[GMQ301] MECHANICS

GENERAL INFORMATION

Studies	DEGREE IN MECHANICAL ENGINEERING			**Subject**	THEORY OF MECHANISMS
Semester	1	**Course**	2	**Mention / Field of specialisation**	
Character	COMPULSORY				
Plan	2022	**Modality**	Face-to-face	**Language**	EUSKARA/CASTELLANO
Credits	6	**Hours/week**	5.33	**Total hours**	96 class hours + 54 non-class hours = **150 total hours**

2030 AGENDA GOALS

PROFESSORS

GALFARSORO ANDUAGA, UNAI
EZKURRA MAYOR, MIKEL
AIZPURU NAZABAL, AITZIBER

REQUIRED PREVIOUS KNOWLEDGE

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

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GMR203 - To demonstrate knowledge of the basic concepts of the general laws of mechanics and their application to solve engineering problems			*x*	5,4
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*		0,36
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*		0,24
			Total:	6

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

ENAEE LEARNING RESULTS

ENA101 - Knowledge and comprehension: Knowledge and understanding of mathematics and other basic sciences inherent in them engineering speciality, at a level that allows them to acquire the other competencies of the degree.

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.

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.

ENA111 - Practical application of engineering: Understanding of the applicable techniques and methods fr analysis, design and research and their limitations in the field of their speciality.

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.

SECONDARY LEARNING RESULTS

1RGM290 **(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	,75 h.	,75 h.	1,5 h.

Tutoring sessions and monitoring of training activities	,75 h.	,75 h.	1,5 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	85%
Observation (technical capacity, attitude and participation)	15%

Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings

CH - Class hours: 1,5 h.
NCH - Non-class hours: 1,5 h.
TH - Total hours: 3 h.

1RGM293 (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	,75 h.	,75 h.	1,5 h.
Tutoring sessions and monitoring of training activities	,75 h.	,75 h.	1,5 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%

Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings

CH - Class hours: 1,5 h.
NCH - Non-class hours: 1,5 h.
TH - Total hours: 3 h.

1RGM294 (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	1 h.	1 h.	2 h.
Tutoring sessions and monitoring of training activities	1 h.		1 h.

EVALUATION SYSTEM	W
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	50%
Observation (technical capacity, attitude and participation)	50%

Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings

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

RGM209 [!] *Analiza el movimiento de la partícula y del sólido rígido, eligiendo el sistema de coordenadas apropiado*

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	8 h.	4 h.	12 h.
Computer simulation exercises, individually and/or in teams	6 h.	4 h.	10 h.
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	14 h.	12,75 h.	26,75 h.

Comments: The updated version of SolidWorks is used to carry out the simulation exercises.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	36%
Individual written and/or oral tests or individual coding/programming tests	64%

MAKE-UP MECHANISMS

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

CH - Class hours: 40 h.
NCH - Non-class hours: 20,75 h.
TH - Total hours: 60,75 h.

RGM210 **[!]** ***Realiza el modelo de un sistema mecánico, aísla los diferentes sólidos y analiza el comportamiento dinámico del sistema***

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	8 h.	4 h.	12 h.
Computer simulation exercises, individually and/or in teams	4 h.	3 h.	7 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	6 h.		6 h.
Carrying out exercises and solving problems individually and/or in teams	8 h.	5,5 h.	13,5 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	36%
Individual written and/or oral tests or individual coding/programming tests	64%

MAKE-UP MECHANISMS

(No mechanisms)

CH - Class hours: 28 h.
NCH - Non-class hours: 12,5 h.
TH - Total hours: 40,5 h.

1RGM292 **(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	,75 h.	,75 h.	1,5 h.
Tutoring sessions and monitoring of training activities	,75 h.	,75 h.	1,5 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	20%
Self-assessment	50%
Observation (technical capacity, attitude and participation)	30%

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings

Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings

CH - Class hours: 1,5 h.
NCH - Non-class hours: 1,5 h.
TH - Total hours: 3 h.

RGM211 **[!]** ***Analiza la dinámica de sólidos utilizando métodos energéticos y determina las acciones producidas por la colisión y su posterior movimiento***

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	4 h.	3 h.	7 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	6 h.		6 h.
Carrying out exercises and solving problems individually and/or in teams	8 h.	10,75 h.	18,75 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	28%
Individual written and/or oral tests or individual coding/programming tests	72%

MAKE-UP MECHANISMS

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

CH - Class hours: 20 h.
NCH - Non-class hours: 13,75 h.
TH - Total hours: 33,75 h.

1RGM291 **(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	,75 h.	,75 h.	1,5 h.
Tutoring sessions and monitoring of training activities	,75 h.	,75 h.	1,5 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	20%
Self-assessment	50%
Observation (technical capacity, attitude and participation)	30%

Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings

MAKE-UP MECHANISMS

(No mechanisms)

Comments: Continuous evaluation. FEEDBACK received from the tutor and the experts in the project follow-up meetings

CH - Class hours: 1,5 h.
NCH - Non-class hours: 1,5 h.
TH - Total hours: 3 h.

CONTENTS

1. Kinematics

1.1 Planar kinematics of particles

1.2 Planar kinematics of rigid solids

1.3 Thee-dimensional kinematics of particles

2. Kinetics

2.1 Newton's second law

2.2 Energy methods

2.3 Mechanical impacts

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform Class presentations Specific Master Software Slides of the subject	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 https://katalogoa.mondragon.edu/janium-bin/sumario.pl?Id=20240105155907