

[GJK205] MODELLING AND SIMULATION OF DYNAMIC SYSTEMS

GENERAL INFORMATION

Studies	DEGREE IN MECHATRONICS ENGINEERING	Subject	?
Semester	1	Course	3
Character	COMPULSORY	Mention / Field of specialisation	
Plan	2022	Modality	Face-to-face
Credits	4,5	Hours/week	3.75
		Language	CASTELLANO/EUSKARA
		Total hours	67.5 class hours + 45 non-class hours = 112.5 total hours

PROFESSORS

ALACANO LOITI, ARGÍNE
PANIAGUA AMILLANO, JULEN

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
PHYSICS I	(No previous knowledge required)
FOUNDATIONS OF ELECTRICAL ENGINEERING	
MATHEMATICS APPLIED TO ENGINEERING	

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GJR301 - To know and master the modeling and simulation of dynamic systems		x		4,02
G-RTR1 - To develop interdisciplinary projects specific to their specialty and of gradual complexity, - becoming aware of respect for human rights and fundamental rights, and analyzing and assessing the impact of the proposed solutions on the SDGs - to acquire and/or apply basic, advanced and /or avant-garde, demonstrating the ability to work in multidisciplinary teams and/or undertake further studies with a high degree of autonomy		x		0,24
G-RTR2 - To express information, ideas and the arguments that support them in an orderly, clear and coherent manner, orally and in writing, based on quality information, self-made or obtained from different sources, using inclusive and non-discriminatory language		x		0,24
Total:				4,5

KC: Knowledge or Content / SK: Skills / AB: Abilities

CONTENTS

- 1.- Introduction to Dynamic Systems and Control
 - 1.1 Introduction
 - 1.2 Classification of Dynamic Systems
 - 1.3 Modeling Dynamic Systems
 - 1.4 Objectives and Course Outline
- 2.- Modeling Mechanical Systems
 - 2.1 Introduction
 - 2.2 Mechanical Element Laws
 - 2.3 Translational Mechanical Systems
 - 2.4 Rotational Mechanical Systems
- 3.- Modeling Electrical and Electromechanical Systems
 - 3.1 Introduction
 - 3.2 Electrical Element Laws
 - 3.3 Electrical Systems
 - 3.4 Electromechanical Systems
- 4.- Standard Models for Dynamic Systems
 - 4.1 Introduction

4.2	Input-Output Equations
4.3	Transfer Functions
4.4	Block Diagrams
4.5	Standard Input Functions
5.-	Numerical Simulation of Dynamic Systems
5.1	Introduction
5.2	System Response Using MATLAB Commands
5.3	Building Simulations Using Simulink
5.4	Simulating Linear Systems Using Simulink
6.-	Analytical Solution of Dynamic Systems
6.1	Introduction
6.2	Analytical Solutions to Linear Differential Equations
6.3	First-Order System Response
6.4	Second-Order System Response
7.-	System Analysis Using Laplace Transforms
7.1	Introduction
7.2	Laplace Transformation
7.3	Inverse Laplace Transformation
7.4	Analysis of Dynamic Systems Using Laplace Transforms

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform Slides of the subject Programmes	Craig A. Kluever, Dynamic systems: Modeling, Simulation and Control, 1st edition (2015), ISBN: 978-1-118-28945-7 http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_in_k.pl?grupo=MECATRONICA31&ejecuta=15&_ST