[GJH203] ADVANCED INDUSTRIAL AUTOMATION

GENERAL INFORMATION

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

PROFESSORS

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REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
INTRODUCTION TO AUTOMATION	*(No previous knowledge required)*

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GJR403 - To know and apply principles for the design and testing of machines and systems Design industrial-mechanical control and automation 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

SECONDARY LEARNING RESULTS

RGJ490 **[!]** ***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	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	2 h.	1 h.	3 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)

Comments: Continuous assessment. Retake is not foreseen.

CH - Class hours: 2 h.
NCH - Non-class hours: 1 h.
TH - Total hours: 3 h.

RGJ491 **[!]** ***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	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	2 h.	1 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)* **Comments:** Continuous assessment. Retake is not foreseen.

CH - Class hours: 2 h.
NCH - Non-class hours: 1 h.
TH - Total hours: 3 h.

RGJ493 **[!]** ***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	1 h.	2 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
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	100%	*(No mechanisms)* **Comments:** Continuous assessment. Retake is not foreseen.

CH - Class hours: 1 h.
NCH - Non-class hours: 2 h.
TH - Total hours: 3 h.

RGJ494 **[!]** ***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.	1 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)* **Comments:** Continuous assessment. Retake is not foreseen.

CH - Class hours: 2 h.
NCH - Non-class hours: 1 h.
TH - Total hours: 3 h.

RGJ407 **[!]** ***Diseña, desarrolla y valida el programa de control de posición de un eje mediante funciones estándares predefinidas***

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	2 h.	1 h.	3 h.
Practical work in workshops and/or laboratories, individually and/or in teams	6 h.	6 h.	12 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	60%	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	40%	**Comments:** Final mark = % 25 ordinary mark + % 75 retake mark. Only the individual test has a retake option.

CH - Class hours: 10 h.
NCH - Non-class hours: 7 h.
TH - Total hours: 17 h.

RGJ408 **[!]** ***Diseña, desarrolla y valida los interfaces hombre-máquina que cumplan con los requisitos especificados***

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	7 h.	4,5 h.	11,5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	2 h.	2 h.	4 h.
Practical work in workshops and/or laboratories, individually and/or in teams	4,5 h.	2,5 h.	7 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	80%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems
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	20%	**Comments:** Final mark = % 25 ordinary mark + % 75 retake mark.

CH - Class hours: 13,5 h.
NCH - Non-class hours: 9 h.
TH - Total hours: 22,5 h.

RGJ409 **[!]** ***Diseña el sistema de automatización y supervisión de una aplicación real, evaluando el riesgo, definiendo e implementando la solución técnica requerida según la norma EN ISO 13.849-1 relativa a la seguridad de máquinas***

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	6 h.	4 h.	10 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	23 h.	15 h.	38 h.
Practical work in workshops and/or laboratories, individually and/or in teams	6 h.	4 h.	10 h.
Seminars, debates and/or workshops to deepen and/or share experiences.	2 h.	1 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	20%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems
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	30%	Individual written and/or oral tests or individual coding/programming tests **Comments:** Final mark = % 25 ordinary mark + % 75 retake mark. Only the individual test has a retake option.
Individual written and/or oral tests or individual coding/programming tests	50%	

CH - Class hours: 37 h.
NCH - Non-class hours: 24 h.
TH - Total hours: 61 h.

CONTENTS

1. - Advanced programming of PLCs

1.1 - PLC programmingenvironment.

1.2 - PLC basic concepts.

1.3 - Advanced Programming (Numerical Processing, Analog Processing, FC, FB and Variables)

1.4 - Industrial Communications (Industrial Ethernet, industrial field buses, OPC UA)

2. - HMIs, monitoring and control.

3. - Machine Safety

3.1 - Directives and Regulations (2006/42 / CE, CE marked, UNE-EN ISO12.100, UNE-EN ISO 13849-1: 2008)

4 . -Introduction to "Motion control"

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform Lab practical training Programmes Slides of the subject	https://www.br-automation.com/en/academy/classroom-learning/train i ng-modules/ https://www.br-automation.com/en/academy/virtual-classroom/br-tuto ri al-portal/ PLCs OMRON: https://sites.google.com/view/omron-spain-education/ p%C3%A1gina-principal/cursos/sysmac-automat-avanzada Web Omron: https://automation.omron.com/es/us/support/resources/d ownloads.ht ml?filters=type==document&filters=type.document==type. document&page=1&pageSize=10 http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_ln k. pl?grupo=MECATRONICA41&ejecuta=5&_ST