ADVANCED PROCESSING OF BIOMEDICAL IMAGING

Mestrado em Engenharia Eletrónica e de Computadores

Code: 21300

Main Scientific Area: Intelligent Systems and Control

Lecturer: João Luís Araújo Martins Vilaça

Language of Instruction: Portuguese

Regime: S1

Contact Hours: 30h Total Workload: 130h

ECTS: 6,0

Objectives

This course aims to give students knowledge about theoretical concepts and practical methodologies on theacquisition and processing of biomedical images.

Learning Outcomes

By the end of the course, students should be able to:

- Distinguish and understand the different medical imaging modalities, theirs physical principles and clinicalapplications

- Know, understand, implement, evaluate and select different methods and algorithms for biomedical imageprocessing

Course Contents

1. Medical imaging modalities

2. Image processing fundamentals

3. Filtering in the spatial domain

4. Mathematical morphology

5. Segmentation

6. Introduction to Deep Learning

7. Development of graphical interfaces in Matlab

Recommended Bibliography

Digital Image Processing (2008), Rafael Gonzalez.

Digital Image Processing using Matlab (2020), Rafael Gonzalez.

Learning and Teaching Methods

From the standpoint of medical imaging, this course will enable students to:a) know, understand and apply the fundamental principles of image processing; b) apply these concepts to software tools that allow the development of image processing algorithms and methods of visualization and interaction with the user. After the integration of these concepts, the student will be confronted with a set of real problems, and will be stimulated to search for solutions to solve them.

Assessment Methods

The final classification of students is obtained based on the following assessment:

- 1 Writing test (50%)

- 1 Intermediate practical work (15%) -Divided into three parts

- 1 Final practical work TP2 (35%)
The grade of the final exam only covers the theoretical component of the final grade.

The minimum grade in every test and project is 8.