

Academic Year: ( 2019 / 2020 )

Review date: 15/05/2020 16:04:22

Department assigned to the subject: Signal and Communications Theory Department

Coordinating teacher: MARTÍNEZ OLMOS, PABLO

Type: Electives ECTS Credits : 3.0

Year : Semester :

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

The students are expected to have basic knowledge of

- Calculus
- Programming skills
- Statistics

## OBJECTIVES

- Know the basic techniques of text pre-processing.
- Use software tools for pre-processing text.
- Know the techniques of topic modeling.
- Use topic modeling software tools in corpus of documents.
- Use topic models for information retrieval in corpus of documents.
- Learn how to train models of semantic representation in a vector space.
- Learn to train language models using recursive neural networks.
- Know basic translation structures based on recursive neural networks.
- Use optimization tools to build language models with recursive neural networks.

## DESCRIPTION OF CONTENTS: PROGRAMME

- Document preprocessing techniques
- Topic Modeling
- Recurrent Neural Networks
- Language Models with RNNs
- Sequence to Sequence for Machine Translation
- Attention Models

## LEARNING ACTIVITIES AND METHODOLOGY

Lectures (1.5 ECTS):

Contents: basic theory and methods of natural language processing systems.

Methodology: classical lecture with use of slides, videos and white/blackboard.

Lab projects (1.5 ECTS):

Contents: implementation of algorithms in for the simulation and assessment of natural language processing systems.

Methodology: use of numerical software packages (matlab/octave) to study the performance of algorithms and systems.

## ASSESSMENT SYSTEM

**% end-of-term-examination/test:** 20

**% of continuous assessment (assignments, laboratory, practicals...):** 80

The continuous evaluation (80%) is based on programming projects to implement the tools seen in class and a presentation of recent articles in the field.

<b>% end-of-term-examination/test:</b>	20
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	80

There will be a final exam that will count 20%.

#### BASIC BIBLIOGRAPHY

- Cristopher Bishop Pattern Recognition and Machine Learning, Springer, 2006
- Ian Goodfellow and Yoshua Bengio and Aaron Courville Deep Learning, MIT Press, 2017
- Steven Bird, Ewan Klein, Edward Loper Natural Language Processing with Python: Analyzing Text with the Natural Language Toolkit, O'Reilly, 2009