SUBJECT TEACHING GUIDE

G991 - Automatic Control Systems I

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

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Industrial Electronic Engineering and Automatic Control Systems First Degree in Industrial Electronic Engineering and Automatic Control Systems			Type and Year	Compulsory. Year 2 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)	
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	MARIA SANDRA ROBLA GOMEZ LUIS GARCIA RODRIGUEZ JOSE ANGEL JUAREZ CRESPO

3.1 LEARNING OUTCOMES
- Knowledge of Automation Technologies and their Applications.
- Knowledge of representation techniques of Dynamic Systems.
- Using mathematical fundamentals and techniques, applied to Control Engineering, to attain the knowledge of analysis and design methods in the time and frequency domains.
- Knowledge of some software tools for modeling and simulation of systems.

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
TOTAL				100,00

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