



## GENERAL INFORMATION

### Data of the subject

Subject name	Advanced Automation
Subject code	DEAC-MII-632
Main program	<a href="#">Official Master's Degree in Industrial Engineering</a>
Involved programs	Máster Universitario en Ingeniería Industrial [Second year]
Credits	4,5 ECTS
Type	Obligatoria
Department	Department of Electronics, Control and Communications

### Teacher Information

#### Teacher

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#### Profesores de laboratorio

#### Teacher

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## DESCRIPTION OF THE SUBJECT

### Contextualization of the subject

#### Prerequisites

Knowledge of Industrial Automation.

## Course contents

### Contents

1. Industrial robotics. Types of industrial robots. Elements of a robot. Specific drives and sensors. Robot dynamics. Robot selection. Robot programming. Simulation.
2. Integration of equipment and systems in industrial systems with a high degree of automation. Taxonomy of equipment to be integrated (PLCs, robots, drives, advanced sensors). Strategies. Protocols. Cybersecurity.



3. Architecture and design of supervision and control systems. Functions. Human machine interface. Hardware and software architecture. Examples: power remote controls, traffic control.
4. New technologies applied to industrial automation: virtual reality, augmented reality, connection to the cloud, collaborative robotics, simulation tools, design tools.
5. Safety and reliability in systems with a high degree of automation.
6. Case studies of industrial systems with a high degree of automation.

## EVALUATION AND CRITERIA

The use of AI to produce full assignments or substantial parts thereof, without proper citation of the source or tool used, or without explicit permission in the assignment instructions, will be considered plagiarism and therefore subject to the University's General Regulations.

Evaluation activities	Evaluation criteria	Weight
<ol style="list-style-type: none"><li>1. Final exam or equivalent project (35%). Those students who have a mark equal to or higher than 7.5 in the follow-up tests and an average mark equal to or higher than 9 in the laboratory practicals may substitute the final exam with an individual automation project of average complexity.</li><li>2. Follow-up tests (15%).</li></ol>	<ol style="list-style-type: none"><li>1. Understanding of concepts.</li><li>2. Application of concepts to the resolution of practical problems.</li><li>3. Analysis and interpretation of the results obtained in problem solving.</li><li>4. Presentation and written communication.</li></ol>	50
<ol style="list-style-type: none"><li>1. Laboratory practicals (45%)</li><li>2. Class participation (5%)</li></ol>	<p>Understanding of concepts</p> <p>Application of concepts to the resolution of practical problems in the laboratory.</p> <p>Analysis and interpretation of the results obtained in the problems solved.</p> <p>Ability to work in groups.</p> <p>Presentation and written communication.</p> <p>Participation in solving problems in class.</p> <p>Attitude in class.</p>	50

## Grading

The grade in the ordinary exam is obtained according to the weights indicated in Assessment Activities, provided that the marks obtained in the final exam, or equivalent project, and in the laboratory practicals are greater than or equal to 5.

The grade in the extraordinary exam will be obtained in the same way as in the ordinary exam, substituting the grade obtained in the final exam, or equivalent project, for the grade obtained in the extraordinary exam. In addition, if the grade in the laboratory practicals was lower than 5, there will be a practical exam in the laboratory that will replace the practical grade.

Class attendance is compulsory, according to the Academic Regulations of the School of Engineering (ICAI). Attendance requirements will be applied separately for theory and laboratory sessions:

- In the case of theory sessions, failure to comply with this rule may prevent the student from taking the exam in the ordinary exam



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## Syllabus 2025 - 2026

session.

- In the case of laboratory sessions, failure to comply with this rule may prevent students from taking the exam in the ordinary and extraordinary exams. In any case, unexcused absences from laboratory sessions will be penalised in the evaluation.

## BIBLIOGRAPHY AND RESOURCES

### Basic References

Slides and notes of the subject

In compliance with current regulations on the **protection of personal data**, we would like to inform you that you may consult the aspects related to privacy and data [that you have accepted on your registration form](#) by entering this website and clicking on "download"

<https://servicios.upcomillas.es/sedeelectronica/inicio.aspx?csv=02E4557CAA66F4A81663AD10CED66792>