COURSE DATA

DATA SUBJECT

Code: 34295
Name: Psychophysics of vision
Cycle: Undergraduate Studies
ECTS Credits: 9
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
1207 - Degree in Optics and Optometry	Facultat de Física	2	Annual

SUBJECT-MATTER

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

COORDINATION

PONS MORENO ALVARO MAXIMO

CAPILLA PEREA PASCUAL

SUMMARY

The course **Visual Psychophysics** examines how to measure the visual system's response to different stimuli and pieces of information that combine to elicit a perceptual response. It also explores the conditions that must be met for the proper generation of a perceptual response -both considering the eye as a receptor of radiant energy and from the perspective of binocular coordination- with special emphasis on its 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 / LEARNING OUTCOMES

1207 - Degree in Optics and Optometry

To be able to develop skills in the evaluation and interpretation of information from psychophysical data.

To be able to perform psychophysical tests to determine levels of visual perception.

To be able to recognize and to implement good scientific practices of measurement and experimentation in psychophysics.

To know how the retina works as a receptor of radiant energy.

To know the sensory and oculomotor mechanisms of binocular vision.

To know the spatial and temporal aspects of vision.

DESCRIPTION OF CONTENTS

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 steropsis. 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

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

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	22,50
Theory	45,00
Laboratory	22,50
Total hours	**90,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	5,00
Individual or group project	20,00
Independent study and work	80,00
Preparation of lessons	15,00
Preparation for assessment activities	15,00
Resolution of case studies	0,00
Total hours	**135,00**

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, withsuggested exercises to be analyzed and studied by the group. Interactivity will be soughtthrough group presentations and classroom examples, made in continuous assessment.

Practical classes: on-campus classes that will develop the theoretical concepts intopractical 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 developthe student interactively.

Student work

- Theoretical study

- Development of work and issues raised in class

- Individual tutorials

EVALUATION

The course assessment will consist of:
1) Written exam (60% of the final grade). At the end of each semester, a multiple-choice exam will be given on the theoretical sections covered. Multiple-choice exams will subtract 1 correct question for every (n-1) incorrect answer. These exams may include an eliminatory section (which will be announced at the beginning of the course) with a maximum of 10 questions, in which passing must involve answering at least 7 questions correctly. Each of these two exams will require obtaining at least a 3 out of 10 in order to be averaged with the other sections of the course. A lower grade will automatically require retaking this section of the course in the second sitting.

2) The seminar work (20% of the final grade). This will be assessed based on the continuous assessment scores, attendance, and the final project report and presentation. It cannot be retaken in the second sitting.

REFERENCES

Basic

- PONS AM, MARTÍNEZ VERDÚ, FM. Fundamentos de Visión Binocular. Publicacions de la Universitat de València. (2004)
- READING, R.W.: Binocular vision: Foundations and applications, Butterworths. (1983).
- ÓPTICA FISIOLÓGICA, PSICOFÍSICA DE LA VISIÓN Artigas, J.M., Capilla, P., Felipe, A. y Pujol, J. McGraw-Hill InterAmericana. Madrid. (1995).

Complementary

- HOWARD IP, ROGERS BJ. Binocular vision and stereopsis. Oxford University Press. 1995.
- OGLE, K.N. Researches in Binocular Vision. W.B. Saunders Company. (1950).
- 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)