# [GAI206] ELECTROMECHANICAL POWER CONVERSION

## GENERAL INFORMATION

| | | | | | |
|---|---|---|---|---|---|
| **Studies** | DEGREE IN ENERGY ENGINEERING | | | **Subject** | ? |
| **Semester** | 2 | **Course** | 3 | **Mention / Field of specialisation** | |
| **Character** | COMPULSORY | | | | |
| **Plan** | 2022 | **Modality** | Face-to-face | **Language** | ENGLISH |
| **Credits** | 6 | **Hours/week** | 2.78 | **Total hours** | 50 class hours + 100 non-class hours = **150 total hours** |

## PROFESSORS

DEL OLMO LARRAÑAGA, JON

## REQUIRED PREVIOUS KNOWLEDGE

| Subjects | Knowledge |
|---|---|
| PHYSICS I | [!] *Software: MATLAB & Simulink* |
| PHYSICS II | |
| CONTROL AND INSTRUMENTATION | |
| PROCESS CONTROL | |
| ELECTRICAL MACHINES | |

## LEARNING RESULTS

| LEARNING RESULTS | KC | SK | AB | ECTS |
|---|---|---|---|---|
| **GAR303** - Implements electromechanical drives using appropriate motors and control strategies | | x | | 5,08 |
| **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 | | 0,44 |
| **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 | | 0,48 |
| | | | **Total:** | 6 |

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

## SECONDARY LEARNING RESULTS

**RGA390** **[!]** ***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 |
|---|---|---|---|
| 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.

**RGA391** **[!]** ***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 |
|---|---|---|---|
| Development and writing of records, reports, presentations, audiovisual material, etc. on | | 4 h. | 4 h. |

projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams

| 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.

**RGA392** **[!]** ***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 |
|---|---|---|---|
| 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.

**RGA393** **[!]** ***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 | | 6 h. | 6 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:** 6 h.
**TH - Total hours:** 6 h.

**RGA394** **[!]** ***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 | | 6 h. | 6 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:** 6 h.
**TH - Total hours:** 6 h.

**RGA308** **[!]** ***Modela el sistema mecánico de accionamientos de motor***

| LEARNING ACTIVITIES | *CH* | *NCH* | *TH* |
|---|---|---|---|
| Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints | | 7 h. | 7 h. |
| Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects | 8 h. | | 8 h. |
| Carrying out exercises and solving problems individually and/or in teams | 3 h. | 3 h. | 6 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 | 10% | Individual written and/or oral tests or individual coding/programming tests |
| Individual written and/or oral tests or individual coding/programming tests | 90% | |

**CH - Class hours:** 11 h.
**NCH - Non-class hours:** 10 h.
**TH - Total hours:** 21 h.

**RGA309** **[!]** ***Modela y controla accionamientos eléctricos basados en motores de corriente continua (DC)***

| LEARNING ACTIVITIES | *CH* | *NCH* | *TH* |
|---|---|---|---|
| Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints | 3 h. | 2 h. | 5 h. |
| Computer simulation exercises, individually and/or in teams | 3 h. | 2 h. | 5 h. |
| Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects | 4 h. | | 4 h. |
| Carrying out exercises and solving problems individually and/or in teams | 3 h. | 2 h. | 5 h. |
| Practical work in workshops and/or laboratories, individually and/or in teams | 3 h. | 2 h. | 5 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 | 40% | Individual written and/or oral tests or individual coding/programming tests |
| Individual written and/or oral tests or individual coding/programming tests | 60% | |

**CH - Class hours:** 16 h.
**NCH - Non-class hours:** 8 h.
**TH - Total hours:** 24 h.

**RGA310** **[!]** ***Modela y controla accionamientos eléctricos basados en motores Brushless (AC/DC)***

| 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 | | 25 h. | 25 h. |
| Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints | 2 h. | 2 h. | 4 h. |
| Computer simulation exercises, individually and/or in teams | 2 h. | 1 h. | 3 h. |
| Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects | 4 h. | 1 h. | 5 h. |
| Carrying out exercises and solving problems individually and/or in teams | 1 h. | 2 h. | 3 h. |
| Practical work in workshops and/or laboratories, individually and/or in teams | 3 h. | 4 h. | 7 h. |

| EVALUATION SYSTEM | W |
|---|---|
| Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems | 40% |
| Individual written and/or oral tests or individual coding/programming tests | 60% |

| MAKE-UP MECHANISMS |
|---|
| Individual written and/or oral tests or individual coding/programming tests |

**CH - Class hours:** 12 h.
**NCH - Non-class hours:** 35 h.
**TH - Total hours:** 47 h.

**RGA311** **[!]** ***Modela y controla accionamientos eléctricos basados en motores asíncronos***

| 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 | | 18 h. | 18 h. |
| Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints | 2 h. | 1 h. | 3 h. |
| Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects | 5 h. | | 5 h. |
| Carrying out exercises and solving problems individually and/or in teams | 2 h. | 3 h. | 5 h. |
| Practical work in workshops and/or laboratories, individually and/or in teams | 2 h. | 2 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 | 50% |
| 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 | 10% |
| Individual written and/or oral tests or individual coding/programming tests | 40% |

| MAKE-UP MECHANISMS |
|---|
| Individual written and/or oral tests or individual coding/programming tests |

**CH - Class hours:** 11 h.
**NCH - Non-class hours:** 24 h.
**TH - Total hours:** 35 h.

## CONTENTS

## LEARNING RESOURCES AND BIBLIOGRAPHY

| Learning resources | Bibliography |
|---|---|
| Subject notes | http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_link.pl?grupo=ENERGIA32&ejecuta=15 |
| Topic related web quires | |
| Lab practical training | |

Student book
Slides of the subject