

[MSC003] Real-time systems

GENERAL INFORMATION

Studies	MASTER DEGREE IN SMART ENERGY SYSTEMS	Subject	Energy management and control
Semester	2	Course	1
Character	COMPULSORY	Mention / Field of specialisation	
Plan	2022	Modality	Face-to-face
Credits	4,5	Hours/week	0
		Language	CASTELLANO
		Total hours	63 class hours + 49.5 non-class hours = 112.5 total hours

PROFESSORS

LIZEAGA GOIKOETXEA, AITOR
LAJAS GARCIA, MIGUEL

REQUIRED PREVIOUS KNOWLEDGE

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

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
MSR131 - Design, program and evaluate real-time power and communications control systems on microprocessors by analysing the timing characteristics		x		4,06
MSR171 - Ability to work in multidisciplinary teams and in a multilingual environment	x		x	0,12
MSR222 - Exhibits, argues and defends the results obtained in the work carried out before a panel of judges			x	0,16
MSR251 - 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

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
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%

MAKE-UP MECHANISMS

(No mechanisms)

CH - Class hours: 0 h.

NCH - Non-class hours: 4 h.

TH - Total hours: 4 h.

RMS115 [!] *Diseñar, programar y evaluar sistemas de control de energía y comunicaciones en tiempo real en microprocesadores analizando las características temporales*

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.	12,5 h.	33,5 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 h.
Computer simulation exercises, individually and/or in teams	8 h.	13 h.	21 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	24 h.		24 h.
Carrying out exercises and solving problems individually and/or in teams	8 h.	13 h.	21 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	33,34%	Individual written and/or oral tests or individual coding/programming tests
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	33,33%	
Individual written and/or oral tests or individual coding/programming tests	33,33%	
CH - Class hours: 63 h. NCH - Non-class hours: 38,5 h. TH - Total hours: 101,5 h.		

RMS251 [!] <i>Desarrolla un proyecto del ámbito de los sistemas energéticos en un contexto de aplicación práctica</i>			
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 [!] <i>Es capaz de trabajar en equipos multidisciplinares y en un entorno multilingüe</i>			
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 h.	3 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 h. TH - Total hours: 3 h.			

CONTENTS

Theoretical contents:

1. Operating systems.
2. Concurrent programming.
3. Real-time operating systems.
4. Time-driven / periodic scheduling.
5. Event-driven / aperiodic scheduling.
6. Real-time operating systems - FreeRTOS.

Practical work:

Practical exercises on programming real-time systems:

1. Practices with evaluation board NUCLEO STM 32.
2. Practices with evaluation board LAUNCHXL-F28379D.

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Subject notes
Moodle Platform
Slides of the subject
Class presentations
Computer practical training

Bibliography

<https://labur.eus/9VvKY>