

[GMI303] ELECTRONIC SYSTEMS

GENERAL INFORMATION

Studies	DEGREE IN MECHANICAL ENGINEERING	Subject ?	
Semester	2	Course	3
Character	COMPULSORY	Mention / Field of specialisation	
Plan	2022	Modality	Face-to-face
Credits	4,5	Hours/week	2.89
		Language	CASTELLANO/EUSKARA
		Total hours	52 class hours + 60.5 non-class hours = 112.5 total hours

PROFESSORS

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REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
<i>(No specific previous subjects required)</i>	<i>(No previous knowledge required)</i>

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GMR302 - To know the fundamentals of electronics	x			3,78
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		0,4
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		0,32
Total:				4,5

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

ENAE LEARNING RESULTS

(No learning results)

SECONDARY LEARNING RESULTS

RGM305 [!] *Conocer los métodos de control de sistemas y elegir el más adecuado para cada caso*

LEARNING ACTIVITIES	CH	NCH	TH
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning	10 h.	10 h.	20 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.	8,5 h.	18,5 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	20%	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	30%	
Individual written and/or oral tests or individual coding/programming tests	50%	

Comments: The make-up exams of the two Check Points will take place on the same day. If a mark of 4 is not achieved in a Check Point, to take the make-up exam will be compulsory. Criteria for calculating the grade after taking the make-up exams: 25 % Check Point + 75 % make-up exam. In order to pass simulations 1 and 2 it will be necessary, on the one hand, to hand in all the simulation exercises carried out and, on the other hand, to pass the defence, if any. The conditions for taking each Check Point will be determined in class as the course progresses.

CH - Class hours: 20 h.
NCH - Non-class hours: 18,5 h.
TH - Total hours: 38,5 h.

RGM391 [!] *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

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
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.	2 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

Comments: Students have the responsibility of meeting the tutor to do the tracking of the project and to ensure the achievement of the goals. The average of the marks of the tutor's assessment and the self-assessment carried out by the work team is calculated, using the defined rubrics. Afterwards, the final mark is calculated by multiplying that average mark by a factor calculated on the basis of the co-evaluation among the members of the group.

MAKE-UP MECHANISMS

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

Comments: Continuous evaluation. FEEDBACK received from the tutor in the semester project follow-up meetings.

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

RGM390 [!] *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

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
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.	3 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

Comments: Students have the responsibility of meeting the tutor to do the tracking of the project and to ensure the achievement of the goals.

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous evaluation. FEEDBACK received from the tutor in the semester project follow-up meetings

CH - Class hours: 1 h.
NCH - Non-class hours: 3 h.
TH - Total hours: 4 h.

RGM306 [!] *Capacidad de comprender y diseñar el acondicionamiento de señal de los sensores*

LEARNING ACTIVITIES

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning	1 h.		1 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	9 h.	18 h.	27 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	30%	Individual written and/or oral tests or individual coding/programming tests
Individual written and/or oral tests or individual coding/programming tests	70%	
<p>Comments: The make-up exams of the two Check Points will take place on the same day. If a mark of 4 is not achieved in a Check Point, to take the make-up exam will be compulsory. Criteria for calculating the grade after taking the make-up exams: 25 % Check Point + 75 % make-up exam. In order to pass simulations 1 and 2 it will be necessary, on the one hand, to hand in all the simulation exercises carried out and, on the other hand, to pass the defence, if any. The conditions for taking each Check Point will be determined in class as the course progresses.</p>		
<p>CH - Class hours: 10 h. NCH - Non-class hours: 18 h. TH - Total hours: 28 h.</p>		

RGM335 [!] *Conoce los fundamentos de la electrónica de potencia y las arquitecturas de los convertidores/Para entender las arquitecturas de los convertidores utiliza los fundamentos de la electrónica de potenci*

LEARNING ACTIVITIES	CH	NCH	TH
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	15 h.	11 h.	26 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	30%	Individual written and/or oral tests or individual coding/programming tests
Individual written and/or oral tests or individual coding/programming tests	70%	
<p>Comments: The make-up exams of the two Check Points will take place on the same day. If a mark of 4 is not achieved in a Check Point, to take the make-up exam will be compulsory. Criteria for calculating the grade after taking the make-up exams: 25 % Check Point + 75 % make-up exam. In order to pass simulations 1 and 2 it will be necessary, on the one hand, to hand in all the simulation exercises carried out and, on the other hand, to pass the defence, if any. The conditions for taking each Check Point will be determined in class as the course progresses.</p>		
<p>CH - Class hours: 17 h. NCH - Non-class hours: 11 h. TH - Total hours: 28 h.</p>		

RGM392 [!] *Identificar y argumentar de forma precisa los ODS en los que incide el proyecto realizado, aportando posibles acciones para la mejora.*

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	1 h.	2 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory	100%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term

<p>exercises, term projects, challenges and problems</p> <p>Comments: Students have the responsibility of meeting the tutor to do the tracking of the project and to ensure the achievement of the goals.</p> <p>CH - Class hours: 1 h. NCH - Non-class hours: 2 h. TH - Total hours: 3 h.</p>	<p>projects, challenges and problems</p> <p>Comments: Continuous evaluation. FEEDBACK received from the tutor in the semester project follow-up meetings.</p>
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RGM394 [!] *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	1 h.	3 h.	4 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
<p>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</p> <p>Comments: Students have the responsibility of meeting the tutor to do the tracking of the project and to ensure the achievement of the goals.</p>	100%	<p>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</p> <p>Comments: Continuous evaluation. FEEDBACK received from the tutor in the semester project follow-up meetings.</p>

CH - Class hours: 1 h.
NCH - Non-class hours: 3 h.
TH - Total hours: 4 h.

RGM393 [!] *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.	3 h.	4 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
<p>Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems</p> <p>Comments: Students have the responsibility of meeting the tutor to do the tracking of the project and to ensure the achievement of the goals.</p>	100%	<p>Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems</p> <p>Comments: Continuous evaluation. FEEDBACK received from the tutor in the semester project follow-up meetings.</p>

CH - Class hours: 1 h.
NCH - Non-class hours: 3 h.
TH - Total hours: 4 h.

CONTENTS

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|----------------------|--------------------|----------------------|---------------------------------|
| 1. General Concepts | -Ohm's Law | -Physical quantities | -Basic electronic elements |
| 2. Power electronics | -Rectifiers | -Transformers | -DC/DC converters |
| 3. Type of control | -Proportional (P) | -Integral (IP) | -Derivative (PD) |
| 4. Signal theory | -Fourier transform | -Filters | -Theorems for capturing signals |

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Subject notes
Moodle Platform

Bibliography

Mohan, Undeland, Robins (2002). Power Electronics: Converters, Applications, and Design. John Wiley & Sons Inc. ISBN: 978-0471226932

Jain Shailendra (2013). Modeling And Simulation Using Matlab - Simulink, 2Nd Ed. ISBN: 978-8126551972

Kluever, Craig. (2015). Dynamic Systems: Modeling, Simulation, and Control. John Wiley & Sons Inc. ISBN: 978-1118289457