

## [GJX202] DATA ACQUISITION SYSTEMS AND REAL-TIME CONTROL

### GENERAL INFORMATION

<b>Studies</b>	DEGREE IN MECHATRONICS ENGINEERING		<b>Subject</b>	?	
<b>Semester</b>	2	<b>Course</b>	3	<b>Mention / Field of specialisation</b>	???
<b>Character</b>	OPTIONAL		<b>Language</b>	EUSKARA/CASTELLANO	
<b>Plan</b>	2022	<b>Modality</b>	Face-to-face	<b>Total hours</b>	62 class hours + 88 non-class hours = <b>150 total hours</b>
<b>Credits</b>	6	<b>Hours/week</b>	3.44		

### PROFESSORS

(No professor appointed)

### REQUIRED PREVIOUS KNOWLEDGE

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

### LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
<b>G-RTR1</b> - 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		0,34
<b>G-RTR2</b> - 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		0,34
<b>R_EE08</b> - Knowledge of automatic regulation and control techniques and their application to industrial automation		x		5,32
<b>Total:</b>				<b>6</b>

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

### SECONDARY LEARNING RESULTS

**RGJ390** [!] *Definir y gestionar los objetivos y la planificación de un proyecto que le permita adquirir y/o reforzar los conocimientos de tecnologías específicas de su especialidad,- que en ocasiones llegan a la vanguardia del conocimiento- y definir una estrate*

#### LEARNING ACTIVITIES

Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams

CH	NCH	TH
2 h.	2,25 h.	4,25 h.

#### EVALUATION SYSTEM

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

W

100%

#### MAKE-UP MECHANISMS

(No mechanisms)

**Comments:** Continuous assessment. Retake is not foreseen.

**CH - Class hours:** 2 h.

**NCH - Non-class hours:** 2,25 h.

**TH - Total hours:** 4,25 h.

**RGJ391** [!] *Coordinar el equipo de trabajo, estimulando la cohesión y buen clima para lograr la integración de todas las personas y su contribución para alcanzar un rendimiento apropiado, tanto a nivel individual como grupal, para el desarrollo del proyecto en*

#### LEARNING ACTIVITIES

Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams

CH	NCH	TH
2 h.	2,25 h.	4,25 h.

#### EVALUATION SYSTEM

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory

W

100%

#### MAKE-UP MECHANISMS

(No mechanisms)

**Comments:** Continuous assessment. Retake is not foreseen.

exercises, term projects, challenges and problems

**CH - Class hours:** 2 h.

**NCH - Non-class hours:** 2,25 h.

**TH - Total hours:** 4,25 h.

**RGJ393** [!] *Elabora la memoria del proyecto, aportando argumentos elaborados y haciendo un uso correcto, inclusivo y no discriminatorio del lenguaje.*

**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

2 h.

2,25 h.

4,25 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)*

**Comments:** Revision and correction of the written report of the semester project

**CH - Class hours:** 2 h.

**NCH - Non-class hours:** 2,25 h.

**TH - Total hours:** 4,25 h.

**RGJ394** [!] *Realiza una presentación oral del proyecto, justificando las soluciones propuestas con argumentos elaborados y precisos, y haciendo un uso correcto, inclusivo y no discriminatorio del lenguaje.*

**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

2 h.

2,25 h.

4,25 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)*

**Comments:** Continuous assessment. Retake is not foreseen.

**CH - Class hours:** 2 h.

**NCH - Non-class hours:** 2,25 h.

**TH - Total hours:** 4,25 h.

**RGFE08** [!] *Conocimientos de regulación automática y técnicas de control y su aplicación a la automatización industrial.*

**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

5 h.

20 h.

25 h.

Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning

20 h.

20 h.

Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints

4 h.

4 h.

Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams

20 h.

19 h.

39 h.

Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects

20 h.

20 h.

Reading and personal and/or shared analysis of relevant and current publications (books, articles, catalogues, etc.) related to the speciality

5 h.

20 h.

25 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

50%

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

50%

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

**CH - Class hours:** 54 h.

**NCH - Non-class hours:** 79 h.

**TH - Total hours:** 133 h.

**CONTENTS**

1. D/A and A/D converters 2. Sampling and Holding Amplifiers (S&H) 3. Instrumentation amplifiers. 4. Isolation amplifiers 5. Real-time data acquisition and control hardware 6. Real-time data acquisition and control software (LabVIEW)

**LEARNING RESOURCES AND BIBLIOGRAPHY**

**Learning resources**

Moodle Platform  
 Class presentations  
 Topic related web quires  
 Labs  
 Slides of the subject

**Bibliography**

Granda Miguel, Mercedes; Mediavilla Bolado, Elena. Instrumentación electrónica: transductores y acondicionadores de señal. Santander : PUBliCan, Ediciones de la Universidad de Cantabria. 2010. ISBN: 978-84-8102-568-2  
 Pallás Areny, Ramón. Sensores y Acondicionadores de Senal. Barcelona: Marcombo. 2003. ISBN: 84-267-1344-0  
 Johns, David. Analog Integrated Circuit Design. New York: John Wiley & Sons. 1997. ISBN: 0-471-14448-7  
 Kester, Walt; Walter, Allan. Data Conversion Handbook (Analog Devices). ScienceDirect ebooks. Amsterdam Boston: Elsevier. 2005. ISBN: 978-0750678414  
 Kitchin, Charles; Counts, Lew. A designer's guide to instrumentation amplifiers (3rd ed). Analog Devices, 2006.  
[www.analog.com/media/en/training-seminars/design-handbooks/designers-guide-instrument-amp-s-complete.pdf](http://www.analog.com/media/en/training-seminars/design-handbooks/designers-guide-instrument-amp-s-complete.pdf)