

Academic Year: (2024 / 2025)

Review date: 02-02-2024

Department assigned to the subject: Bioengineering Department

Coordinating teacher: IZQUIERDO GARCÍA, DAVID

Type: Additional training ECTS Credits : 3.0

Year : Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

- Signals and systems
- Differential equations
- Image processing

OBJECTIVES

The 'Introduction to BioSignals and BioImages' course initiates the students into a basic understanding of how to detect, obtain, record and analyze the different BioSignal and BioImages that can be later on used in pre-clinical and clinical applications. We will learn about the physical and physiological origin of the different signals and images. During this course we will explore different modalities, such as ECG, EEG, MRI, CT or PET among others. We will study the physical devices, tools and methods that enable the acquisition and recording of their signals and images.

DESCRIPTION OF CONTENTS: PROGRAMME

Origin of biomedical signals.
 Recording of Biomedical Signals
 Physical principles of biomedical imaging.
 Medical imaging modalities
 ECG
 EEG
 X-Rays
 CT
 PET
 SPECT
 MRI
 Microscopy
 Optical Imaging

LEARNING ACTIVITIES AND METHODOLOGY

AF3 Theoretical practical classes
 AF4 Laboratory practices
 AF5 Tutoring
 AF6 Team work
 AF7 Student individual work
 AF8 Partial and final exams

Activity code	total hours number	presencial hours number	% Student Presence
AF3	33	33	100%
AF4	24	24	100%
AF5	16	0	0%
AF6	35	0	0%
AF7	70	0	0%

AF8	4	4	100%
TOTAL SUBJECT	182	61	33,5%

ASSESSMENT SYSTEM

% end-of-term-examination:	30
% of continuous assessment (assignments, laboratory, practicals...):	70
SE1	Participation in class
SE2	Individual or team works made during the course
SE3	Final exam

Evaluation systems	Minimum weighting (%)	Maximum Weighting (%)
SE1	0	20
SE2	0	100
SE3	0	100

The extraordinary evaluation (june call) will be carried out with a final exam (SE3) that weighs 100% of the grade.

BASIC BIBLIOGRAPHY

- Sörnmo, Laguna Bioelectrical Signal Processing in Cardiac and Neurological Applications, Elsevier, 2005
- van Drongelen Signal Processing for Neuroscientists, Academic Press, 2018

ADDITIONAL BIBLIOGRAPHY

- Hende, Ritenour Medical Imaging Physics, Wiley, 2002