Course guide
270426 - PIA - Integrated Project of Artificial Intelligence

Last modified: 02/02/2024

Unit in charge:	Barcelona School of Informatics
Teaching unit:	270 - FIB - Barcelona School of Informatics.
Degree:	BACHELOR'S DEGREE IN ARTIFICIAL INTELLIGENCE (Syllabus 2021). (Compulsory subject).

Academic year: 2023　**ECTS Credits:** 6.0　**Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer:	RAMON SANGÜESA SOLE - CECILIO ANGULO BAHON
Others:	Segon quadrimestre:
	CECILIO ANGULO BAHON - 11, 12
	RAMON SANGÜESA SOLE - 11, 12

PRIOR SKILLS

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

CE10. To analyze, design, build and maintain applications in a robust, secure and efficient way, choosing the most appropriate paradigm and programming languages.

CE12. To master the fundamental principles and models of computing and to know how to apply them in order to interpret, select, assess, model, and create new concepts, theories, uses and technological developments related to artificial intelligence.

CE14. To master the foundations, paradigms and techniques of intelligent systems and to analyze, designing and build computer systems, services and applications that use these techniques in any field of application, including robotics.

CE15. To acquire, formalize and represent human knowledge in a computable form for solving problems through a computer system in any field of application, particularly those related to aspects of computing, perception and performance in intelligent environments or environments.

CE17. To develop and evaluate interactive systems and presentation of complex information and its application to solving human-computer and human-robot interaction design problems.

CE18. To acquire and develop computational learning techniques and to design and implement applications and systems that use them, including those dedicated to the automatic extraction of information and knowledge from large volumes of data.

CE28. To plan, ideate, deploy and direct projects, services and systems in the field of artificial intelligence, leading its implementation and continuous improvement and assessing its economic and social impact.

Generical:

CG1. To ideate, draft, organize, plan and develop projects in the field of artificial intelligence.

CG2. To use the fundamental knowledge and solid work methodologies acquired during the studies to adapt to the new technological scenarios of the future.

CG3. To define, evaluate and select hardware and software platforms for the development and execution of computer systems, services and applications in the field of artificial intelligence.

CG4. Reasoning, analyzing reality and designing algorithms and formulations that model it. To identify problems and construct valid algorithmic or mathematical solutions, eventually new, integrating the necessary multidisciplinary knowledge, evaluating different alternatives with a critical spirit, justifying the decisions taken, interpreting and synthesizing the results in the context of the application domain and establishing methodological generalizations based on specific applications.

CG5. Work in multidisciplinary teams and projects related to artificial intelligence and robotics, interacting fluently with engineers and professionals from other disciplines.

CG6. To identify opportunities for innovative applications of artificial intelligence and robotics in constantly evolving technological environments.

CG7. To interpret and apply current legislation, as well as specifications, regulations and standards in the field of artificial intelligence.

CG8. Perform an ethical exercise of the profession in all its facets, applying ethical criteria in the design of systems, algorithms, experiments, use of data, in accordance with the ethical systems recommended by national and international organizations, with special emphasis on security, robustness , privacy, transparency, traceability, prevention of bias (race, gender, religion, territory, etc.) and respect for human rights.

CG9. To face new challenges with a broad vision of the possibilities of a professional career in the field of Artificial Intelligence. Develop the activity applying quality criteria and continuous improvement, and act rigorously in professional development. Adapt to organizational or technological changes. Work in situations of lack of information and / or with time and / or resource restrictions.

Transversal:

CT1. Entrepreneurship and innovation. Know and understand the organization of a company and the sciences that govern its activity; Have the ability to understand labor standards and the relationships between planning, industrial and commercial strategies, quality and profit.

CT3. Efficient oral and written communication. Communicate in an oral and written way with other people about the results of learning, thinking and decision making; Participate in debates on topics of the specialty itself.

CT4. Teamwork. Be able to work as a member of an interdisciplinary team, either as a member or conducting management tasks, with the aim of contributing to develop projects with pragmatism and a sense of responsibility, taking commitments taking into account available resources.

CT8. (ENG) Perspectiva de gènere. Conèixer i comprendre, des del propi àmbit de la titulació, les desigualtats per raó de sexe i gènere a la societat; Integrar les diferents necessitats i preferències per raó de sexe i de gènere en el disseny de solucions i resolució de problemes.

Basic:

CB2. That the students know how to apply their knowledge to their work or vocation in a professional way and possess the skills that are usually demonstrated through the elaboration and defense of arguments and problem solving within their area of ??study.

CB4. That the students can transmit information, ideas, problems and solutions to a specialized and non-specialized public.

TEACHING METHODOLOGY

TEACHING METHODOLOGIES
* Expository class of theoretical and practical contents
* Participatory class, based on the resolution of practical cases or exercises or on the discussion of previously assigned readings
* Group work with the presence of the teacher
* Group / cooperative work without the presence of the teacher
* Presentation of work by students

LEARNING OBJECTIVES OF THE SUBJECT

1.Have the ability to conceive, design, develop and implement AI-based systems capable of extracting information from data and signals, processing them and generating solutions (responses, actions, decisions, diagnoses, predictions) applicable to the problem environment, whether physical , virtual or a combination of both.

2.Being able to select the most appropriate AI techniques, methods and models for each aspect of the problem to be solved, and integrate them into a single, coherent and effective system.

3.Being able to manage a complex project, define its scope, carry out temporal planning (of processes and activities) and economic planning (of human, material and immaterial resources), prioritize and re-plan when necessary (based on criteria of reduction of the risk and increase in the value contributed by the result).

4.Being able to adequately present the results of the project, justifying the decisions made and the added value provided by the system.

STUDY LOAD

Type	Hours	Percentage
Hours small group	30,0	20.00
Hours large group	30,0	20.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Project managament

Description:
After the first phase, students do an exercise to create a project management environment.

Lean innovation and design thinking

Description:
In the second phase, problems that come from companies are heard and the students make a proposal.

Project development

Description:
In the third phase, after selecting proposals, we work towards a minimum viable product.

ACTIVITIES

Project management

Specific objectives:
3, 4

Related competencies :
CG4. Reasoning, analyzing reality and designing algorithms and formulations that model it. To identify problems and construct valid algorithmic or mathematical solutions, eventually new, integrating the necessary multidisciplinary knowledge, evaluating different alternatives with a critical spirit, justifying the decisions taken, interpreting and synthesizing the results in the context of the application domain and establishing methodological generalizations based on specific applications.
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Full-or-part-time: 50h
Theory classes: 10h
Practical classes: 10h
Self study: 30h

Lean innovation and design thinking

Specific objectives:
1, 3

Related competencies :
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Specific objectives:
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GRADING SYSTEM

Long-answer oral or written tests (%) 0.0-20.0
Multiple choice tests (%) 0.0-15.0
Oral presentations (%) 20.0-40.0
Written assignments on topics proposed in advance(%) 0.0-30.0
Tests performed (%) 10.0-30.0

BIBLIOGRAPHY

Basic:

- Blank, Steve; Dorf, Bob. The Startup Owner's Manual The Step-by-Step Guide for Building a Great Company. John Wiley & Sons, Inc., 2020. ISBN 9781119690689.