

**COURSE DATA****Data Subject**

Code	34295
Name	Psychophysics of vision
Cycle	Grade
ECTS Credits	9.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. Period year
1207 - Degree in Optics and Optometry	Faculty of Physics	2 Annual

Subject-matter

Degree	Subject-matter	Character
1207 - Degree in Optics and Optometry	10 - Visual perception I	Obligatory

Coordination

Name	Department
CAPILLA PEREA, PASCUAL	280 - Optics and Optometry and Vision Sciences
LUQUE COBIJA, M JOSEFA	280 - Optics and Optometry and Vision Sciences
PONS MORENO, ALVARO MAXIMO	280 - Optics and Optometry and Vision Sciences

SUMMARY

The Psychophysics of Vision course studies how to measure the visual system's response to different magnitudes and information will be combined to develop a perceptual response. It will also assess the conditions to be set for the proper establishment of a perceptual response, considering both the eye as a receptor of radiant energy from the point of view of the binocular coordination, with special attention to their applications in optometry.

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 student must have prior knowledge of anatomy and physiology of the eye and of Physiological Optics, ie the process of imaging in the human eye.

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

1207 - Degree in Optics and Optometry

- To know the sensory and oculomotor mechanisms of binocular vision.
- To be able to develop skills in the evaluation and interpretation of information from psychophysical data.
- To be able to recognize and to implement good scientific practices of measurement and experimentation in psychophysics.
- To be able to perform psychophysical tests to determine levels of visual perception.
- To know how the retina works as a receptor of radiant energy.
- To know the spatial and temporal aspects of vision.

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

The student must, at the end of the course, be able to apply the principles of psychophysics of vision in the usual processes of optometric clinical practice, linking the different theoretical methods of detection and diagnosis of visual problems that are used in this specialty.

In particular, you must know and correctly apply the systems for measuring visual perceptual parameters for use in clinical methodologies.

DESCRIPTION OF CONTENTS

1. Binocular Vision

Module 1: Binocular Vision

1. Introduction to the different aspects of the psychophysics of vision. Historical evolution of psychophysics. Evolution of vision in the human being.
2. Study and analysis of ocular kinematics and dynamics. Classification and measurement of ocular movements.
3. Analysis of binocular convergence: area of clear and haplopic binocular vision. Detection of convergence anomalies.
4. Binocular vision with prisms and their application in convergence anomalies.
5. From fusion to stereopsis. Binocular fusion, characteristics. Dominance and binocular prevalence.



- 6. The directional sense: the horopterus.
- 7. Measurement of distances in the visual system. Monocular distance and depth evaluation systems. Stereopsis.
- 8. Anisometropia. Characteristics of anyseiconia. Compensation of anyseiconia

2. Psychophysics of vision

Module 2: Psychophysics of vision

- 1. Sensitivity and adaptation. Radiance, luminance and luminosity: spectral sensitivity. Adaptation to darkness: the absolute threshold. Adaptation to light: incremental thresholds.
- 2. Spatial and temporal properties of vision. Spatial limits of vision: acuity and hyper acuity. Contrast sensitivity. Temporal properties of vision.
- 3. Color vision. Perceptual descriptors of color. Visual trivariance. Introduction to tristimulus colorimetry. Color discrimination. Appearance of isolated colors. Appearance of colors that are part of a scene. Abnormalities and deficiencies in color vision.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	45,00	100
Tutorials	22,50	100
Laboratory practices	22,50	100
Attendance at events and external activities	5,00	0
Development of group work	10,00	0
Development of individual work	10,00	0
Study and independent work	75,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	15,00	0
Preparing lectures	5,00	0
Preparation of practical classes and problem	10,00	0
TOTAL	225,00	

TEACHING METHODOLOGY

Live Activities



Theoretical and practical classes: class-campus (with possible modalities include blended or face) where taught the theoretical matter. They reinforce the use of audiovisual methods, which exemplify more clearly the theoretical and examples to develop. Exercises will develop practical application of theoretical contents.

Small Group Theory sessions:

These sessions dedicated to student group work, with suggested exercises to be analyzed and studied by the group. Interactivity will be sought through group presentations and classroom examples, made in continuous assessment.

Practical classes: on-campus classes that will develop the theoretical concepts into practical application in the laboratory. These classes, small group of maximum 16 students, will take place using many real systems such as virtual labs that can develop the student interactively.

Student work

- Theoretical study
- Development of work and issues raised in class
- Individual tutorials

EVALUATION

At the end of each semester an examination of multiple-choice questions will be performed on the developed theoretical blocks. Multiple-choice exams will subtract 1 correct question for each (n-1) response option. These exams may include an eliminatory block (of which will be informed at the beginning of the course) of a maximum of 10 questions, in which it is obligatory to approve to answer at least 7 questions correctly. The average grade of these two exams will compute 60% of the total grade. The work to be developed in seminar will be evaluated from the notes of continuous evaluation, attendance and the memory and exhibition of the final work. The note in this section will be 20% of the total grade. The practicum shall be evaluated by means of questionnaires covering the experiments, computations and models seen in the laboratory sessions, which must be delivered within the terms that will be announced at the beginning of each session. The qualifications of the practicum amounts to 20%



of the final marks.

REFERENCES

Basic

- Referencia b1: PONS AM, MARTÍNEZ VERDÚ, FM. Fundamentos de Visión Binocular. Publicacions de la Universitat de València. (2004)

Referencia b2: READING, R.W.: Binocular vision: Foundations and applications, Butterworths. (1983).

Referencia b3: ÓPTICA FISIOLÓGICA, PSICOFÍSICA DE LA VISIÓN
Artigas, J.M., Capilla, P., Felipe, A. y Pujol, J. McGraw-Hill InterAmericana. Madrid. (1995).

Additional

- Referencia c1: HOWARD IP, ROGERS BJ. Binocular vision and stereopsis. Oxford University Press. 1995.

Referencia c2: OGLE, K.N. Researches in Binocular Vision. W.B. Saunders Company. (1950).

Referencia c3: CARPENTER, R.H.S. Eye Movements. En Vision and visual dysfunction. Vol 8. Ed. Cronly-Dillon, J.R. Macmillan Press (1991).

REGAN, D.: Binocular Vision. En Vision and visual dysfunction. Vol. 9. Ed. Cronly-Dillon, J.R. Macmillan Press (1991)