

SUBJECT TEACHING GUIDE

G1015 - Multivariable and Advanced Process Control

Degree in Industrial Electronic Engineering and Automatic Control Systems

Academic year 2019-2020

1. IDENTIFYING DATA			
Degree	Degree in Industrial Electronic Engineering and Automatic Control Systems	Type and Year	Optional. Year 4
Faculty	School of Industrial Engineering and Telecommunications		
Discipline	Subject Area: Systems and Automation Engineering Optional Module		
Course unit title and code	G1015 - Multivariable and Advanced Process Control		
Number of ECTS credits allocated	6	Term	Semester based (2)
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	LUCIANO ALONSO RENTERIA		
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Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 2. DESPACHO (S2022)		
Other lecturers	ALBERTO PURAS TRUEBA MARIA SANDRA ROBLA GOMEZ		

3.1 LEARNING OUTCOMES

- Ability to analyze and design control systems using advanced techniques

4. OBJECTIVES

Describe the internal representation systems using state variables.
Present the possibilities for control of multivariable systems by state feedback.
Introduction to optimal control systems.
Study the techniques of nonlinear control systems.

6. COURSE ORGANIZATION

CONTENTS	
1	CONTROL BY STATE VARIABLES Description of physical systems using state variables. Internal representation of systems. Analysis of control systems with state variables. State transition matrix. Controlabilidad and observability. State feedback. Observer states.
2	OPTIMIZATION CONTROL SYSTEMS Indices of behavior control systems Optimization of continuous and discrete regulators. Linear optimal quadratic regulator.
3	NONLINEAR CONTROL SYSTEMS Description of nonlinear system by descriptive function. Descriptive function of the most common nonlinearities. Stability of nonlinear systems. Control of nonlinear systems.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Final Work	Work	No	Yes	30,00
Laboratory Practices	Laboratory evaluation	No	No	20,00
Final exam	Written exam	No	Yes	40,00
Realization of a control during the course	Written exam	No	No	10,00
TOTAL				100,00
Observations				
Attendance at practices is mandatory for all students				
Observations for part-time students				
For part-time students, a final exam will be held with one part of theory and one part of practices, with a weight of 50% each.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

José Gómez Campomanes. "Automática: Análisis y diseño de los sistemas automáticos de control". Ediciones Jucar
 J. Pérez Oria. "Sistemas continuos de control". Ediciones TDG.
 Athans M. and P. Falb. "Optimal Control: An introduction to theory and its applications". Mc Graw-Hill.
 Callier F. and C. Desoer. "Multivariable Feedback Systems". Springer-Verlag
 Khalil H. "Non linear systems". Ed. Macmillan.

