

## [GJJ202] MECHANICAL TECHNOLOGY

### GENERAL INFORMATION

<b>Studies</b>	DEGREE IN MECHATRONICS ENGINEERING	<b>Subject</b>	?
<b>Semester</b>	1	<b>Course</b>	2
<b>Character</b>	OPTIONAL	<b>Mention / Field of specialisation</b>	???
<b>Plan</b>	2022	<b>Modality</b>	Face-to-face
<b>Credits</b>	6	<b>Language</b>	EUSKARA/CASTELLANO
		<b>Hours/week</b>	5.11
		<b>Total hours</b>	92 class hours + 58 non-class hours = <b>150 total hours</b>

### 2030 AGENDA GOALS



### PROFESSORS

GOMEZ SAGARZAZU, MIREN  
OROBENGOA GURIDI, DANIEL  
BIZKARRA LANGARA, KEPA  
AZPI-ARTETXE, MAIALEN (SOMORROSTRO)  
URIBE AZKARRETA, MAITANE

### REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	(No previous knowledge required)

### LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
<b>GJR104</b> - To know and apply the basic principles of materials engineering, metrology and industrial fluidic systems	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		0,36
<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

**Total:** 6

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

### SECONDARY LEARNING RESULTS

#### 1RGJ291 (1 sem)

#### LEARNING ACTIVITIES

Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams

CH 2 h. NCH 1 h. TH 3 h.

#### EVALUATION SYSTEM

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

W  
100%

#### MAKE-UP MECHANISMS

(No mechanisms)

**Comments:** With the project of the second semester

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

#### 1RGJ292 (1 sem)

#### 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

2 h.

1 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:** 2 h.

**NCH - Non-class hours:** 1 h.

**TH - Total hours:** 3 h.

**1RGJ293 (1 sem)**

**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**

**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)

**Comments:** Revision and correction of the written report of the semester project

**CH - Class hours:** 1 h.

**NCH - Non-class hours:** 2 h.

**TH - Total hours:** 3 h.

**RGJ218 [!]** *Conoce y aplica las técnicas y aparatos de medida y control utilizados en la industria manufacturera*

**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.

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

2 h.

1 h.

3 h.

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

6 h.

3 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

80%

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%

**Comments:** Final mark: written second-chance exam (75%) + exam(25%)

**CH - Class hours:** 11 h.

**NCH - Non-class hours:** 4 h.

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

**RGJ219 [!]** *Identifica los componentes y describe las funciones que cumplen en un sistema de potencia fluidica e interpreta los circuitos y diagramas en los que estos se representan*

**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.	4 h.	10 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.	8 h.	10 h.
Computer simulation exercises, individually and/or in teams	5 h.	3 h.	8 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	14 h.	6 h.	20 h.
Carrying out exercises and solving problems individually and/or in teams	7 h.	5 h.	12 h.
Practical work in workshops and/or laboratories, individually and/or in teams	6 h.	2 h.	8 h.

#### **EVALUATION SYSTEM**

**W**

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

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

30%

20%

50%

#### **MAKE-UP MECHANISMS**

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

**Comments:** Final mark: written second-chance exam (75%) + exam (25%)

**CH - Class hours:** 40 h.

**NCH - Non-class hours:** 28 h.

**TH - Total hours:** 68 h.

#### **1RGJ290 (1 sem)**

#### **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

2 h.

1 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**

(No mechanisms)

**Comments:** With the project of the second semester

**CH - Class hours:** 2 h.

**NCH - Non-class hours:** 1 h.

**TH - Total hours:** 3 h.

#### **1RGJ294 (1 sem)**

#### **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

2 h.

1 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**

(No mechanisms)

**Comments:** With the oral presentation of the project of the second semester

**CH - Class hours:** 2 h.

**NCH - Non-class hours:** 1 h.

**TH - Total hours:** 3 h.

**RGJ217** [!] *Distingue entre los diferentes tipos de material entendiendo los fundamentos de ciencia, tecnología y química de materiales, comprendiendo la relación entre la microestructura, la síntesis o procesado y las propiedades de los materiales*

#### 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.	4 h.	10 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.	8 h.	10 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	20 h.	6 h.	26 h.
Carrying out exercises and solving problems individually and/or in teams	4 h.	2 h.	6 h.

#### EVALUATION SYSTEM

W

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

24%

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

56%

#### MAKE-UP MECHANISMS

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

**Comments:** Final mark: written second-chance exam (75%) + exam(25%)

**CH - Class hours:** 32 h.

**NCH - Non-class hours:** 20 h.

**TH - Total hours:** 52 h.

## CONTENTS

In the Mechanical Technology course, three sections are distinguished: 1. MATERIALS- Metal alloys\* Steels and cast irons and their designations.\* Heat treatments and surface treatments of steels.\* Non-ferrous metals- Plastics\* Classification and structure\* Mechanical properties\* Physical properties- Testing\* Mechanical tests\* Non-destructive testing 2. METROLOGY-Accuracy-Measuring instruments: rulers, calipers, micrometers-Comparative clock, calipers and standards-Rugosimeters 3. FLUIDS-Applications in industry Fluid power transmission (pneumatics and hydraulics) -Actuators-Actuators-Valves and Pumps-Pressurized air installations-Pneumatic and hydraulic accumulators-Hydraulic circuits in industrial machines (understanding and design) -Hydraulic circuits in industrial machines (understanding and design)

## LEARNING RESOURCES AND BIBLIOGRAPHY

### Learning resources

- [!] Consultas en páginas web relacionadas con el tema
- [!] Laboratorios
- [!] Plataforma Moodle
- [!] Proyección de videos
- [!] Realización de prácticas en laboratorio
- [!] Transparencias de la asignatura

### Bibliography

- CALLISTER Jr., W.D. 2011. Materialen Zientzia eta Ingeniaritza Hastapenak. Euskal Herriko Unibertsitateko Argitalpen Zerbitzua
- ILANGO, S., SOUNDARARAJAN, V. 2007. Introduction to hydraulics and pneumatics. PHI Learning Pvt. Ltd.
- RABIE, M. 2009. Fluid Power Engineering. McGraw-Hill.
- MORO, M. 2017. Fundamentos de Metrología Dimensional. Marcombo Universitaria
- LORIENTE, O.; GONZALEZ, E., TRULL, O. 2013. Verificación y Metrología. Libro de Prácticas. Lulu. Powered by [http://katalogoa.mondragon.edu/janium-bin/janium\\_login\\_opac\\_re\\_Ink.pl?grupo=MECATRONICA21&ejecuta=15&\\_ST](http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_Ink.pl?grupo=MECATRONICA21&ejecuta=15&_ST)
- GALAL RABIE, M.; RABIE, M. 2009. Fluid Power Engineering. McGraw-Hill Professional Publishing
- DE LAS HERAS, S. 2011. Fluidos, bombas e instalaciones hidráulicas. Iniciativa Digital Politècnica Universitat Politècnica de Catalunya