

## SUBJECT TEACHING GUIDE

### G991 - Automatic Control Systems I

#### First Degree in Industrial Electronic Engineering and Automatic Control Systems

Academic year 2025-2026

1. IDENTIFYING DATA					
Degree	First Degree in Industrial Electronic Engineering and Automatic Control Systems			Type and Year	Compulsory. Year 2
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Electronics and Automation Module in Common with the Industrial Branch				
Course unit title and code	G991 - Automatic Control Systems I				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Knowledge Field	Industrial engineering, mechanical engineering, automation engineering, industrial organization engineering and navigation engineering				
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. TECNOLOGIA ELECTRONICA E INGENIERIA DE SISTEMAS Y AUTOMATICA				
Name of lecturer	CARLOS TORRE FERRERO				
E-mail	carlos.torre@unican.es				
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 2. DESPACHO (S2018)				
Other lecturers	MARIA SANDRA ROBLA GOMEZ LUIS GARCIA RODRIGUEZ JOSE ANGEL JUAREZ CRESPO				

4. OBJECTIVES
To present the different types of industrial automatisms, their classification and technologies.
To define and present the most common ways of representing dynamic systems.
To present the basic control actions.
To present analysis techniques in the time domain.
To present analysis techniques in the frequency domain.

6. SUBJECT PROGRAM	
CONTENTS	
1	Introduction to industrial control methods and techniques. Basic concepts and components.
2	AUTOMATISMS: Industrial automatisms: definition, types and classification. Technologies and examples.
3	Representation of time-continuous control systems.
4	TIME-DOMAIN RESPONSE Introduction.- Routh Stability Criterion - Static Error Coefficients - Response of 1st, 2nd and higher order systems.
5	BASIC CONTROL ACTIONS Introduction.- Proportional, Derivative and Integral Controls. PID Control.
6	ROOT LOCUS Introduction.- Properties.- Rules for its representation - Root contours.
7	FREQUENCY-DOMAIN RESPONSE Introduction.- Sinusoidal Transfer Function. - Bode Diagrams - Polar Diagrams - Correlation between Time-Domain and Frequency-Domain Responses.
8	STABILITY IN THE FREQUENCY DOMAIN Introduction.- Nyquist Criterion - Relative Stability: Gain Margin and Phase Margin.- Closed Loop Response.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Laboratory Practices	Laboratory evaluation	No	No	6,00
Group Project	Work	No	Yes	10,00
Other Continuous Assessment Activities	Others	No	No	4,00
Final Exam	Written exam	Yes	Yes	40,00
Laboratory Questionnaires	Written exam	No	Yes	14,00
Partial Exams (2nd and 3rd parts).	Written exam	No	Yes	26,00
<b>TOTAL</b>				<b>100,00</b>
Observations				
In order to pass this course, the student must obtain, at least, the 50% of the total points and the grade of the final exam cannot be less than 4 (out of 10).				
Observations for part-time students				
The part-time students must indicate to the professor if they can follow regularly the previewed activities. If not, they will have to do an exam at the laboratory (20%).				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Ingeniería de control moderna / Katsuhiko Ogata 5 Ed. 2010
Fundamentos de control con MATLAB / Enrique Pinto Bermúdez, Fernando Matía Espada. Pearson Education, 2010
Sistemas de control moderno / Richard C. Dorf, Robert H. Bishop. 10ª ed., Pearson Educación, 2008.
Automatismos Industriales. José A.Barbado Santana, J. Martin Sierra, J. Aparicio Bravo. Creaciones Copyright. 2011

