# UAB
## Universitat Autònoma de Barcelona

## Introduction to AI

Code: 106558
ECTS Credits: 3

**2024/2025**

| Degree | Type | Year |
|---|---|---|
| 2504392 Artificial Intelligence | OB | 1 |

## Contact

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## Teaching groups languages

You can view this information at the end of this document.

## Prerequisites

No prerequisits.

## Objectives and Contextualisation

En aquesta matèria s'oferirà una introducció a la Intel·ligència Artificial, per tal de donar una perspectiva històrica

## Competences

- Communicate effectively, both orally and in writing, adequately using the necessary communicative resources and adapting to the characteristics of the situation and the audience.
- Conceive, design, analyse and implement autonomous cyber-physical agents and systems capable of interacting with other agents and/or people in open environments, taking into account collective demands and needs.
- Develop critical thinking to analyse alternatives and proposals, both one's own and those of others, in a well-founded and argued manner.
- Identify, analyse and evaluate the ethical and social impact, the human and cultural context, and the legal implications of the development of artificial intelligence and data manipulation applications in different fields.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- Work independently, with responsibility and initiative, planning and managing time and available resources, and adapting to unforeseen situations.

## Learning Outcomes

1. Communicate effectively, both orally and in writing, adequately using the necessary communicative resources and adapting to the characteristics of the situation and the audience.
2. Develop critical thinking to analyse alternatives and proposals, both one's own and those of others, in a well-founded and argued manner.
3. Incorporate the principles of responsible research and innovation in AI-based developments.
4. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
5. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
6. Understand the social, ethical and legal implications of professional AI practice.
7. Work independently, with responsibility and initiative, planning and managing time and available resources, and adapting to unforeseen situations.

## Content

INTRODUCTION TO AI

Origins

The first relevant advances

AI winter

New approaches

Successful cases

Future and open problems

Ethical issues

SEARCH

Heuristic search

Combinatorial explosion

Metaheuristics

Successful cases

KNOWLEDGE REPRESENTATION - LOGIC

The role of knowledge

Logic: proof, models

Propositional and predicate logic

Limitations of logic

LEARNING

Symbolic learning

Neural learning

Deep learning

Successful cases

NATURAL LANGUAGE

Natural language tasks

Question answering

Machine translation

Successful cases

ROBOTICS

Sensors and effectors

Architectures

Service robotics

Industrial robotics

ETHICS

Ethics in engineering

Moral agents

Alignment with individual/societal values

Autonomous car dilemmas

## Activities and Methodology

| Title | Hours | ECTS | Learning Outcomes |
|---|---|---|---|
| Type: Directed | | | |
| Sessions of theory, problems and presentations | 25 | 1 | 1, 2, 3, 4, 5, 6, 7 |
| Type: Autonomous | | | |
| Assimilation of theory and problems sessions | 25.8 | 1.03 | 1, 2, 4, 5, 7 |
| Preparation of presentations | 20 | 0.8 | 3, 6 |

The sessions will be face-to-face in class and will be organized to introduce the contents of the subject, through n

Sessions will be organized two hours a week with all students. For the presentations, the division of the students

In the face-to-face sessions, the concepts detailed in the syllabus of the subject will be worked on. In some cases

The classes of problems will serve to exemplify what has been explained in the theory classes. The presentations

The student will have to complete the face-to-face classes with the autonomous personal work in the realization c

The management of the teaching will be done through the UAB Virtual Campus platform, which will be used to vie

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

## Assessment

### Continous Assessment Activities

| Title | Weighting | Hours | ECTS | Learning Outcomes |
|---|---|---|---|---|
| Presentations | 0.4 | 0.2 | 0.01 | 3, 6 |
| Test 1 | 0.3 | 2 | 0.08 | 1, 2, 4, 5, 7 |
| Test 2 | 0.3 | 2 | 0.08 | 1, 2, 4, 5, 7 |

The assessment of the subject will take into account three types of assessment activities: Two midterm exams as

The final grade of the course is obtained by combining the assessment of these 3 activities as follows:

Final Grade = (0.6 the two partial tests of individual evaluation) + (0.4 Presentations by groups)

Presentations:

• A minimum grade of 5 in this activity must be obtained in order to pass the subject.

Individual assessment: this section includes the results of the individual tests that will be done throughout the cou

• A minimum grade of 4.5 must be obtained in each of the two parts in order to pass the course.

• The final grade will be the average of the two partials:

Individual Assessment = (0.5 * Partial1) + (0.5 * Partial 2)

The assessment of the subject will take into account three types of assessment activities: Two midterm exams as

• A minimum grade of 5 must be obtained in the grade of the individual assessment in order to pass the course.

Recovery:

• First partial: a student who fails the first partial can recover it in the final exam.

• Second partial: a student who fails the first partial can recover it in the final exam.

• Presentation / Work: in case of not reaching 5 in the presentation/work, the group has to resubmit the corrected

Not assessable: A student will be considered non-assessable (NA) if he / she does not participate in the presenta

Suspended: If the calculation of the final grade is equal to or higher than 5 but does not reach the minimum requi

Honors: Granting an honors degree is the decision of the faculty responsible for the subject. UAB regulations stat

Important Note: Copies and plagiarism Without prejudice to other disciplinary measures deemed appropriate, and in accordance with current academic regulations, irregularities committed by a student that may lead to a variation in the grade will be graded with a zero (0). Assessment activities qualified in this way and by this procedure will not be recoverable. If it is necessary to pass any of these assessment activities to pass the subject, this subject will be suspended directly, without the opportunity to retake it in the same course. These irregularities include, but are not limited to: • The total or partial copy of an internship, report, or any other assessment activity • Let copy • Present a group work not done entirely by the group members • Present as own materials prepared by a third party, even if they are translations or adaptations, and in general works with non-original and exclusive elements of the student • Have communication devices (such as mobile phones, smart watches, etc.) accessibleduring individual theoretical-practical assessment tests (exams). • Talk to classmates during individual theoretical-practical assessment tests (exams); • Copying or attempting to copy other students during the theoretical-practical assessment tests (exams); • Use or attempt to use writings related to the subject during the performance of the theoretical-practical assessment tests (exams), when these have not been explicitly allowed. In these cases, the numerical grade of the transcript will be the lower value between 3.0 and the weighted average of the grades (and therefore it will not be possible to pass it by compensation). Copy of the program code will be used in the evaluation of problem and practice deliveries. Note on planning assessment activities: The dates of continuous evaluation and delivery of works will be published at the beginning of the course and may be subject to schedule changes for reasons of adaptation to possible incidents. These changes will always be reported to the Virtual Campus as it is understood that this is the usual platform for the exchange of information between teachers and students.

## Bibliography

Inteligencia Artificial. Ramon López de Mántaras, Pedro Meseguer, in collection "Qué Sabemos de…", Los libros de la Catarata, 2017.

Artificial Intelligence. A modern approach. Stuart Russell, Peter Norvig. 4th edition. Pearson, 2020.

## Software

None.

## Language list

| Name | Group | Language | Semester | Turn |
|------|-------|----------|----------|------|
| (TE) Theory | 71 | English | first semester | afternoon |