

**COURSE DATA****DATA SUBJECT**

Code: 34314
Name: Registry and processing of clinical images
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1207 - Degree in Optics and Optometry	Facultat de Física	4	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1207 - Degree in Optics and Optometry	Biomedical optics	ELECTIVES

COORDINATION

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SUMMARY

Technological advance has not been alien to the health sciences. Understand the registration processes and Imaging using electronic sensors is relevant to any professional who work in the health field. Treatment of clinical images or microscope images Electronic generated great interest from the beginning of the so-called digital age. Many clinical teams, provide information through digital images: X-rays, ultrasounds, MRIs, CT scans, etc. that were traditionally recorded on film. In optometric clinics, find video keratographs, slit lamps and ophthalmoscopes that allow a study efficient ocular system. An adequate treatment of the images obtained by these methods makes a lot of hidden information appear, greatly facilitating diagnosis final.

PREVIOUS KNOWLEDGE**RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE**

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

OTHER REQUIREMENTS

Prior knowledge of geometric and instrumental optics is required. It is also required very basic knowledge



of Fourier analysis.

COMPETENCES / LEARNING OUTCOMES

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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.

Knowing how to apply the knowledge acquired to professional activity, knowing how to solve problems and develop and defend arguments.

To acquire basic skills to handle photographic and video instruments.

To have and to understand the fundamentals of Optometry for its correct clinical and healthcare application.

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 the basic elements of optical and digital image treatment.

To know the fundamentals of analog and digital photography.

To recognize the prominent elements in a digitally processed medical image.

To recognize the type of target suitable for different clinical applications and its relationship with the resolution of the recording medium.

DESCRIPTION OF CONTENTS

1. Formation of the photographic image

2. Photographic image registration

3. Image structure and coding



4. Image manipulation techniques

6. Laboratory practices

- PRACTICE 1: Handling the digital camera I.
- PRACTICE 2: Handling the digital camera II.
- PRACTICE 3: Introduction to the digital laboratory. Basic management of THE GIMP Program.
- PRACTICE 4: Image formats. Compression. (THE GIMP).
- PRACTICE 5: Transformations of images and histograms. (THE GIMP).
- PRACTICE 6: Biometrics. IMAGEJ program.
- PRACTICE 7: Restoration of images. (IMAGEJ).
- PRACTICE 8: Edges and layers. (THE GIMP).

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Laboratory	15,00
Computer classroom practice	15,00
Total hours	60,00

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	20,00
Independent study and work	10,00
Preparation of lessons	60,00
Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	90,00

TEACHING METHODOLOGY

In this subject it is intended that the student knows the basic tools to understand the formation, registration and subsequent processing of digital images. For this, the subject will consist of two types of classes with differentiated methodology:

- (i) Theoretical-practical classes.



(ii) Laboratory sessions including computer room.

In the classes of type (i) the basic theoretical contents of the subject will be taught, as well as practical examples that best illustrate them. To increase the presentation / assimilation ratio, they will be able to use graphic tools to present content, through transparencies, including graphics, drawings, videos and animations, in combination with discussions / presentations in board. Likewise, simple practical demonstrations may be presented, especially examples relevant, applets, simulations, etc., that allow to illustrate some of the concepts explained. I know will encourage and guide students in expanding the content received in each class through the recommended bibliography, as well as the possibility of expanding knowledge in subject future.

In the classes of type (ii), the laboratory activities will be based on the use of the digital camera as well as in the use of suitable commercial image analysis software. The use of of databases of clinical cases so that students become familiar with the type of images that are you will find in professional practice

EVALUATION

The assessment system will take into account both the theoretical part and the practical part carried out in the laboratory and the computer lab. In addition, the submission of practical assignments as part of continuous assessment will also be considered.

A written exam will be held covering both theoretical and practical knowledge, which will account for 60% of the final grade. The continuous assessment assignments will consist of an oral presentation of the practical experiences carried out, as well as the completion of exercises using software. These may be submitted through audiovisual or audio-based formats, which will not be made public and will be used exclusively by the teaching staff for assessment purposes. These assignments will make up the remaining 40% of the final grade.

The final grade for both the first and second examination sessions will be calculated in the same way, and the continuous assessment grade will be retained between sessions.

REFERENCES

b1. M. Martínez Corral, W. Furlan, A. Pons y G. Saavedra. Instrumentos ópticos y optométricos. Teoría y prácticas. Universitat de València (1998).

b2. J. F. Pertusa, Técnicas de Análisis de Imagen. Universitat de València (2003).

b3. A. de la Escalera, Visión por computador. Fundamentos y métodos. Prentice Hall (2000).



c1. R. Bouillot. Curso de Fotografía Digital. Editorial Omega (2005).

c2. R. C. Gonzalez y R. E. Woods, Digital Image Processing 2nd Ed. Prentice Hall (2002).