[GFE002] Electronics and Automation

GENERAL INFORMATION

Studies	DEGREE IN ENGINEERING PHYSICS APPLIED TO INDUSTRY			**Subject**	Industrial Electronics
Semester	2	**Course**	2	**Mention / Field of specialisation**	
Character	COMPULSORY				
Plan	2022	**Modality**	Face-to-face	**Language**	ENGLISH
Credits	4,5	**Hours/week**	0	**Total hours**	67.5 class hours + 45 non-class hours = **112.5 total hours**

2030 AGENDA GOALS

PROFESSORS

ALACANO LOITI, ARGIÑE

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
Mathematical Methods Applied to Engineering	*(No previous knowledge required)*
Foundations of Electronic Engineering	

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GFR118 - Modelling and analysing linear systems and designing control systems in the frequency domain	x	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

RGF230 **[!]** ***Identifica y modela sistemas lineales y realiza su análisis temporal, de estabilidad y precisión.***

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 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 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	1 h.	10 h.	11 h.
Computer simulation exercises, individually and/or in teams	1 h.	2 h.	3 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	20 h.		20 h.
Carrying out exercises and solving problems individually and/or in teams	5 h.	7 h.	12 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	50%
Individual written and/or oral tests or individual coding/programming tests	50%

Comments: In "SE00000009", both the Coursework (30 %) and the POPBL (20 %) are taken into account.

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

Comments: The Coursework must be retaken if mark <5 and with a maximum (retake) mark of 5. In case of failing the exam, the final mark will be: 25 % exam + 75 % retake exam.

CH - Class hours: 29 h.

NCH - Non-class hours: 21 h.
TH - Total hours: 50 h.

2RGF293 **(2 sem)**

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 h.

EVALUATION SYSTEM	W
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%

MAKE-UP MECHANISMS
(No mechanisms)
Comments: Continuous assessment. Retake is not foreseen.

CH - Class hours: 2 h.
NCH - Non-class hours: 0 h.
TH - Total hours: 2 h.

2RGF294 **[!]** ***(2 sem)Realiza una presentación oral del proyecto con argumentos elaborados por sí mismos y haciendo un uso correcto, inclusivo y no discriminatorio del lenguaje.***

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.		2 h.

EVALUATION SYSTEM	W
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%

MAKE-UP MECHANISMS
(No mechanisms)
Comments: Continuous assessment. Retake is not foreseen.

CH - Class hours: 2 h.
NCH - Non-class hours: 0 h.
TH - Total hours: 2 h.

2RGF291 **(2 sem)**

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	3 h.		3 h.

EVALUATION SYSTEM	W
Self-assessment	25%
Co-assessment	25%
Observation (technical capacity, attitude and participation)	50%

MAKE-UP MECHANISMS
(No mechanisms)
Comments: Continuous assessment. Retake is not foreseen.

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

RGF231 **[!]** ***Diseña y analiza sistemas de control en el dominio frecuencial aplicando diferentes métodos: FT en lazo cerrado, métodos frecuenciales y lugar de las raíces.***

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 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 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		10 h.	10 h.
Computer simulation exercises, individually and/or in teams	1 h.	4 h.	5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	19,5 h.		19,5 h.
Carrying out exercises and solving problems individually and/or in teams	4 h.	8 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	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

Comments: In "SE00000009", both the Coursework (30 %) and the POPBL (20 %) are taken into account.

Comments: The Coursework must be retaken if mark <5 and with a maximum (retake) mark of 5. In case of failing the exam, the final mark will be: 25 % exam + 75 % retake exam.

CH - Class hours: 26,5 h.
NCH - Non-class hours: 24 h.
TH - Total hours: 50,5 h.

2RGF290 **(2 sem)**

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	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	85%	*(No 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	15%	

Comments: Continuous assessment. Retake is not foreseen.

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

2RGF292 **(2 sem)**

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 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: 0 h.
TH - Total hours: 2 h.

CONTENTS

1. Introduction to Control Systems
    1. Introduction
    2. Definition of the system concept
    3. Definition of the control concept
    4. Basic control actions
    5. Closed-loop configuration using sensors
2. Modeling of Linear Dynamic Systems
    1. Mathematical modeling of multiphysics systems
    2. Transfer function
3. Analysis of Linear Systems
    1. Time-domain responses. Types of responses
    2. Frequency analysis of systems
    3. Controllers
    4. Stability analysis. Routh-Hurwitz criterion
    5. Root locus analysis
    6. System accuracy
4. Controller Design
    1. Types of controllers
    2. Tuning techniques
5. Electronic Sensors for Industrial Applications
    1. Main sensor characteristics
    2. Temperature measurement
    3. Measurement of electrical variables: voltage and current
    4. Measurement of mechanical variables: position & velocity
    5. Signal conditioners and measurement systems

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
[!] *Plataforma Moodle*	https://labur.eus/gHReJ
[!] *Transparencias de la asignatura*	