

## [GEE301] ENVIRONMENTAL AND SUSTAINABILITY TECHNOLOGIES

### GENERAL INFORMATION

<b>Studies</b>	DEGREE IN INDUSTRIAL ELECTRONICS ENGINEERING		<b>Subject</b>	ORGANISATION AND MANAGEMENT
<b>Semester</b>	2	<b>Course</b>	2	<b>Mention / Field of specialisation</b>
<b>Character</b>	COMPULSORY		<b>Language</b>	CASTELLANO/EUSKARA
<b>Plan</b>	2022	<b>Modality</b>	Face-to-face	<b>Total hours</b>
<b>Credits</b>	3	<b>Hours/week</b>	2.06	37 class hours + 38 non-class hours = <b>75 total hours</b>

### PROFESSORS

MARZO ELGUERO, IOSU

### REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
PHYSICS II CHEMISTRY THERMAL AND FLUID ENGINEERING	(No previous knowledge required)

### LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
<b>GER214</b> - To demonstrate basic knowledge and application of environmental technologies		x		2,6
<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		0,16
<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	0,24
<b>Total:</b>				<b>3</b>

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

### ENAE LEARNING RESULTS

- ENA103** - Knowledge and comprehension: Awareness of the multidisciplinary context of engineering.
- ENA104** - Analysis in engineering: The ability to analyse complex products, processes and systems in their field of study; choose and apply relevant analytical, calculation and experimental methods in a suitable way; and correctly interpret the results of such analyses.
- ENA105** - Analysis in engineering: The ability to identify, formulate and solve engineering problems in their speciality; choose and apply adequately established analytical, calculation and experimental methods; and acknowledge the importance of social, health and safety, environmental, economic, and industrial restrictions.
- ENA106** - Engineering projects: Ability to project, design and develop complex products (parts, components, finished products, etc.), processes and systems of their speciality, which meet the established requirements, including awareness of the social, health and safety, environmental, economic and industrial aspects, as well as selecting and applying appropriate project methods.
- ENA108** - Research and innovation: Ability to carry out bibliographic searches and consult and use databases and other information sources with discretion, in order to carry out simulation and analysis with the aim of conducting research on technical topics of their speciality.
- ENA109** - Research and innovation: Ability to consult and apply codes of good practice and security in their speciality.
- ENA110** - Research and innovation: Capacity and ability to project and carry out experimental investigations, interpret results, and reach conclusions in their field of study.
- ENA111** - Practical application of engineering: Understanding of the applicable techniques and methods for analysis, design and research and their limitations in the field of their speciality.
- ENA112** - Practical application of engineering: Practical competency to solve complex problems, carry out complex engineering projects, and conduct investigations specific to their speciality.
- ENA113** - Practical application of engineering: Knowledge of application of materials, equipment and tools, engineering technology and processes, and their limitations in the field of their speciality.
- ENA114** - Practical application of engineering: Ability to apply standards of engineering practice in their speciality.
- ENA115** - Practical application of engineering: Knowledge of the social, health and safety, environmental, economic and industrial implications of engineering practice.
- ENA117** - Preparation of judgements: Ability to collect and interpret data and handle complex concepts within their speciality, in order to make judgements that involve reflection on ethical and social issues.
- ENA118** - Preparation of judgements: Ability to manage complex technical or professional activities or projects of their speciality, taking responsibility for decision making.
- ENA119** - Communication and Teamwork: Ability to effectively communicate information, ideas, problems and solutions in the field of engineering and with society in general.
- ENA120** - Communication and Teamwork: Ability to operate effectively in domestic and international contexts, individually and as a team, and to cooperate with both engineers and people from other disciplines.
- ENA122** - Continued training: Ability to stay up to date on science and technology innovations.

### SECONDARY LEARNING RESULTS

**RGE290** [!] *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
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.	1 h.	2 h.

**EVALUATION SYSTEM**

	W
Observation (technical capacity, attitude and participation)	100%

**MAKE-UP MECHANISMS**

Observation (technical capacity, attitude and participation)  
**Comments:** Continuous assessment

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

**RGE291** [!] *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
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.	1 h.	2 h.

**EVALUATION SYSTEM**

	W
Observation (technical capacity, attitude and participation)	100%

**MAKE-UP MECHANISMS**

Observation (technical capacity, attitude and participation)  
**Comments:** Continuous assessment

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

**RGE293** [!] *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	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	100%

**MAKE-UP MECHANISMS**

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems  
**Comments:** - Continuous assessment. - It may be asked to redo the document

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

**RGE294** [!] *Realiza una presentación oral del proyecto con argumentos elaborados por sí mismos y haciendo un uso correcto, inclusivo y no discriminatorio del lenguaje.*

<b>LEARNING ACTIVITIES</b>		<b>CH</b>	<b>NCH</b>	<b>TH</b>
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.	2 h.	3 h.
<b>EVALUATION SYSTEM</b>	<b>W</b>	<b>MAKE-UP MECHANISMS</b>		
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%	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 <b>Comments:</b> Continuous assessment.		

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

**RGE234** [!] *Conoce las principales características de los recursos energéticos y tecnologías de generación*

<b>LEARNING ACTIVITIES</b>		<b>CH</b>	<b>NCH</b>	<b>TH</b>
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning			10 h.	10 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints		9 h.	5 h.	14 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects		15 h.		15 h.
Seminars, debates and/or workshops to deepen and/or share experiences.		4 h.	2 h.	6 h.
<b>EVALUATION SYSTEM</b>	<b>W</b>	<b>MAKE-UP MECHANISMS</b>		
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%	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		
Individual written and/or oral tests or individual coding/programming tests	60%	Individual written and/or oral tests or individual coding/programming tests		
<b>Comments:</b> - Control point: minimum grade 5.		<b>Comments:</b> - Students with less than a 5 at the control point must retake the exam. - Final note of the control point: control point 25% and retake 75%.		

**CH - Class hours:** 28 h.  
**NCH - Non-class hours:** 17 h.  
**TH - Total hours:** 45 h.

**RGE235** [!] *Conoce el impacto medioambiental del uso de la energía y herramientas de calificación energética de edificios*

<b>LEARNING ACTIVITIES</b>		<b>CH</b>	<b>NCH</b>	<b>TH</b>
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects		2 h.		2 h.
Carrying out exercises and solving problems individually and/or in teams		1 h.	4,5 h.	5,5 h.
Carrying out work experience in real environments and writing the corresponding report		2 h.	10,5 h.	12,5 h.
<b>EVALUATION SYSTEM</b>	<b>W</b>	<b>MAKE-UP MECHANISMS</b>		
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	31%	Prototype / Product		
Prototype / Product	19%	<b>Comments:</b> - For the courseworks, their correction will be asked. The maximum mark for the corrected courseworks will be 5.0. - In the project / PBL there will not be any retake of the individual		
<b>Comments:</b> - Courseworks: minimum grade 5. - PBL project				

grade: 30% product, 20% technical content of the report and 50% defense.  
individual technical defense.

**CH - Class hours:** 5 h.  
**NCH - Non-class hours:** 15 h.  
**TH - Total hours:** 20 h.

## CONTENTS

## LEARNING RESOURCES AND BIBLIOGRAPHY

### Learning resources

Moodle Platform

### Bibliography

José A. C. González, Roque C. Pérez, Antonio C. Santos, Manuel -A. C. Gil, Centrales de Energías Renovables: Generación Eléctrica con Energías Renovables, PEARSON EDUCACIÓN S.A., Madrid 2009, ISBN: 978-84-8322-600-1.

G. Boyle, Renewable Energy: Power for a sustainable future, OUP Oxford, 3ª edición, 2012, ISBN: 0199545332.

Michael J. Moran, Howard N. Shapiro, Fundamentos de Termodinámica Técnica, 2ª edición, 2004, ISBN: 9788429143799