



POLITÉCNICA

INTERNATIONAL  
CAMPUS OF  
EXCELLENCE

COORDINATION PROCESS OF  
LEARNING ACTIVITIES  
PR/CL/001



E.T.S. de Ingenieros  
Informáticos

# ANX-PR/CL/001-01

## LEARNING GUIDE

**SUBJECT**

**103000372 - Seminars**

**DEGREE PROGRAMME**

10AJ - Master Universitario En Inteligencia Artificial

**ACADEMIC YEAR & SEMESTER**

2025/26 - Semester 2

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## 1. Description

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### 1.1. Subject details

<b>Name of the subject</b>	103000372 - Seminars
<b>No of credits</b>	10 ECTS
<b>Type</b>	Compulsory
<b>Academic year of the programme</b>	First year
<b>Semester of tuition</b>	Semester 2
<b>Tuition period</b>	February-June
<b>Tuition languages</b>	English
<b>Degree programme</b>	10AJ - Master Universitario en Inteligencia Artificial
<b>Centre</b>	10 - E.T.S. De Ingenieros Informáticos
<b>Academic year</b>	2025-26

## 2. Faculty

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### 2.1. Faculty members with subject teaching role

<b>Name and surname</b>	<b>Office/Room</b>	<b>Email</b>	<b>Tutoring hours *</b>
Damiano Zanardini (Subject coordinator)		damiano.zanardini@upm.es	- -
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Nikolaus Guyon Swoboda		nik.swoboda@upm.es	Sin horario.
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\* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

### 2.3. External faculty

Name and surname	Email	Institution
Elena Montiel Ponsoda	emontiel@fi.upm.es	ETSI Informáticos

## 3. Skills and learning outcomes \*

### 3.1. Skills to be learned

C1 - Ser capaces de aplicar técnicas de trabajo colaborativo en equipos multidisciplinares y liderazgo, así como utilizar métodos para asumir la responsabilidad de orientar y realizar trabajos científicos en el ámbito de la Inteligencia Artificial. (To be able to apply collaborative work techniques in multidisciplinary teams and leadership, as well as use methods to take responsibility for guiding and carrying out scientific work in the field of Artificial Intelligence). TIPO: Competencias.

C2 - Ser capaces de analizar y evaluar los problemas éticos y sociales relacionados con la Inteligencia Artificial, y tener la capacidad de aplicar la teoría a casos prácticos relevantes. (To be able to analyze and evaluate ethical and social problems related to Artificial Intelligence, and have the ability to apply theory to relevant practical cases). TIPO: Competencias.

C3 - Ser capaces de concebir, desarrollar y validar nuevos sistemas que puedan aumentar la calidad de vida de las personas, y realizar, en contextos académicos y profesionales, innovaciones o avances tecnológicos que puedan hacer avanzar el estado del arte en áreas relacionadas con la Inteligencia Artificial. (To be able to

conceive, develop, and validate new systems that can improve people's quality of life, and carry out, in academic and professional contexts, innovations or technological advances that can advance the state of the art in areas related to Artificial Intelligence). TIPO: Competencias.

C4 - Ser capaces de resolver problemas e integrar conocimiento en temas nuevos o escasamente definidos y en entornos multidisciplinares del área de la Inteligencia Artificial. (To be able to solve problems and integrate knowledge in new or loosely defined topics and multidisciplinary environments in the field of Artificial Intelligence). TIPO: Competencias.

C6 - Ser capaces de aplicar metodologías, procedimientos, herramientas y normas del estado del arte para la creación de nuevos componentes tecnológicos. (To be able to apply methodologies, procedures, tools, and standards from the state of the art for the creation of new technological components). TIPO: Competencias.

C7 - Ser capaces de construir nuevas hipótesis y modelos, evaluarlos y aplicarlos a la resolución de problemas en el área de la Inteligencia Artificial. (To be able to build new hypotheses and models, evaluate them, and apply them to problem-solving in the field of Artificial Intelligence). TIPO: Competencias.

C8 - Ser capaces de explicar e interpretar adecuadamente los resultados de la modelización y análisis de datos proporcionados por las técnicas de Inteligencia Artificial, utilizando plataformas existentes. (To be able to properly explain and interpret the results of modeling and data analysis provided by Artificial Intelligence techniques, using existing platforms). TIPO: Competencias.

C9 - Tener la capacidad de evaluar la aplicación de los algoritmos de Inteligencia Artificial, sus ventajas y limitaciones, y de seleccionar adecuadamente las técnicas apropiadas para un problema práctico o de investigación. (To have the ability to evaluate the application of Artificial Intelligence algorithms, their advantages and limitations, and to appropriately select the techniques suitable for a practical or research problem). TIPO: Competencias.

K1 - Conocer los fundamentos de la investigación y la gestión de proyectos en el campo de la Inteligencia Artificial, las oportunidades y los riesgos, así como las implicaciones éticas, sociales y legales. (To understand the fundamentals of research and project management in the field of Artificial Intelligence, including opportunities, risks, and ethical, social, and legal implications). TIPO: Conocimientos o contenidos.

K2 - Conocer los modelos cuantitativos que dan soporte a los procesos de toma de decisiones en sus distintas variantes. (To understand quantitative models that support decision-making processes in their various forms). TIPO: Conocimientos o contenidos.

K3 - Conocer la teoría, los algoritmos y las herramientas software del aprendizaje automático. (To understand the theory, algorithms, and software tools of machine learning). TIPO: Conocimientos o contenidos.

K4 - Conocer las principales técnicas de computación natural, tanto a nivel simbólico como físico, e identificar su

idoneidad para distintos tipos de problemas. (To understand the main techniques of natural computing, both at a symbolic and physical level, and identify their suitability for different types of problems). TIPO: Conocimientos o contenidos.

K5 - Conocer los métodos de representación del conocimiento y razonamiento aplicables al desarrollo de sistemas inteligentes en entornos centralizados y distribuidos. (To understand the methods of knowledge representation and reasoning applicable to the development of intelligent systems in centralized and distributed environments). TIPO: Conocimientos o contenidos.

K6 - Conocer los problemas relacionados con la robótica y la visión por computador, y los algoritmos que los resuelven. (To understand the problems related to robotics and computer vision, and the algorithms that solve them). TIPO: Conocimientos o contenidos.

K7 - Conocer los avances más recientes en el ámbito de la Inteligencia Artificial. (To understand the latest advances in the field of Artificial Intelligence). TIPO: Conocimientos o contenidos.

S1 - Plantear un proyecto de investigación, teniendo en cuenta los riesgos y los aspectos éticos, sociales y legales. (To formulate a research project, considering risks and ethical, social, and legal aspects). TIPO: Habilidades o destrezas.

S2 - Aplicar los modelos cuantitativos que dan soporte a los procesos de toma de decisiones en sus distintas variantes. (To know how to apply quantitative models that support decision-making processes in their various forms). TIPO: Habilidades o destrezas.

S3 - Analizar conjuntos de datos para identificar propiedades generales o relaciones que permitan explicar unos datos a partir de otros, aplicar algoritmos de aprendizaje automático para generar automáticamente modelos a partir de dichos datos y evaluar el rendimiento de dichos modelos. (To analyze data sets to identify general properties or relationships that explain one data set from another, apply machine learning algorithms to automatically generate models from such data, and evaluate the performance of such models). TIPO: Habilidades o destrezas.

S4 - Aplicar las principales técnicas de computación natural, tanto a nivel simbólico como físico, en base a su idoneidad para distintos tipos de problemas. (To apply the main techniques of natural computing, both at a symbolic and physical level, based on their suitability for different types of problems). TIPO: Habilidades o destrezas.

S5 - Almacenar conocimiento de forma que sea procesable por sistemas informáticos, posibilitando su reutilización en diferentes aplicaciones, y construir sistemas con capacidades de razonamiento para realizar de forma automática tareas tales como planificación o análisis de consistencia. (To store knowledge in a way that is processable by computer systems, enabling its reuse in different applications, and build systems with reasoning capabilities to automatically perform tasks such as planning or consistency analysis). TIPO: Habilidades o

destrezas.

S6 - Analizar un problema de robótica o de visión por computador, determinar qué técnica es la más adecuada para su resolución y evaluar su funcionamiento. (To analyze a problem in robotics or computer vision, determine which technique is most suitable for its resolution, and evaluate its performance). TIPO: Habilidades o destrezas.

S7 - Aplicar de manera efectiva y avanzada las técnicas de Inteligencia Artificial en contextos complejos y en constante evolución. (To effectively and advancedly apply Artificial Intelligence techniques in complex and constantly evolving contexts). TIPO: Habilidades o destrezas.

S8 - Identificar áreas de aplicación en las que se puedan utilizar las técnicas y métodos de la Inteligencia Artificial y aplicar los mismos de manera adecuada. (To identify application areas where Artificial Intelligence techniques and methods can be used and apply them appropriately). TIPO: Habilidades o destrezas.

### 3.2. Learning outcomes

RA115 - Los resultados del aprendizaje correspondientes a esta asignatura han quedado definidos en el apartado de competencias de este documento, señalando los que corresponden a conocimientos, habilidades y competencias propiamente dichas.

\* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

## 4. Brief description of the subject and syllabus

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### 4.1. Brief description of the subject

The student must attend **six seminars**. The seminars offered in the Master's degree course are all optional, except S1: Research Methodology, S2: Project Management and Risk Control and S3: Ethical and legal aspects of Artificial Intelligence, which are mandatory. All seminars are organised into three categories:

- **Mandatory** seminars (S1 and S2, each with 2 ECTS; S3, with 1.5 ECTS).
- Seminars whose name match the subject to which they belong (**representative** seminars) (S5, S6, S7, S8 and S11, all with 1.5 ECTS). If the student decides not to be taught any module belonging to M2 to M6, then the student must take this seminar. In these seminars the student will acquire general knowledge

about the respective subject.

- **Optional** seminars that complement modules (S4, S9, S10, S12, S13, S14, S15 and S16, all with 1.5 ECTS). These are aimed at covering some disciplines of Artificial Intelligence which are not studied in the modules.
- Seminars by visiting professors, in which the student acquires advanced or specialised knowledge about any of the subjects taught within the course.

Note: under duly justified circumstances, seminars can be attended as distance learning via videoconferencing, with the exception of S9: Fuzzy logic and S12: Principals of Robotic Locomotion.

## SEMINAR DESCRIPTIONS

**S1: Research Methodology** (offered in English). This seminar guides students about the most common methods, techniques and systems used for the practice of scientific research, what will be relevant for the development of their MSc theses, as well as for some of the courses covered in this Master. The topics that will be covered in this seminar are the following:

- The career of a researcher, where the different paths and stages of the career of a researcher in academia or industry will be reviewed and discussed.
- The Scientific Method and how it can be applied in the context of Artificial Intelligence.
- The role of scientific publications in research, including where and when to publish results, and how to publish them.
- Methods and Techniques for generating a literature review.
- Intellectual property, including industrial property, copyright and software licenses.
- Open Science: principles, good practices and trends.

**S2: Project Management and Risk Control** (offered in English). This seminar will cover fundamental aspects of project management and risk control. It will be possible for the student to understand the principles of project management, risk and change management, as well as to acquire the ability to apply methodologies and processes for project management and risk mitigation.

**S3: Ethical and legal aspects of Artificial Intelligence** (offered in English). This seminar provides students an introduction to the legal framework regulating data and AI in Europe. The students will also learn how to evaluate in practice the ethical aspects of an AI project.

**S4: Artificial Intelligence and Inclusion** (offered in English). This seminar will provide the student with general knowledge about Bias and Fairness in AI methods and techniques with respect to the disability dimension, since most of the research done so far on these aspects has focused on race and gender; Explicability, in general and with respect to the disability dimension (an essential aspect to minimize bias and ensure fairness refers to the creation of explanations associated with AI developments); and Cases of use and applications of AI methods and techniques to solve social inclusion problems.

**S5: Decision Analysis** (offered in English). The seminar provides students with a general knowledge on the topic of Decision Analysis, being itself an introduction to the different modules that are part of the subject: Decision Support Systems, Participatory Decision-Making and Negotiation and Simulation Methods.

**S6: Machine Learning** (offered in English). The seminar provides students with general knowledge about the topic of Machine Learning, being itself an introduction to the various modules and seminars that are part of the subject: Bayesian Networks, Machine Learning and Neural Networks.

**S7: Natural Computing** (offered in English). The seminar provides students with general knowledge about the topic of Natural Computing, being itself an introduction to the different modules which are part of the subject: Intelligent Search based on Metaheuristics, Evolutionary Computation and Unconventional Computing (biomolecular computing and biocircuit engineering).

**S8: Knowledge Representation and Reasoning** (offered in Spanish). The seminar provides students with general knowledge on the topic of Knowledge Representation and Reasoning Models, being itself an introduction to the several modules and seminars that are part of the subject: Intelligent Agents and Multi- agent Systems, Ontology Engineering, Commonsense Reasoning and Fuzzy Logic.

**S9: Fuzzy Logic** (offered in Spanish). This seminar aims to provide the theoretical and practical foundations of Fuzzy Logic, which permits to represent imprecise knowledge. Students will acquire knowledge of the design of fuzzy control systems and their inference process in current applications and real-world scenarios. This seminar is intended for students without previous experience in fuzzy logic.

**S10: Cognitive Computing** (offered in Spanish). The aim of this seminar is to provide an introduction to Cognitive Science and Cognitive Systems, paying attention to architectures, key components, and revising the main systems and platforms that can be found in the literature.

**S11: Cognitive Robotics and Perception** (offered in Spanish). The purpose of this seminar is to provide students with a brief introduction to some of the topics covered in the following courses: Computer Vision and Autonomous

Robots. The seminar will include:

- Robotics: Introduction and Reactive navigation; Control of robotic systems; Planning.
- Computer Vision: Introduction; Deep models for computer vision

**S12: Principles of Robotic Locomotion** (offered in English). Very few living organisms do not have the capacity of locomotion, being able to move is fundamental to survival in the real world. Likewise, locomotion is one of the basic capacities expected of an intelligent robotic system. In this seminar we will discuss issues related to robot

locomotion with a focus on navigation and mapping. Participants in the seminar will build a simple robot controller and will test that controller in a real robot.

**S13: Applications of Artificial Intelligence** (offered in English). The seminar is a compendium of Artificial Intelligence applications naturally taking full advantage of the research potential of professors at DIA and the experience of its members in numerous R&D projects undertaken in recent years. In order to do this, descriptions of all DIA modules (and particularly those who have an applied component and less than basic research) are considered and included in this seminar. In this seminar not only are the topics important to teach, but teaching the very development of Artificial Intelligence applications and projects in the area, exceeding the idea of mere exposition of a theoretical lectures without the applied aspect which is essential in Artificial Intelligence and

particularly for industrial use.

**S14: Natural Language Processing** (offered in Spanish). The purpose of this seminar derives from the need to fill a gap in the teaching of subjects that are, generally speaking, on Language Engineering. On the one hand, when we talk about Engineering, then we talk about design, methodologies, techniques, systems, and components; on the other hand, when we talk about language then we talk about grammars, corpora, dictionaries, etc. Usually, the teaching of these subjects often has a tendency, perhaps excessive, to one side or another. This seminar aims to provide a unified view of both sides, from the fundamentals to applications. The area of Linguistic Engineering is considered to be one of the areas where most research and development efforts will lie in the next few years, if we are to achieve the goal of having machines that really make our lives easier in a simple way. The seminar is focused, in the first part, on the state of the art technologies, followed by a second part where we will explore in

depth technologies that allow supporting applications on the market. For practical reasons, the practice work will be focused in word processing technologies.

**S15: Automated Planning** (offered in English). Automated planning is a branch of Artificial intelligence aimed at obtaining plans (i.e. sequences of actions) for solving complex problems or for governing the behavior of intelligent agents, autonomous robots or unmanned vehicles. Planning techniques have been successfully applied in different

domains, including industrial contexts, logistics, computer games, robotics or space exploration. In this seminar we will review the existing approaches for solving classical planning problems, such as state-space search, plan-space search, graph-based techniques or turning classical planning problems into propositional satisfiability problems. The course will then focus on the study of knowledge-based planning methods, such as control rule-based pruning or hierarchical task network-based planning techniques. These approaches exploit the domain knowledge provided by human experts to improve the performance of the planning algorithms. Finally, we will briefly introduce

advanced planning algorithms, which are able to generate planning policies that take into account time constraints and/or partial observability conditions, which are common in real world applications.

**S16: Generative AI and Prompt Engineering: Applications and Challenges** (offered in Spanish). Generative artificial intelligence (GenAI) includes systems capable of creating and generating content, such as text, images, or other media, in response to instructions or prompts. When these systems can process and integrate data from different modalities along with textual prompts (such as images, audio, and video), we refer to this as multimodal GenAI. These technologies have experienced exponential growth in popularity due to their ease of use and ability to address a wide variety of tasks, from generating creative and artistic content to solving complex problems in fields like engineering and medicine. This seminar will explore the field of multimodal GenAI, focusing on its practical application through methods such as prompt engineering, few-shot prompting, chain-of-thought prompting, and retrieval-augmented generation (RAG). A challenge-based learning methodology will be followed. Some

challenges that can be addressed with GenAI include: generating videos from textual descriptions, answering questions about content in images, or automatic voice-to-text translation. Collaborative work, active experimentation, and the exchange of ideas among participants will be encouraged.

## 4.2. Syllabus

1. S1: Research Methodology
2. S2: Project Management and Risk Control
3. S3: Ethical and legal aspects of Artificial Intelligence
4. S4: Artificial Intelligence and Inclusion
5. S5: Decision Analysis
6. S6: Machine Learning
7. S7: Natural Computing
8. S8: Knowledge Representation and Reasoning
9. S9: Fuzzy Logic
10. S10: Cognitive Computing
11. S11: Cognitive Robotics and Perception
12. S12: Principles of Robotic Locomotion
13. S13: Applications of Artificial Intelligence
14. S14: Natural Language Processing
15. S15: Automated Planning
16. S16: Generative AI and Prompt Engineering: Applications and Challenges

## 5. Schedule

### 5.1. Subject schedule\*

Week	Type 1 activities	Type 2 activities	Distant / On-line	Assessment activities
1	<b>S1: Research methodology</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
2	<b>S2: Project management and risk control</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
3	<b>S3: Ethical and legal aspects of Artificial Intelligence</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
4	<b>S4: Artificial Intelligence and Inclusion</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
5	<b>S5: Decision analysis</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
6	<b>S6: Machine learning</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
7	<b>S7: Natural computing</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00

8	<b>S8: Knowledge representation and reasoning</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
9	<b>S9: Fuzzy logic</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
10	<b>S10: Cognitive Computing</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
11	<b>S11: Cognitive robotics and perception</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
12	<b>S12: Principles of robotic locomotion</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
13	<b>S13: Applications of Artificial Intelligence</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
14	<b>S14: Natural language processing</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
15	<b>S15: Automated planning</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00
16	<b>S16. Generative AI and Prompt Engineering: Applications and Challenges</b> Duration: 10:00 Lecture			<b>Evaluation activities</b> Other assessment Progressive assessment and Global Examination Presential Duration: 00:00

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Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

## 6. Activities and assessment criteria

### 6.1. Assessment activities

#### 6.1.1. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
1	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	C1 C2 K1 S1
2	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K1 S1 C1 C2
3	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	C1 C2 K1 S1
4	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	C1 C2 K1 S1
5	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	S8 C7 C8 C3 C9 K2 S2
6	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	S3 S8 C7 C8 C3 C9 K3
7	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	S4 S8 C7 C8 C3 C9 K4

8	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	S5 S8 C7 C8 C3 C9 K5
9	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	C7 C8 C3 C9 K5 S5 S8
10	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	S5 S8 C7 C8 C3 C9 K5
11	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K6 S8 C7 C8 C3 C9 S6
12	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K6 S8 C7 C8 C3 C9 S6
13	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K7 S7 S8 C6 C7 C8 C3 C9 C4
14	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K7 S7 S8 C6 C7 C8 C3 C9 C4

15	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K7 S7 S8 C6 C7 C8 C3 C9 C4
16	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K7 S7 S8 C6 C7 C8 C3 C9 C4

### 6.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
1	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	C1 C2 K1 S1
2	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K1 S1 C1 C2
3	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	C1 C2 K1 S1
4	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	C1 C2 K1 S1
5	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	S8 C7 C8 C3 C9 K2 S2
6	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	S3 S8 C7 C8 C3 C9 K3

7	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	S4 S8 C7 C8 C3 C9 K4
8	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	S5 S8 C7 C8 C3 C9 K5
9	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	C7 C8 C3 C9 K5 S5 S8
10	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	S5 S8 C7 C8 C3 C9 K5
11	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K6 S8 C7 C8 C3 C9 S6
12	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K6 S8 C7 C8 C3 C9 S6
13	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K7 S7 S8 C6 C7 C8 C3 C9 C4

14	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K7 S7 S8 C6 C7 C8 C3 C9 C4
15	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K7 S7 S8 C6 C7 C8 C3 C9 C4
16	Evaluation activities	Other assessment	Face-to-face	00:00	16.66%	5 / 10	K7 S7 S8 C6 C7 C8 C3 C9 C4

### 6.1.3. Referred (re-sit) examination

No se ha definido la evaluación extraordinaria.

## 6.2. Assessment criteria

The **final grade** of this class is computed from the grades obtained in each of the six seminars taken.

If all the grades are **at least 5 out of 10**, then the final grade will be the **average** of the six. Otherwise, the final grade will be the minimum of the six.

The student obtains his or her grades during the semester, as long as the seminars take place.

In both the **ordinary period** (convocatoria ordinaria) and the **extraordinary period** (convocatoria extraordinaria), the student who hasn't passed the class (because he or she did not obtain at least 5 out of 10 in six seminars during the teaching period) can take suitable evaluation activities of one or more seminars. Such activities will be decided by the teachers of each seminar and will allow the student to pass the class.

The evaluation activities in each one of them vary, being those indicated below:

**S1: Research methodology:** Although the seminar is compulsory, attendance is not mandatory. The student will individually do a test and perform a work:

- Test related to the contents of the seminar, done at the end of the seminar (30%).
- Summarizing the most important points addressed in the seminar (70%).

**S2: Project management and risk analysis:** The final grade is obtained as follows:

- Grade of written summary of the most important points presented at the seminar (30%).
- Grade of written summary and presentation of one of the topics presented in class (30%).

- Grade of attendance and participation in class (40%). The student must attend at least the 80% of the classes.

**S3: Ethical and legal aspects of Artificial Intelligence:** The final grade is obtained as follows:

- Two Moodle questionnaires made during the sessions 2 and 3 and one paper questionnaire during the last session. The evaluation is obtained as the average of these questionnaires.
- Attendance is strongly recommended.

**S4: Artificial Intelligence and Inclusion:**

- Students will have to deliver an individual report around a topic proposed during the seminar where all the skills acquired in this course are demonstrated.
- Attendance and participation during the sessions could be also considered.

**S5: Decision Analysis:**

- Regular attendance to class will be an essential condition.
- Individual summary about the theoretical content of the course. It will be evaluated according to its completeness, clarity and coherence.
- Collective work on the state of the art of the discipline through a specific wiki associated to the seminar. It will be evaluated according to the participation index, the ability to interconnect ideas, clarity and originality.

**S6: Machine Learning:**

- Attendance will be mandatory.
- The student will individually perform a practical work consisting of software management and oral presentation of an application case.

**S7: Natural computing:**

- Compulsory attendance at the seminars (35%).
- Individual work summary report (65%).

**S8: Knowledge representation and reasoning:** The final grade will be computed in the following way:

- Attendance to the classes (40%)
- Written test about the topics covered in the seminar (60%).

**S9: Fuzzy logic:**

- Attendance to the classes (40%).
- There will be a written exam on the last day of the seminar, without the possibility of consulting notes, bibliography or any other type of documentation (60%).

**S10: Cognitive computing:**

- Attendance to class (a minimum of 80% attendance is mandatory) (40%).
- Summary of the most important points discussed in the seminar. The clarity, coherence and correct use of the terminology will be evaluated (30%).
- Individual work that delves into one of the topics covered in the seminar. The presentation, clarity and adequacy of the bibliography will be evaluated (30%).

**S11: Cognitive robotics and perception:**

- Attendance and participation in classes during the seminar (15%).
- Practical project, including its presentation and defense (85%).

**S12: Principles of robotic locomotion:**

- Attendance and participation in classes during the seminar (25%).
- Practical project (75%).

**S13: Application of Artificial Intelligence:**

- Attendance of the students to the seminar.

- The development of a practical work on one of the topics of the seminar. The workload necessary for this practice will be adequate and proportional to the idea of a seminar and the number of credits.

#### **S14: Natural Language processing:**

- Attendance in at least 80% of the classes.
- A work done individually or in a group on a topic to be defined related to the exploration of information on some type of system in the market, its analysis and conclusions. It is not intended with this work more than to accustom the student to search existing solutions in the market and learn to develop an idea of how to solve them. The qualification in the extraordinary period will be governed by the same rules as in the ordinary one. Attendance 80% of the classes is required as well as to delivery an individual or group work.

#### **S15: Automated planning:**

- Attendance to the classes and short practices carried out during the seminar (50%).
- A project that will be carried out by the students (50%).

#### **S16: Generative AI: Applications ad Challenges:**

- Attendance of the students to the seminar.
- Peer assessment among students.
- The development of a practical work on one of the topics of the seminar. The workload necessary for this practice will be adequate and proportional to the idea of a seminar and the number of credits.
- [ Global and extraordinary assessment ] : This may include a written exam, and the practical project may differ from the one carried out during the ordinary assessment. In all cases, the evaluation will take place face to face.

#### **Seminars by visiting professors:**

- The evaluation activities of these seminars will be established by the visiting teachers.
- Attending one or more of these seminars may be awarded with a bonus of up to +1.0 points on the total grade of the whole subject (i.e., is the average grade of the six seminars is 7.7, the student could get a maximum of 8.7 as the final grade), with the condition that such total grade is already at least 5 out of 10. The subject coordinator will decide how to apply the bonus, taking into account the specific circumstances

(number of seminars, numbers of sessions in each seminar, etc.). The bonus is not meant to be taken for granted by the students, who will be informed in due time about if and how the bonus will be given.

## 7. Other information

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### 7.1. Other information about the subject

Although the Seminars subject is taught in the second semester, seminar S1: Research Methodology is also taught (exceptionally) in the first week of the first semester. Students can choose to attend this seminar in any of the two semesters.

Seminars can be attended as distance learning via videoconferencing (except S9, S12, and S16).

#### Teaching staff:

S1: Research methodology

Óscar Corcho García, Asunción Gómez Pérez (coordinator), Mariano Rico Almodóvar, Víctor Rodríguez Doncel

S2: Project management and risk control

Javier Bajo Pérez (coordinator), Asunción Gómez Pérez

S3: Ethical and legal aspects of Artificial Intelligence

Asunción Gómez Pérez (coordinator), Laura Melgar García, Víctor Rodríguez Doncel

#### S4: Artificial Intelligence and Inclusion

María del Carmen Suárez de Figueroa Baonza (coordinator)

#### S5: Decision analysis

Concha Bielza Lozoya, Jacinto González Pachón (coordinator), Antonio Jiménez Martín

#### S6: Machine learning

Concha Bielza Lozoya, Pedro Larrañaga Múgica (coordinator)

#### S7: Natural Computing

Pedro Larrañaga Múgica, Alfonso Mateos Caballero, Alfonso Rodríguez-Patón Aradas (coordinator)

#### S8: Knowledge representation and reasoning

Óscar Corcho García, Asunción Gómez Pérez, Josefa Hernández Diego, Daniel Manrique Gamo, Martín Molina González (coordinator), Elena Montiel Ponsoda, Nik Swoboda

#### S9: Fuzzy logic

Daniel Manrique Gamo (coordinator)

S10: Cognitive computing

Javier Bajo Pérez, Óscar Corcho García, Asunción Gómez Pérez, Jacinto González Pachón, Josefa Hernández Diego, Laura Melgar García (coordinator), Martín Molina González, Nik Swoboda

S11: Cognitive robotics and perception

Luis Baumela Molina, Javier de Lope Asiaín, Nik Swoboda (coordinator), Roberto Valle Fernández

S12: Principles of robotic locomotion

Nik Swoboda (coordinator)

S13: Applications of Artificial Intelligence

Juan Antonio Fernández del Pozo Salamanca (coordinator), Víctor Maojo García, Alfonso Mateos Caballero, M<sup>a</sup> del Carmen Suárez de Figueroa Baonza

S14: Natural language processing

Igor Boguslavski, Mariano Rico Almodóvar (coordinator)

S15: Automated planning

Miguel García Remesal (coordinator)

S16: Generative AI and Prompt Engineering: Applications and Challenges

Emilio Serrano Fernández (coordinator), Damiano Zanardini

### ODS:

In the Project Management and Risk Management seminar, all SDGs are addressed, as European calls for projects are explained and all of them assess the SDGs.

The Artificial Intelligence and Inclusion seminar covers: SDG4 (Quality Education), SDG5 (Gender Equality), and SDG10 (Reducing Inequalities).

The Automatic Planning seminar works on SDG 7: Affordable Energy. It explains how automated planning techniques can optimise the movement of containers in port terminals, thus contributing to a more efficient use of the energy resources required by cranes and other container transport and exchange vehicles.

The seminars Knowledge Representation and Reasoning and Cognitive Computing address SDG10: Reducing inequalities.