SUBJECT TEACHING GUIDE

G991 - Automatic Control Systems I

First Degree in Industrial Electronic Engineering and Automatic Control Systems

Academic year 2026-2027

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
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Other lecturers	ALBERTO PURAS TRUEBA MARIA SANDRA ROBLA GOMEZ LUIS GARCIA RODRIGUEZ

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	8,00
Other Continuous Assessment Activities	Others	No	No	2,00
Final Exam	Written exam	Yes	Yes	44,00
Laboratory Questionnaires	Written exam	No	Yes	12,00
Partial Exams (2nd and 3rd parts).	Written exam	No	Yes	28,00
TOTAL				100,00

Observations

REGULAR EXAM SESSION:

To pass the module, students must achieve at least 50% of the total marks, provided they have scored at least 4 out of 10 in the final exam.

SUPPLEMENTARY EXAM SESSION:

During the supplementary exam session, students may retake the following components of the module:
- Final Exam (44%): Minimum pass mark: 4.
- Mid-term assessments (28%): Theoretical and practical questions from Parts 2 and 3 of the module. Students who wish to improve their mark in any of these parts must do the full exam of questions.
- Practical questionnaires (12%)

Observations for part-time students

Part-time students must inform the professor at the start of the course whether they will be able to take part in the continuous assessment activities. If they do not do so, their assessment will consist of the two mid-term exams (28%), the final exam (46%), the automation assignment (8%) and a laboratory exam (18%) in order to pass the practicals.

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