Course guides
32089 - VO - Visual Optics

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 731 - OO - Department of Optics and Optometry.

Degree: DOCTORAL DEGREE IN PHOTONICS (Syllabus 2007). (Optional subject).
MASTER'S DEGREE IN PHOTONICS (Syllabus 2009). (Optional subject).
ERASMUS MUNDUS MASTER'S DEGREE IN PHOTONICS ENGINEERING, NANOPHOTONICS AND
BIOPHOTONICS (Syllabus 2010). (Optional subject).

Academic year: 2015  ECTS Credits: 2.5  Languages: English

LECTURER

Coordinating lecturer: Montserrat Arjona
Others: Jaume Pujol

TEACHING METHODOLOGY

Presencial Teaching + activities

LEARNING OBJECTIVES OF THE SUBJECT

Visual optics deal with the issues of how light propagates and forms images into the eye. Visual Optics have suffered a remarkable expansion in the last years due basically to the development of new sensors and techniques that rapidly provide accurate and complete descriptions of the eyes' aberrations, and the demonstration that adaptive optics can provide better correction of the eyes' aberrations than has previously been possible.

The course focuses on the basic and advanced topics covered by Visual Optics. It assumes a basic knowledge of optics (aberration theory) and Fourier Optics; many of the key background concepts are reviewed. Basic models for the optics of the eye are presented. In this context, refractive anomalies and accommodation are studied including the most important optical features of any type of correcting lenses ophthalmic, contact or intraocular. Visual performance, including Visual Acuity and Contrast Sensitivity measurements is also described. The most important part of the course is devoted to the study of the optical quality of the eye. Topics covered include aberrations, their measurement and correction using adaptive optics systems, retinal image quality and intraocular scatter measurement. Finally, the latest techniques to obtain high resolution retinal images are analyzed. Numerous examples and applications are described.

CONTENTS


### The human eye: an overview.


### Human eye aberrations and measurement techniques.


### Retinal image quality measurement.

Double pass technique. Intraocular scatter measurements. Applications: measurement of ocular optical quality.

### Adaptive optics for vision.

Principal components of an AO system. Wavefront correctors. Applications.

### High-resolution Retinal Imaging.

Conventional imaging. Scanning Laser Imaging. OCT Ophthalmoscope.

### Future trends and applications

**GRADING SYSTEM**

Exam

Homework (problems, selected papers reading, short presentation...)

**EXAMINATION RULES.**

The usual in University teaching

**BIBLIOGRAPHY**

**Basic:**

**Complementary:**