

## [GJC203] MACHINE AND MECHANICAL THEORY

### GENERAL INFORMATION

<b>Studies</b>	DEGREE IN MECHATRONICS ENGINEERING		<b>Subject</b>	?
<b>Semester</b>	2	<b>Course</b>	1	<b>Mention / Field of specialisation</b>
<b>Character</b>	BASIC TRAINING		<b>Language</b>	CASTELLANO/EUSKARA
<b>Plan</b>	2022	<b>Modality</b>	Face-to-face	<b>Total hours</b>
<b>Credits</b>	6	<b>Hours/week</b>	5	90 class hours + 60 non-class hours = <b>150 total hours</b>

### PROFESSORS

EZKURRA MAYOR, MIKEL
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### REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
PHYSICS I	(No previous knowledge required)
MATHEMATICS I	

### LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
<b>GJR102</b> - To understand and master the principles of mechanical physics and the theory of mechanisms to solve engineering problems			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

### SECONDARY LEARNING RESULTS

**RGJ190** [!] *Conocer y aplicar las fases para desarrollar de forma guiada, con los objetivos y la planificación previamente definidos, un proyecto de complejidad técnica acorde con los conocimientos de formación básica de la ingeniería. Reflexiona sobre los cono*

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.	2 h.	4 h.
<b>EVALUATION SYSTEM</b>	<i>W</i>	<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>Comments:</b> Continuous assessment. Retake is not foreseen.			

**CH - Class hours:** 2 h.  
**NCH - Non-class hours:** 2 h.  
**TH - Total hours:** 4 h.

**RGJ191** [!] *Contribuir en la estrategia de funcionamiento del equipo priorizando los objetivos comunes, fomentando y valorando la participación de todas las personas y responsabilizándose de las tareas individuales, así como del cumplimiento de plazos.*

LEARNING ACTIVITIES	CH	NCH	TH
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in	2 h.	2 h.	4 h.

interdisciplinary contexts, real and/or simulated, individually and/or in teams

**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:** Continuous assessment. Retake is not foreseen.

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

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

**TH - Total hours:** 4 h.

**RGJ193** [!] *Redacta una memoria de proyecto clara y concisa utilizando las fuentes de información y estructura de memoria facilitadas, 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

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**

*(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.

**RGJ194** [!] *Realiza una presentación oral y defensa del proyecto clara y concisa, haciendo un uso correcto 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

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

100%

**MAKE-UP MECHANISMS**

*(No mechanisms)*

**Comments:** Continuous assessment. Retake is not foreseen.

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

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

**TH - Total hours:** 4 h.

**RGJ135** [!] *Analizar el movimiento de un mecanismo y determinar las solicitaciones que rigen su movimiento*

**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

12 h.

4 h.

16 h.

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

4 h.

16 h.

20 h.

Computer simulation exercises, individually and/or in teams

8 h.

8 h.

16 h.

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

25 h.

25 h.

Carrying out exercises and solving problems individually and/or in teams	14 h.	12 h.	26 h.
Self-assessment tests in a context of autonomous and continuous learning	2 h.		2 h.

**EVALUATION SYSTEM**

	<i>W</i>
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	25%
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	55%

**MAKE-UP MECHANISMS**

Individual written and/or oral tests or individual coding/programming tests  
**Comments:** Final mark: written second-chance exam (75%) + exam (25%). Laboratory practices and auto evaluations will be made-up by on-going evaluation. It is compulsory to submit the team-exercise, otherwise the result of the learning outcome will be 0. For marks under 5, there will be a possibility of a retake, with a maximum mark of 5.

**CH - Class hours:** 65 h.  
**NCH - Non-class hours:** 40 h.  
**TH - Total hours:** 105 h.

**RGJ136** [!] *Conocer los conceptos básicos de la vibraciones mecánicas y analizar el movimiento vibratorio de sistemas con un grado de libertad*

**LEARNING ACTIVITIES**

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	10 h.		10 h.
Carrying out exercises and solving problems individually and/or in teams	6 h.	11 h.	17 h.
Practical work in workshops and/or laboratories, individually and/or in teams	2 h.	1 h.	3 h.

**EVALUATION SYSTEM**

	<i>W</i>
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:** It is compulsory to submit the team-exercise, otherwise the result of the learning outcome will be 0. For marks under 5, there will be a possibility of a retake, with a maximum mark of 5.

**CH - Class hours:** 18 h.  
**NCH - Non-class hours:** 12 h.  
**TH - Total hours:** 30 h.

**CONTENTS**

1. Analysis of mechanisms - Model of mechanisms - Kinematics of mechanisms - Kinetics of mechanisms  
 Mechanical vibrations - Basis - Systems of one degree of freedom

**LEARNING RESOURCES AND BIBLIOGRAPHY**

**Learning resources**

Subject notes  
 Moodle Platform  
 Class presentations  
 Lab practical training

**Bibliography**

Meriam J.L., Kraige L.G., Mecánica para Ingenieros. Dinámica, 3. argitaraldia, Reverté S.A. argitaletxea, 2014  
 Beer F.P., Mecánica Vectorial para Ingenieros. Dinámica, 11. argitaraldia, McGraw-Hill argitaletxea, 2017  
 Riley W. F. & Sturges L. D., Ingeniería Mecánica. Dinámica, Reverté S.A. argitaletxea, 1996  
 Bedford A. & Fowler W., Mecánica para Ingeniería. Dinámica, Addison-Wesley Iberoamericana argitaletxea, 2008  
 Shames I.H., Mecánica para Ingenieros. Dinámica, Prentice Hall Iberia argitaletxea, 1999  
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