26804 - Visual Optics I

Información del Plan Docente

Academic Year	2017/18
Faculty / School	100 - Facultad de Ciencias
Degree	297 - Degree in Optics and Optometry
ECTS	12.0
Year	1
Semester	Annual
Subject Type	Basic Education
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The overall objective is to understand the functioning of the human eyeball as an optical imaging instrument, as a first important stage of visual perception, and study the quality of the images obtained with it.

To do this we develop, according to their anatomy, schematic eye models within the paraxial Geometrical Optics.

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5.2.Learning tasks

5.3.Syllabus

Program

0. Historical introduction.

1. Basic concepts and laws of geometrical optics.

2. Optical Representation.

3. Paraxial optics: cardinal elements in centered systems.

4. The human eye as an optical instrument.

5. Imaging in thin systems

6. Correspondence equations in centered systems.

7. Schematic eye models.

8. Imaging and refraction of the eye.

9. Retinal image of an emmetropic eye.

10. Accommodation.

11. Spherical ametropy.

12. Optical compensation of spherical ametropia.

13. Eye astigmatism.

14. Visual acuity.

15. Optical systems with flat surfaces.

16. Ray limitation: aperture and field stops.

Practical sessions

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1. Image formation with a positive lens.

2. Formation of image with negative lens.

3. Refraction through a regular astigmatic lens.

4. Compound systems. Characterization of an optically thick lens.

5. Simulation on an eye on a bench and with VOLT.

6. Simulation of real eye with VOLT.

7. Simulation of ametropies and compensations of a reduced eye on an optical bench.

8. Simulation of ametropies with a digital video camera.
9. Compensation of ametropies with a digital video camera.

10. Simulation of the process of accommodation with a digital video camera.

5.4.Course planning and calendar

5.5.Bibliography and recommended resources

BB	Aguilar, M. Óptica Fisiológica. Vol. 1 y 2 Universidad Politécnica de Valencia. 1994
BB	Goss, David A.. Introduction to the optics of the eye/ David A. Goss, Roger W. West Boston [etc] : Butterworth-Heinemann, cop. 2002
BB	Pons Moreno, Alvaro M.. Fundamentos de visión binocular / Álvaro M. Pons Moreno, Francisco M. Martínez Verdú . Alicante : Universitat d'Alacant, Valencia : Universitat de Valencia, 2004
BB	Romero, A. Curso Introductorio a la Óptica Fisiológica Comares. Grabada. 1996
BB	Viqueira Pérez, Valentín. Óptica fisiológica : modelo paraxial y compensación óptica del ojo / Valentín Viqueira Pérez, Francisco Miguel Martínez Verdú, Dolores de Fez Saiz . Alicante : Universidad, D.L.

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BC	Atchison, David A.. Optics of the human eye / David A. Atchison, George Smith. - 1ª ed., reimpr. Oxford [etc.] : Butterworth-Heinemann, 2002
BC	Tunnacliffe, Alan H.. Introduction to visual optics / Alan H. Tunnacliffe . - 4th ed., repr. Kent : ABDO Collegue, 2004