

## [GOO301] MATERIALS SCIENCE AND ENGINEERING

### GENERAL INFORMATION

<b>Studies</b>	DEGREE IN INDUSTRIAL ORGANIZATION ENGINEERING		<b>Subject</b>	MATERIAL ENGINEERING AND SCIENCE	
<b>Semester</b>	1	<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>Credits</b>	6	<b>Hours/week</b>	3.56	<b>Total hours</b>	64 class hours + 86 non-class hours = <b>150 total hours</b>

### PROFESSORS

IBARRETXE LOPEZ, UNAI
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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
<b>GOR208</b> - To distinguish the different types of materials, understanding the fundamentals of science, technology and chemistry of materials, taking into account the relationship between the microstructure, synthesis or processing and the properties of the materials.		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
<b>Total:</b>				<b>6</b>

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

#### ENAE LEARNING RESULTS

ENAE LEARNING RESULTS	ECTS
<b>ENAE01</b> - Knowledge and understanding: Knowledge and understanding of the underlying scientific and mathematical principles in their branch of engineering.	3,2
<b>ENAE04</b> - Knowledge and understanding: To be aware of the multidisciplinary context of engineering.	0,4
<b>ENAE05</b> - Analysis in engineering: Ability to apply their knowledge and understanding in identifying, formulating and solving engineering problems using established methods.	0,16
<b>ENAE06</b> - Analysis in engineering: Ability to apply their knowledge and understanding in analysing product, process and method engineering.	0,32
<b>ENAE08</b> - Engineering projects: Ability to apply their knowledge in the development and completion of projects which meet specific requirements.	0,32
<b>ENAE12</b> - Research & innovation: Technical and lab competences.	0,32
<b>ENAE14</b> - Practical application of engineering: Ability to combine theory and practice in order to solve engineering problems.	0,32
<b>ENAE17</b> - Transversal competences: To work effectively, both individually and in a team.	0,32
<b>ENAE18</b> - Transversal competences: To use different methods to communicate effectively with the engineering community and society in general.	0,32
<b>ENAE19</b> - Transversal competences: Demonstrate that they are aware of the responsibility implied in the practical application of engineering, the social and environmental impact, and show commitment with professional ethics, responsibility and regulations of the practical application of engineering.	0,32
<b>Total:</b>	<b>6</b>

### SECONDARY LEARNING RESULTS

**RG0290** [!] *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*

<b>LEARNING ACTIVITIES</b>	<b>CH</b>	<b>NCH</b>	<b>TH</b>
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	2 h.	2 h.	4 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	100%	(No mechanisms)	
<b>CH - Class hours:</b> 2 h.			
<b>NCH - Non-class hours:</b> 2 h.			
<b>TH - Total hours:</b> 4 h.			

**RG0291** [!] *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)*

<b>LEARNING ACTIVITIES</b>	<b>CH</b>	<b>NCH</b>	<b>TH</b>
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	2 h.	2 h.	4 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%	(No mechanisms)	
<b>CH - Class hours:</b> 2 h.			
<b>NCH - Non-class hours:</b> 2 h.			
<b>TH - Total hours:</b> 4 h.			

**RG0293** [!] *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.*

<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	2 h.	2 h.	4 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%	(No mechanisms)	
<b>CH - Class hours:</b> 2 h.			
<b>NCH - Non-class hours:</b> 2 h.			
<b>TH - Total hours:</b> 4 h.			

**RG0294** [!] *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	2 h.	1 h.	3 h.

individually and/or in teams

**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

100%

*(No mechanisms)*

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

**RG0217** [!] *Selecciona los materiales más adecuados para poder fabricar el producto dentro de las especificaciones establecidas por el cliente*

**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.

15 h.

16 h.

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

3 h.

3 h.

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

28 h.

36 h.

64 h.

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

2 h.

15 h.

17 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

20%

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

60%

**CH - Class hours:** 34 h.  
**NCH - Non-class hours:** 66 h.  
**TH - Total hours:** 100 h.

**RG0218** [!] *Calcula las dimensiones de elementos estructurales simples sometidos a cargas estáticas bajo criterios de rigidez y resistencia*

**LEARNING ACTIVITIES**

**CH**

**NCH**

**TH**

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

2 h.

2 h.

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

14 h.

2 h.

16 h.

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

6 h.

11 h.

17 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

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

80%

**CH - Class hours:** 22 h.  
**NCH - Non-class hours:** 13 h.

**TH - Total hours:** 35 h.

## CONTENTS

Knowledge of materials:

Metallic materials

Ceramic materials

Polymeric materials

Composite materials

Behavior of materials

Mechanical characterization

Behavior in service

Materials mechanics

Stress and strain

Traction and compression

Shear

Torsion

Flexion

## LEARNING RESOURCES AND BIBLIOGRAPHY

### Learning resources

Moodle Platform

Technical articles

Labs

Class presentations

Topic related web quires

Slides of the subject

Video projections

### Bibliography

[http://katalogoa.mondragon.edu/janium-bin/janium\\_login\\_opac\\_re\\_Ink.pl?grupo=ORGINDUSTRIAL21&ejecuta=60](http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_Ink.pl?grupo=ORGINDUSTRIAL21&ejecuta=60)