COURSE DATA

Data Subject	
Code	34317
Name	Vision of forms and colour
Cycle	Grade
ECTS Credits	4.5
Academic year	2020 - 2021

Study (s)

Degree	Center	Acad. year	Period
1207 - Degree in Optics and Optometry	Faculty of Physics	4	First term

Subject-matter

Degree	Subject-matter	Character
1207 - Degree in Optics and Optometry	16 - Optional subjects	Optional
1207 - Degree in Optics and Optometry	20 - Visual perception: mechanisms and clinical applications	Optional

Coordination

Name	Department
CAPILLA PEREA, PASCUAL	280 - Optics and Optometry and Vision Sciences
MALO LOPEZ, JESUS	280 - Optics and Optometry and Vision Sciences

SUMMARY

English version is not available

Se presenta el fenómeno de la visión como un proceso de extracción de información a partir de lasimágenes que se forman en el plano imagen del sistema de adquisición, en el caso del sistema visualhumano, las imágenes retinianas. El objetivo de este proceso es la representación de la informaciónde manera que se puedan resolver problemas de identificación de objetos. En este proceso, lossensores que se aplican a la señal de entrada (neuronas del LGN y V1) son extractores decaracterísticas cuyo comportamiento determina que información es retenida y cual es eliminada. Eneste contexto, el rol de características tales como bordes, texturas y colores es esencial.El curso consta de dos grandes bloques: (1) el análisis de la visión de texturas, y (2) el análisis de lavisión del color.El curso introduce el material necesario para la caracterización lineal de los sensores de bordes ytexturas en V1. También se presenta su comportamiento no lineal, relacionado con la adaptación alcontraste. En cuanto al color, se presentan las limitaciones de la colorimetría triestímulo lineal(introducida en la asignatura de

"Mecanismos y Modelos de la Visión"), dando paso a la consideraciónde las dimensiones perceptuales de los estímulos cromáticos y del comportamiento no lineal de losmodelos que explican la apariencia del color.Al final del curso los estudiantes conocen los elementos básicos de un modelo sencillo de observadorespacio-cromático que puede aplicarse a imágenes reales

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

Es necesario haber cursado "Psicofísica" (de 2º) y "Mecanismos y Modelos de la Visión" (de 3º)

OUTCOMES

1207 - Degree in Optics and Optometry

- To have and to understand the fundamentals of Optometry for its correct clinical and healthcare application.
- Knowing how to apply the knowledge acquired to professional activity, knowing how to solve problems and develop and defend arguments.
- Being able to gather and interpret relevant data to make judgments.
- Being able to transmit information, ideas, problems and solutions to both a specialized and non-specialized audience.
- Development of learning skills necessary to undertake further studies with a high degree of autonomy.
- To know the applicable legislation in professional practice, with special attention to matters of gender equality between men and women, human rights, solidarity, sustainability, protection of the environment and promotion of the culture of peace.
- To know how the visual system adapts to the lighting level and the chromaticity of light.
- To know how the visual system adapts to the frequency content (space-time) of complex scenes.
- To know the architecture and function of the areas of the extra-striated cortex with relevant participation in visual perception, as well as their interactions.
- To know the way in which the information of the various perceptual dimensions is integrated to make judgments about the scene.

LEARNING OUTCOMES

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DESCRIPTION OF CONTENTS

1. First part

Brightness perception
Contrast discrimination
Perceptual contrast
Multichannel models
On the physiological mechanisms for spatial vision

2. Second part

Colour appearance. Limitations of the triestimulus colorimetry.
Colour visión models with a single opponent stage
Colour visión models with two opponent stages
On the physiological mechanisms for colour vision
Spatio-chromatic models

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Tutorials	7,50	100
Laboratory practices	7,50	100
Study and independent work	35,00	0
Preparing lectures	10,00	0
Preparation of practical classes and problem	10,00	0
Resolution of case studies	10,00	0
TOTAL	**110,00**	

TEACHING METHODOLOGY

1) Face-to-face work consisting of:

a) Theory classes, which will consist of the presentation and basic explanation of the corresponding material.

b) Seminars and demonstrative practices designed to illustrate the operation of the models covered in the course using specific software developed for the subject.

2) Non-contact work consisting of:

a) Completion (voluntary, see evaluation section) of exercises proposed in theory classes and seminars, as well as in practical classes.

b) Exam preparation.

3) Individual and / or group tutorials. There are established certain hours of unscheduled tutoring per week that students can attend to clarify their doubts.

EVALUATION

Option 1: Assessment based on the completion of the proposed practical exercises (necessary requirement to pass) and additional practical theoretical exam (voluntary) to upload a grade.A- Delivery of the proposed numerical exercises (50% of the final grade).B- Attendance at theoretical-practical sessions and demonstrative seminars (5% of the final grade).C- Exam of theoretical and practical questions (45% of the final grade).Compliance with sections A and B (attendance and completion of exercises) is the necessary requirement to pass under Option 1. Otherwise, it will be assessed under Option 2.Option 2: For students who decide not to attend the sessions regularly or do not present the exercises, an evaluation is proposed exclusively based on the examination of theoretical and practical questions.The evaluation will comply with the Qualification Regulations of the Universitat de València. At the time of writing this teaching guide, the current regulations are those approved by the UVEG Governing Council of January 27, 2004, which is in accordance with the provisions for this purpose by Royal Decree 1044/2003 and 1125 / 2003. It basically establishes that the qualifications will be numerical from 0 to 10 with the expression of a decimal and to which the qualitative qualification corresponding to the following scale should be added: From 0 to 4.9: “Suspense” From 5 to 6.9 : "Approved" From 7 to 8.9: "Notable" From 9 to 10: "Outstanding" or "Outstanding with Honor Registration".

REFERENCES

Basic

- Apuntes de clase y notas proporcionadas por el profesor (disponibles en el aula virtual)
  B. Wandell. Foundations of Vision. Sinauer Assoc. 1995
  M. Fairchild. Color appearance models. Wiley. 2005
  P. Capilla et al. Introducción a la Colorimetria. Univ. Valencia 2002
  Percepción visual. Psicofísica, mecanismos y modelos, Editorial Médica panamericana (2019)

Additional

- Gaskill. Linear Systems, Fourier Transforms, and Optics (Wiley Series in Pure and Applied Optics). Wiley 1978

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

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