

## [GAI201] ELECT. TECHNOL. I

### GENERAL INFORMATION

<b>Studies</b>	DEGREE IN ENERGY ENGINEERING	<b>Subject</b>	ELECTRICAL ENERGY
<b>Semester</b>	1	<b>Course</b>	2
<b>Character</b>	COMPULSORY	<b>Mention / Field of specialisation</b>	
<b>Plan</b>	2022	<b>Modality</b>	Face-to-face
<b>Credits</b>	6	<b>Language</b>	CASTELLANO/EUSKARA
		<b>Total hours</b>	59 class hours + 91 non-class hours = <b>150 total hours</b>

### PROFESSORS

MAZUELA LARRAÑAGA, MIKEL

### REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
PHYSICS II	(No previous knowledge required)

### LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
<b>GAR204</b> - It uses linear electronic circuits to power electrical-electronic devices and condition electrical signals.	x	x		5,4
<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		0,32
<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		0,28

Total: 6

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

### SECONDARY LEARNING RESULTS

**RG290** [!] *Proponer los objetivos y la planificación de un proyecto que le permita adquirir y/o reforzar los conocimientos de tecnologías propias de su especialidad,- que en ocasiones llegan a la vanguardia del conocimiento- y definir una estrategia de aprendizaje*

#### 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.

**RG291** [!] *Establecer las responsabilidades de los miembros del equipo utilizando técnicas adecuadas para fomentar la eficiencia del equipo para el desarrollo del proyecto en los plazos establecidos (compartir recursos, aportar ideas, habilidades comunicativas)*

#### 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
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#### 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.

**RG293** [!] *Redacta y estructura correctamente la memoria del proyecto, haciendo un uso correcto, inclusivo y no discriminatorio del lenguaje. Para ello, busca y hace uso de las fuentes de información adecuadas.*

#### 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.

**RG294** [!] *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

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.

**RG208** [!] *Diseña circuitos electrónicos lineales para la alimentación de dispositivos eléctrico-electrónicos y para la adaptación de señales eléctricas*

#### 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

10 h.

10 h.

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

16 h.

16 h.

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

4 h.

4 h.

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

35 h.

35 h.

Carrying out exercises and solving problems individually and/or in teams

20 h.

20 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

12%

(No mechanisms)

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

88%

**CH - Class hours:** 39 h.

**NCH - Non-class hours:** 46 h.

**TH - Total hours:** 85 h.

**RG209** [!] *Analiza y resuelve circuitos electrónicos lineales con la ayuda de herramientas de simulación*

**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.

5 h.

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

1 h.

1 h.

Computer simulation exercises, individually and/or in teams

5 h.

4 h.

9 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%

(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

22%

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

45%

**CH - Class hours:** 6 h.

**NCH - Non-class hours:** 9 h.

**TH - Total hours:** 15 h.

**RG210** [!] *Implementa circuitos electrónicos lineales para la alimentación de dispositivos eléctrico-electrónicos y para la adaptación de señales eléctricas*

**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

15 h.

15 h.

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

1 h.

1 h.

Practical work in workshops and/or laboratories, individually and/or in teams

13 h.

6 h.

19 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

29%

(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

42%

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

29%

**CH - Class hours:** 14 h.  
**NCH - Non-class hours:** 21 h.  
**TH - Total hours:** 35 h.

## CONTENTS

### 0. Basic concepts

#### 1. Semiconductor Theory

#### 2. Diodes

#### 3. Special Purpose Diodes (Zener)

#### 4. Rectifiers and DC Voltage Sources

#### 5. BJT Transistors

6.1. DC Analysis

6.2. ac Analysis

6.3. ac curves

6.4 Emitter Follower

### 6. Operational Amplifiers

6.1. Differential Amplifier

6.2. Negative Feedback

6.3. Circuits based on Operational Amplifiers

6.4. Active Filters

### Lab Exercises

LA2. Diodes

LA3. Zener Diode

LA4. Bipolar DC Source  $\pm 15V$

LA6. Operational Amplifiers

### Ejercicios de simulación

S3. Zener Diode

S4. Bipolar DC Source  $\pm 15V$

S5. BJT based voltage amplifiers

S6. Operational Amplifiers

## LEARNING RESOURCES AND BIBLIOGRAPHY

### Learning resources

Moodle Platform  
Specific Master Software  
Slides of the subject  
Lab practical training  
Computer practical training  
Labs  
Programmes

### Bibliography

[http://katalogoa.mondragon.edu/janium-bin/janium\\_login\\_opac\\_re\\_in  
k.pl?grupo=ENERGIA21&ejecuta=25](http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_in<br/>k.pl?grupo=ENERGIA21&ejecuta=25)