

Academic Year: ( 2023 / 2024 )

Review date: 26-05-2023

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: LEDEZMA ESPINO, AGAPITO ISMAEL

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 2

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

- Ethical and Legal Implications of AI

**OBJECTIVES**

The objective of this course is to provide the student with the necessary knowledge about the role of Artificial Intelligence in Sustainable Development. The student should acquire knowledge about the implications of the application of AI in different aspects of development, using the United Nations Sustainable Development Goals as a common thread. The student should understand the main challenges facing the application of AI in developing countries and will know some of the main applications developed, the techniques applied, and the results obtained.

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Introduction
  - Concept of sustainable development.
  - The Sustainable Development Goals (SDGs) of the United Nations.
  - Ethical aspects of Artificial Intelligence.
  - AI as a strategy for Sustainable Development.
2. AI for sustainable development
  - Introduction
  - AI as a driving tool for the 2030 Agenda.
  - Advantages and disadvantages.
  - Case studies.
3. Challenges of AI in developing countries.
  - Introduction.
  - Technological challenges.
  - Social challenges.
  - Economic challenges.
  - Environmental challenges.
4. AI applications for development in the world
  - Introduction.
  - AI Applications in Water and Energy Access in Sub-Saharan Africa.
  - AI Applications in Medicine in Latin America.
  - AI Applications in Agriculture in Southeast Asia.
5. Inclusive AI and weapon against catastrophes.
  - Introduction
  - Indigenous Communities and AI.
  - The role of AI in emergencies

**LEARNING ACTIVITIES AND METHODOLOGY**

Training Activities:

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AF1 - Theoretical class

AF3 - Theoretical-practical classes

AF5 - Individual and group tutorials

AF6 - Group work

Teaching methodology:

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- MD1: Class lectures by the lecturer with the support of computer and audiovisual media, in which the main concepts of the subject are developed and the bibliography is provided to complement the students' learning.
- MD2: Critical reading of texts recommended by the subject teacher: press articles, reports, manuals and/or academic articles, either for subsequent discussion in class or to expand and consolidate knowledge of the subject.
- MD3: Resolution of practical cases, problems, etc... posed by the teacher individually or in groups.
- MD4: Presentation and discussion in class, under the moderation of the teacher, of topics related to the content of the subject, as well as practical cases.
- MD5: Preparation of individual or group work and reports.

## ASSESSMENT SYSTEM

The evaluation will consist of several continuous evaluation activities and a final exam. The continuous evaluation will account for 80% of the final grade of the course and will consist of:

- Class participation: 10%.
- Final Project: 70%.

To successfully complete the course, the student is required to score a minimum of 4 in the final exam, which holds 20% weightage. In case of an Extraordinary Evaluation, the exam will be the sole determining factor and hold 100% weightage.

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

## BASIC BIBLIOGRAPHY

- Hassanien, Aboul Ella & Bhatnagar, Roheet & Darwish, Ashraf Artificial Intelligence for Sustainable Development: Theory, Practice and Future Applications, Springer, 2021
- Hui Lin Ong, Ruey-an Doong, Raouf Naguib, Chee Peng Lim, Atulya K. Nagar Artificial Intelligence and Environmental Sustainability. Challenges and Solutions in the Era of Industry 4.0, Springer, 2022
- Kamal Kant Hiran, Deepak Khazanchi, Ajay Kumar Vyas and Sanjeevikumar Padmanaban Machine Learning for Sustainable Development, De Gruyter, 2021
- Peter Dauvergne AI in the Wild: Sustainability in the Age of Artificial Intelligence, MIT Press, 2020
- William W. Hsieh Machine Learning Methods in the Environmental Sciences. Neural Networks and Kernels, Cambridge Core, 2010
- Zakaria Boulouard, Mariya Ouaisa, Mariyam Ouaisa, Sarah El Himer AI and IoT for Sustainable Development in Emerging Countries. Challenges and Opportunities, Springer, 2022