[MSC102] ADVANCED CONTROL OF ENERGY SYSTEMS

GENERAL INFORMATION

Studies	MASTER DEGREE IN SMART ENERGY SYSTEMS			**Subject**	?
Semester	2	**Course**	1	**Mention / Field of specialisation**	
Character	COMPULSORY				
Plan	2025	**Modality**	Face-to-face	**Language**	EUSKARA/CASTELLANO/ENGLISH
Credits	4,5	**Hours/week**	0	**Total hours**	63 class hours + 49.5 non-class hours = **112.5 total hours**

2030 AGENDA GOALS

PROFESSORS

EGUREN ALUSTITZA, IMANOL
MORENO LA FUENTE, YERAI

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	*(No previous knowledge required)*

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
MS071 - Design and implement advanced control strategies for energy systems such as digital and multivariable controllers.		*x*		4,04
MS171 - Ability to work in multidisciplinary teams and in a multilingual environment	*x*		*x*	0,14
MS222 - Exhibits, argues and defends the results obtained in the work carried out before a panel of judges			*x*	0,16
MS251 - Develops a project in the field of energy systems in a practical application context		*x*		0,16
			Total:	4,5

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

SECONDARY LEARNING RESULTS

RMS113 **[!]** ***Diseñar e implementar estrategias avanzadas de control para sistemas energéticos como controladores digitales y multivariables***

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams		21 h.	21 h.
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning	2 h.		2 h.
Computer simulation exercises, individually and/or in teams	4 h.	8 h.	12 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	57 h.		57 h.
Carrying out exercises and solving problems individually and/or in teams		9 h.	9 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	33%
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	34%
Individual written and/or oral tests or individual coding/programming tests	33%

MAKE-UP MECHANISMS

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

Individual written and/or oral tests or individual coding/programming tests

CH - Class hours: 63 h.
NCH - Non-class hours: 38 h.
TH - Total hours: 101 h.

RMS222 **[!]** ***Expone, argumenta y defiende ante un tribunal los resultados obtenidos en el trabajo desarrollado***

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams		4 h.	4 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	*(No mechanisms)*

CH - Class hours: 0 h.
NCH - Non-class hours: 4 h.
TH - Total hours: 4 h.

RMS251 **[!]** ***Desarrolla un proyecto del ámbito de los sistemas energéticos en un contexto de aplicación práctica***

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams		4 h.	4 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	*(No mechanisms)*

CH - Class hours: 0 h.
NCH - Non-class hours: 4 h.
TH - Total hours: 4 h.

RMS171 **[!]** ***Es capaz de trabajar en equipos multidisciplinares y en un entorno multilingüe***

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams		3,5 h.	3,5 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	*(No mechanisms)*

CH - Class hours: 0 h.
NCH - Non-class hours: 3,5 h.
TH - Total hours: 3,5 h.

CONTENTS

1. Digital Control

    1. Introduction

2. Signal sampling and reconstruction
3. Discrete systems
4. Z-transform
5. Closed-loop system transfer function
6. System analysis: stability and accuracy
7. Digitalization

2. State space control

1. Introduction
2. Change of representation
3. Analysis of linear systems

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Subject notes	Acceso online a bibliografía: https://labur.eus/n6SdS
Moodle Platform	
Class presentations	
Slides of the subject	