

Academic Year: ( 2022 / 2023 )

Review date: 11-05-2022

Department assigned to the subject:

Coordinating teacher: MARTÍNEZ OLMOS, PABLO

Type: Electives ECTS Credits : 6.0

Year : 1 Semester : 1

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

The students are expected to have basic knowledge of

- Calculus
- Programming skills
- Numerical optimization

**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.

CB8 Students are able to integrate knowledge and to face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.

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.

CB10 Students have the learning skills that will enable them to continue studying in a way that will be largely self-directed or autonomous.

## 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

CE4 Ability to use techniques for processing massive amounts of medical data and images.

CE5 Ability to implement medical imaging and data processing methods.

**DESCRIPTION OF CONTENTS: PROGRAMME**

## Deep Learning

Neural networks and backpropagation.

Deep networks: optimization and regularization for massive data.

Deep architecture and methods for spatial correlated data.

Deep architectures and methods for sequences.

Representation learning.

Generative deep neural networks.

## 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	134	134	100%
AF4	42	42	100%
AF5	24	0	0%
AF6	120	0	0%
AF7	248	0	0%
AF8	16	16	100%
SUBJECT TOTAL	600	184	30,66%

## ASSESSMENT SYSTEM

The continuous evaluation will consist of partial exams, practicals and programming projects and presentation of works.

<b>% end-of-term-examination:</b>	0
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	100

## BASIC BIBLIOGRAPHY

- Cristopher Bishop Pattern Recognition and Machine Learning, Springer, 2006
- Ian Goodfellow and Yoshua Bengio and Aaron Courville Deep Learning, MIT Press, 2017
- Kevin Murphy Machine Learning A Probabilistic Perspective, MIT Press, 2012