

[GAI203] ELECTRONIC TECHNOLOGY II

GENERAL INFORMATION

| | | | |
|------------------|------------------------------|--|--|
| Studies | DEGREE IN ENERGY ENGINEERING | Subject | ELECTRICAL ENERGY |
| Semester | 2 | Course | 2 |
| Character | COMPULSORY | Mention / Field of specialisation | |
| Plan | 2022 | Modality | Face-to-face |
| Credits | 6 | Language | CASTELLANO/EUSKARA |
| | | Total hours | 57 class hours + 93 non-class hours = 150 total hours |

PROFESSORS

MAZUELA LARRAÑAGA, MIKEL

REQUIRED PREVIOUS KNOWLEDGE

| Subjects | Knowledge |
|-------------------|----------------------------------|
| ELECT. TECHNOL. I | (No previous knowledge required) |

LEARNING RESULTS

| LEARNING RESULTS | KC | SK | AB | ECTS |
|--|----|----|----|----------|
| GAR209 - Uses switched electronic circuits to power electrical-electronic devices | x | x | | 5,4 |
| 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 | | 0,32 |
| 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 | | 0,28 |
| Total: | | | | 6 |

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

SECONDARY LEARNING RESULTS

RGA290 [!] *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 aprendiz*

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.

RGA291 [!] *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 |
|---|------|
| Reports on the completion of exercises, case studies, | 100% |

MAKE-UP MECHANISMS

(No mechanisms)

computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

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.

RG222 [!] *Diseña circuitos electrónicos conmutados para la alimentación de dispositivos eléctrico-electrónicos*

| 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 | | 20 h. | 20 h. |
| Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints | 5 h. | | 5 h. |
| Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects | 31 h. | | 31 h. |
| Carrying out exercises and solving problems individually and/or in teams | | 24 h. | 24 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 | 11% | (No mechanisms) |
| Individual written and/or oral tests or individual coding/programming tests | 89% | |
| CH - Class hours: 36 h. NCH - Non-class hours: 54 h. TH - Total hours: 90 h. | | |

| RGA223 [!] Analiza y resuelve circuitos electrónicos conmutados 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 | | 2 h. | | 2 h. |
| Computer simulation exercises, individually and/or in teams | | 8 h. | | 8 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 | 33,33% | (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 | 16,67% | | | |
| Individual written and/or oral tests or individual coding/programming tests | 50% | | | |
| CH - Class hours: 10 h. | | | | |
| NCH - Non-class hours: 5 h. | | | | |
| TH - Total hours: 15 h. | | | | |

| RGA224 [!] <i>Implementa circuitos electrónicos conmutados para la alimentación de dispositivos eléctrico-electrónicos</i> | | | | |
|--|-----|--------------------|-------|-------|
| 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. |
| Practical work in workshops and/or laboratories, individually and/or in teams | | 11 h. | 4 h. | 15 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% | (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 | 50% | | | |
| CH - Class hours: 11 h. | | | | |
| NCH - Non-class hours: 19 h. | | | | |
| TH - Total hours: 30 h. | | | | |

CONTENTS

Content

1. Power Switching Devices
 - 1.1. Diodes
 - 1.2. MOSFETs
 - 1.3. IGBTs
 - 1.4. Thyristors
 - 1.5. IGCTs
2. Power Losses in Power Switches
3. Pulse Width Modulation
4. Drivers for Power Swtiches
5. Snubbers for Power Switches

Lab Exercises

- LA1. Analogic PWM
- LA2. DC Chopper

Simulation Exercises

- S1. DC Motor Regulation (Linear Current Booster vs Switched DC Chopper comparison)
- S2. Analogic PWM

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

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

Bibliography

http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_in k.pl?grupo=ENERGIA22&ejecuta=25