



GENERAL INFORMATION

Data of the subject	
Subject name	Advanced Automation
Subject code	DEAC-MII-632
Main program	Official Master's Degree in Industrial Engineering
Involved programs	Máster Universitario en Ingeniería Industrial y Máster Universitario en Sistemas Ferroviarios [Second year] Máster Universitario en Ingeniería Industrial + Máster en Industria Conectada / in Smart Industry [Second year] Máster Universitario en Ingeniería Industrial [Second year] Máster Universitario en Ingeniería Industrial + Máster en Industria Conectada / in Smart Industry [Second year]
Credits	4,5 ECTS
Type	Obligatoria
Department	Department of Electronics, Control and Communications

Teacher Information	
Teacher	
Name	José Antonio Rodríguez Mondéjar
Department	Department of Electronics, Control and Communications
Office	Alberto Aguilera 25 [D-211]
E-Mail	mondejar@iit.comillas.edu
Phone	2422
Profesores de laboratorio	
Teacher	
Name	Francisco Javier Calmuntia Arroyo
Department	Department of Electronics, Control and Communications
E-Mail	fjcalmuntia@icai.comillas.edu
Teacher	
Name	Javier Sánchez Alonso
Department	Department of Electronics, Control and Communications
E-Mail	jsalonso@icai.comillas.edu

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

Evaluation activities	Evaluation criteria	Weight
<ol style="list-style-type: none"> 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. 2. Follow-up tests (15%). 	<ol style="list-style-type: none"> 1. Understanding of concepts. 2. Application of concepts to the resolution of practical problems. 3. Analysis and interpretation of the results obtained in problem solving. 4. Presentation and written communication. 	50
<ol style="list-style-type: none"> 1. Laboratory practicals (45%) 2. Class participation (5%) 	<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 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/sedelectronica/inicio.aspx?csv=02E4557CAA66F4A81663AD10CED66792>