



# COMILLAS

UNIVERSIDAD PONTIFICIA

ICAI

ICADE

CIHS

**Syllabus**  
**2025 - 2026**

## GENERAL INFORMATION

Data of the subject	
Subject name	Industrial Automation
Subject code	DEAC-MII-521
Mainprogram	<a href="#">Official Master's Degree in Industrial Engineering</a>
Involved programs	Grado en Administración y Dirección de Empresas y Máster Universitario en Ingeniería Industrial [Fifth year] Máster Universitario en Ingeniería Industrial [First year]
Credits	6,0 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]
EMail	mondejar@iit.comillas.edu
Phone	2422
Teacher	
Name	Francisco Javier Calmuntia Arroyo
Department	Department of Electronics, Control and Communications
EMail	fjcalmuntia@icai.comillas.edu
Teacher	
Name	Lucía Güitta López
Department	Department of Electronics, Control and Communications
Office	Francisco de Ricci, 3
EMail	lguitta@comillas.edu
Phone	4518
Teacher	
Name	Sergio Luis Asenjo Vegue
Department	Department of Electronics, Control and Communications
EMail	sasenjo@icai.comillas.edu
Teacher	
Name	Alfonso Vázquez Requejo



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<b>Department</b>	Department of Electronics, Control and Communications
<b>E-Mail</b>	avrequejo@comillas.edu
<b>Teacher</b>	
<b>Name</b>	Antonio Luis Molero Senosiain
<b>Department</b>	Department of Electronics, Control and Communications
<b>E-Mail</b>	almolero@icai.comillas.edu
<b>Teacher</b>	
<b>Name</b>	Emilio Manuel Domínguez Adan
<b>Department</b>	Department of Electronics, Control and Communications
<b>E-Mail</b>	emdominguez@comillas.edu
<b>Teacher</b>	
<b>Name</b>	Javier Díaz Machín
<b>Department</b>	Department of Industrial Organization
<b>E-Mail</b>	jdmachin@icai.comillas.edu
<b>Teacher</b>	
<b>Name</b>	Javier Sánchez Alonso
<b>Department</b>	Department of Electronics, Control and Communications
<b>E-Mail</b>	jsalonso@icai.comillas.edu
<b>Teacher</b>	
<b>Name</b>	José Antonio Villacañas Palomo
<b>Department</b>	Department of Electronics, Control and Communications
<b>E-Mail</b>	jvillacanas@icai.comillas.edu
<b>Teacher</b>	
<b>Name</b>	José Nicolás Burneo Riofrio
<b>Department</b>	Department of Electronics, Control and Communications
<b>E-Mail</b>	jnburneo@icai.comillas.edu
<b>Teacher</b>	
<b>Name</b>	Manuel Richi de Zavala
<b>Department</b>	Department of Electronics, Control and Communications
<b>E-Mail</b>	mrichi@icai.comillas.edu
<b>Teacher</b>	
<b>Name</b>	Rául Puyuelo Morillo
<b>Department</b>	Department of Electronics, Control and Communications
<b>E-Mail</b>	rpuyuelo@icai.comillas.edu



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## DESCRIPTION OF THE SUBJECT

### Contextualization of the subject

### Prerequisites

Basic knowledge of programming, mechanics, electrical engineering and electronics.

## Course contents

### Contents

Theory:

Topic 1: Introduction

Basic concepts: plant (process), control, operator, sensors, drives, open loop control, closed loop control, continuous processes, discrete processes, batch processing.

Topic 2: Technologies

Automation by means of automatisms and programmable controllers.

Topic 3: Basic methodologies

Programming languages. Programming using combinational and sequential strategies (Grafcet).

Topic 4: Advanced methodologies

Advanced programming of automations using templates: GEMMA and PackML.

Topic 5: Architecture of automated systems

Classical and new architectures for advanced process control. Functional, physical, data and communications organisation. ISA model. Industry 4.0 model. Supervision and control systems (SCADA).

Topic 6: Case studies

Case studies of advanced process control: energy systems, industrial plants (ISA S95), intelligent building management, logistics systems, home automation and security systems.

Topic 7: Reliability

Definitions. Architectures. Reliability analysis. SIL levels. Standardisation: IEC 61508, national legislation.

Lab: Automation, programmable controllers, man-machine interfaces, identification systems, quality control systems and robots.

## 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
1. Laboratory practice (20%). 2. Class participation (5%).	Understanding of concepts. Application of concepts to the resolution of practical problems in the laboratory. Analysis and interpretation of the results obtained in the problems solved. Ability to work in groups. Presentation and written communication. Participation in solving problems in class. Attitude in class.	25
1. Final exam or equivalent project (40%). 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 replace the final exam with an individual automation project of average complexity. 2. Follow-up tests (15%). 3. Laboratory exam (20%). For those students who take the equivalent project instead of the final exam, this activity is part of it, with a weight of 60%.	Understanding of concepts. Application of concepts to the resolution of practical problems with special emphasis on the laboratory. Analysis and interpretation of the results obtained in problem solving. Presentation and written communication.	75

## Grading

The grade in the ordinary call is obtained according to the weights indicated in Assessment Activities, provided that the marks obtained in the final exam, or equivalent project, in the laboratory exam 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 mark in the laboratory practicals or in the laboratory exam was lower than 5, there will be a practical exam in the laboratory that will replace the mark in the practicals or in the laboratory exam or both.

Class attendance is compulsory, according to the Academic Regulations of the Escuela Técnica Superior de Ingeniería (ICAI). School of Engineering (ICAI). Attendance requirements will be applied independently 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 the student 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 course notes



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