Biosignals & Bioimages

Academic Year: (2019 / 2020)   Review date: 10-07-2020

Department assigned to the subject: Bioengineering and Aeroespace Engineering Department

Coordinating teacher: VAQUERO LOPEZ, JUAN JOSE

Type: Compulsory ECTS Credits : 6.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

- Signals and systems
- Fundamentals of bioengineering
- Differential equations
- Image processing

OBJECTIVES

Basic competences

CB6 Having and understanding the knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context

CB7 Students know how to apply their acquired knowledge and problem-solving skills in new or unfamiliar settings within broader (or multidisciplinary) contexts related to their field of study.

CB9 Students know how to communicate their conclusions and the knowledge and ultimate reasons behind them to specialised and non-specialised audiences in a clear and unambiguous way.

General competences

CG1 Ability to maintain continuous education after his/her graduation, enabling him/her to cope with new technologies.

CG2 Ability to apply the knowledge of skills and research methods related to engineering.

CG3 Ability to apply the knowledge of research skills and methods related to Life Sciences.

CG4 Ability to contribute to the widening of the frontiers of knowledge through an original research, part of which merits publication referenced at an international level.

Specific competences

CE1 Ability to know the peculiarities of data acquisition and information processing in the field of biomedical signals and images.

CE2 Ability to design and implement automatic learning systems for supervised and unsupervised problem solving.

CE3 Ability to design estimation and decision procedures from signals and images using statistical modeling.

DESCRIPTION OF CONTENTS: PROGRAMME

Biosignals & Bioimages

Sources of physiological signals and images: acquisition, clinical use, information extraction, advanced processing, diagnostic aids.

Concept of molecular and multimodal imaging.

Image quantification: dynamic data, parametric images, kinetic analysis.

LEARNING ACTIVITIES AND METHODOLOGY

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

Activity code	total hours number	presencial hours number	% Student Presence
AF3	100	100	100%
AF4	32	32	100%
AF5	18	0	0%
AF6	90	0	0%
AF7	186	0	0%
AF8	12	12	100%
TOTAL SUBJECT	450	138	30,6%

ASSESSMENT SYSTEM

% end-of-term-examination: 60

% of continuous assessment (assigments, laboratory, practicals…):   40

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	60

BASIC BIBLIOGRAPHY

- Jiang Hsieh Computed tomography, SPIE press, 2009

- Paul L. Nunez, Ramesh Srinivasan Electric fields of the brain, Oxford, 2006