

Academic Year: ( 2023 / 2024 )

Review date: 27-04-2023

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: LEDEZMA ESPINO, AGAPITO ISMAEL

Type: Compulsory ECTS Credits : 6.0

Year : 4 Semester : 1

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

- Artificial Intelligence (Course 2 / Semester 2)
- Machine Learning (Course 3 / Semester 2)

## SKILLS AND LEARNING OUTCOMES

- ¿ Know different representation paradigms used in artificial intelligence for solving problems both with and without uncertainty.
- ¿ Be able to select the most appropriate representation paradigm to solve real-world problems.

## OBJECTIVES

The objective of the course is to provide the student with the necessary knowledge about the applications of Artificial Intelligence, through its various paradigms, in the solution of problems in a wide range of sectors. In the same way, the student should know the principles, methods, and techniques of Artificial Intelligence.

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction
  - Context.
  - Key Features.
  - Main techniques.
2. Expert Systems
  - Introduction.
  - What is an Expert System?
  - Applications of Expert Systems.
  - Advantages and Disadvantages
  - Case studies
3. Neural Networks
  - Introduction
  - Artificial Neural Networks
  - Applications of ANN
  - Advantages-Disadvantages
  - Case studies
4. Evolutionary Algorithms
  - Introduction
  - Evolutionary algorithms
  - Applications of evolutionary algorithms
  - Advantages and disadvantages
  - Case studies
5. Data Mining
  - Introduction

- Applications
  - KDD and Data Mining
  - Data Mining Tasks
  - Applications
  - Case studies
6. Text mining
- Definition
  - Overall Architecture of Text Mining Systems
  - Core Text Mining Operations
  - Applications
  - Case studies
7. Web Mining
- Introduction
  - Types of Web Mining
  - Content Web Mining
  - Structure Web Mining
  - Usage Web Mining
  - Case studies
8. Fuzzy Logic
- The concept of fuzzy
  - Fuzzy Sets
  - Fuzzy logic
  - Fuzzy reasoning systems
  - Case studies
9. Agents
- Introduction
  - What is an agent?
  - Multiagent Systems
  - Applications
  - Case studies
10. Other techniques
- Introduction
  - Description
  - Applications
  - Case studies

## LEARNING ACTIVITIES AND METHODOLOGY

- Lectures (0,6 ECTS). They are aimed at achieving the specific cognitive competencies of the course. The fundamental ideas of the subject will be presented.

- Seminars (0,3 ECTS). They have the purpose of complementing the acquisition of specific cognitive competencies. In addition, they develop some transversal competencies such as the capacity of analysis and synthesis and teamwork.

- Practical classes (0,8 ECTS). They develop the specific instrumental competencies and most transversal competencies, such as teamwork, the ability to apply knowledge to practice, planning and organizing, and analyzing and synthesizing. They also aim to develop specific attitudinal skills.

- Directed Academic Activities (4.3 ECTS)

-- With the presence of the professor. Participation in classes oriented by the professor where aspects of the subject are deepened and evaluated. Evaluation tests of theoretical and practical knowledge.

-- Without the presence of the professor. Exercises, complementary readings proposed by the professor, preparation of classes, practice. Participation in the SPOC of the course.

- Tutorials: Individualized assistance (individual tutorials) or in group (collective tutorials) to the students by the professor.

## ASSESSMENT SYSTEM

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

In addition to serving as a training activity, the exercises and exams have the dual purpose of being a measure for the evaluation system. According to the following weighting, the evaluation system includes assessing the directed academic and practical activities (the relation with the competencies is not specified since the formative activities have already been related to them).

THEORY (60% - Minimum grade 4.0).

- Seminars: 10%.
- Continuous evaluation tests: 35%.
- Directed activities: 15%.

PRACTICAL WORK (40%)

- Short practicals: 15%.
- Final practical: 15%.
- Continuous evaluation test (10%).

The entire course is evaluated through continuous evaluation activities (theory and practice). In the activities associated with the evaluation of theoretical concepts, there is a minimum grade of 4.0. In exceptional situations where the continuous evaluation cannot be followed and in the extraordinary assessment, the university regulations for courses without a final exam will be followed.

## BASIC BIBLIOGRAPHY

- Akerkar, Rajendra Artificial Intelligence for Business, Springer, 2019
- Francesco Corea Applied Artificial Intelligence: Where AI Can Be Used In Business, Springer, 2019
- Jerry Overton Artificial Intelligence, O'Reilly Media, Inc, 2018
- Ramesh Sharda, Dursun Delen, Efraim Turban Analytics, data science, & artificial intelligence : systems for decision support, Pearson , 2020

## ADDITIONAL BIBLIOGRAPHY

- Efrain Turban, Ramesh Sharda, Dursun Delen Decision Support and Business Intelligence Systems (ninth edition), Pearson, 2011
- Nilsson, N. Inteligencia Artificial. Una nueva síntesis, McGraw-Hill.
- Pyle, Dorian Business modeling and data mining, Morgan Kaufmann Publishers.
- Witten, I.H., Frank, E. Data mining : practical machine learning tools and techniques, Morgan Kaufmann.