Universidad Zaragoza

Academic Year/course: 2024/25

26834 - Radiometry, Photometry, Colour and Photography

Syllabus Information

Academic year: 2024/25
Subject: 26834 - Radiometry, Photometry, Colour and Photography
Faculty / School: 100 - Facultad de Ciencias
Degree: 297 - Degree in Optics and Optometry
ECTS: 6.0
Year:
Semester: First semester
Subject type: Optional
Module:

1. General information

The objectives of this subject are to understand and assimilate the most important and general concepts, theories and models of the three thematic and conceptual blocks that compose it: Radiometry and Photometry, Colorimetry and Photography. The purpose is that the student has a global vision of these concepts for their application in Optics and Optometry.

All observations made through the eye have radiation, light, as a basic component. Knowing the parameters that define good lighting is essential for an optician-optometrist because of its impact on the hygiene of visual work.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (https://www.un.org/sustainabledevelopment/es/), in such a way that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement.

2. Learning results

- To be able to understand the behaviour of radiation and its interaction with the human visual system.
- To be able to operate devices in the laboratory and understand absolute and relative radiation measurements (with the eye as a reference).
- To be able to know how to use lighting systems and cameras for the realization of different projects and reports

3. Syllabus

THEORY

Radiometry and Photometry

Topic 1. Electromagnetic energy and spectrum

Topic 2. Radiometric quantities

Topic 3. The eye and the reference observer

Topic 4. Photometric quantities

Topic 5. Key relationships

Topic 6. Light sources, natural and artificial

Topic 7. Lanterns. Lighting applications

Colorimetry

Topic 8. Physiology of vision: colour vision. Basic theory

Topic 9. Colour- Colour spaces: Linear (RGB, CMYK), Standard (CIE-XYZ), Perceptual (L*u*v*, L*a*b*), Artistic (Munsell, NCS)

Topic 10. Colour measurement. Colour differences

Photography

Topic 11. The camera and the image

Topic 12. Cameras and their operation

Topic 13. Lighting in photography
Topic 14. The language of photography
Topic 15. Post-camera techniques

PRACTICAL SESSIONS
Practice 1. Operation of luxmeters, luminance meters and photometers
Practice 2. Spectral measurement of lamps
Practice 3. Physical and optical effects
Practice 4. Colour measurement by reflection and transmission
Practice 5. Interior photography
Practice 6. Outdoor photography

4. Academic activities

Lectures: 40 hours
Theoretical sessions in which the contents of the subject are explained.

Problems and cases: 10 hours
Problem solving and case studies of each topic.

Laboratory Practices: 10 hours
Simulation tools and laboratory instrumentation will be used to address the issues raised in theory

Teaching assignments: 10 hours
Both the evaluable teaching assignments and the preparation of laboratory practice reports are included.

Personal study. 74 hours

Assessment tests. 6 hours

5. Assessment system

Continuous assessment. Regular attendance to practical classes is a prerequisite for this modality of evaluation.

- Practical part (1/3 of the final grade)

  Practice scripts (1/6)
  Photographic project (1/6)
- Theoretical part (2/3 of the final grade)

  Written exam (1/2)
  Exercises and problems (1/6)

Final exam. This evaluation modality will be applied when regular attendance to the practices of laboratory is not possible.

- Practical exam (1/3 of the final grade)
- Theoretical exam (2/3 of the final grade)

6. Sustainable Development Goals

4 - Quality Education
9 - Industry, Innovation and Infrastructure