

26834 - Radiometry, Photometry, Colour and Photography

Syllabus Information

Academic year: 2023/24

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:

Goal 4: Quality Education.

Goal 9: Industry, Innovation and Infrastructure

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)