30% of the final marks.

If the tasks are not presented within the allotted time, the final qualification will be computed using only the written exam. Tasks with Urkund plagiarism index above 20% shall get zero points.

Both evaluation blocs contain two separate sections: Optical Methods and Psychophysical Methods, with the same weight. The qualification of all the elements must be greater than 3/10. This asessment procedure will be considered in the first examination round (January). In the second round (June) the score obtained in the continuous assesment part will be considered only if it improves the final score of the student. Otherwise, the 100% of the final score wil be given by the exam part exclusively.

REFERENCES

Basic

- J. Porter; et al. (Eds.) Adaptive Optics for Vision Science., Wiley, 2006.
- M. E. Brezinski. Optical Coherence Tomography: Principles and Applications (Academic Press, 2006).
- The Psychophysical Measurement of Visual Function. Thomas T. Norton, David A. Corliss, James E. Bailey, eds. Burlington, MA: Butterworth-Heinemann, 2002.
- CronlyDillon J. R. (Ed.) Vision and Visual Dysfunction, MacMillan Press, 1991.
- Rowe F., Visual Fields Via The Visual Pathway, Blackwells, 2006.

Additional

- Articles seleccionats de diferents revistes científiques especialitzades: Vision Research, Opthalmic and Physiological Optics, Optometry and Vision Science, Investigative Ophthalmology and Vision Science, etc
  - Artículos seleccionados de distintas revistas especializadas: Vision Research, Opthalmic and Physiological Optics, Optometry and Vision Science, Investigative Ophthalmology and Vision Science, etc
  - Selected papers from specialized scientific journals: Vision Research, Opthalmic and Physiological Optics, Optometry and Vision Science, Investigative Ophthalmology and Vision Science, etc