[GJE303] MATHEMATICS APPLIED TO ENGINEERING

GENERAL INFORMATION

Studies	DEGREE IN MECHATRONICS ENGINEERING			**Subject**	?
Semester	2	**Course**	1	**Mention / Field of specialisation**	
Character	BASIC TRAINING				
Plan	2025	**Modality**	Face-to-face	**Language**	CASTELLANO/EUSKARA
Credits	6	**Hours/week**	5	**Total hours**	90 class hours + 60 non-class hours = **150 total hours**

2030 AGENDA GOALS

PROFESSORS

ITURRASPE LARREATEGUI, MARIA AINHOA
ABETE HUICI, JOSE MANUEL
ARRASATE AYERBE, JAVIER
ZARATE LARRINAGA, ENRIQUE
AGUIRRE ALONSO, MIKEL
LASA ALONSO, JON
ZUBIRIA ULACIA, MARIA
SALABERRIA CALVILLO, HAIZEA

REQUIRED PREVIOUS KNOWLEDGE

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

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GJR111 - To solve mathematical problems that may arise in engineering, demonstrating the ability to apply knowledge about: numerical algorithms; statistics			*x*	5,4
G-TR1 - 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-TR2 - 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

2RGJ193 (2 sem) Write a clear and concise project report using the information sources and report structure provided, and using language that is correct, inclusive, and non-discriminatory.

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.

2RGJ192 **(2 sem) Understand and describe the phases involved in developing engineering teams, and identify and describe the professional roles of an engineer, recognizing their contribution to the achievement of sustainable development goals (SDGs).**

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.

RGJ116 **They apply mathematical tools for the resolution of the transient and permanent regime of circuits.**

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.	4 h.	7 h.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	4 h.	12 h.	16 h.
Computer simulation exercises, individually and/or in teams	6 h.	6 h.	12 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	33 h.		33 h.
Carrying out exercises and solving problems individually and/or in teams	10 h.	12 h.	22 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	10%	Individual written and/or oral tests or individual coding/programming tests **Comments:** Final mark, if applicable, 25% of the mark of the first control point and 75% of the mark of the recovery.
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	10%	
Individual written and/or oral tests or individual coding/programming tests	80%	

CH - Class hours: 56 h.
NCH - Non-class hours: 34 h.
TH - Total hours: 90 h.

2RGJ190 **(2 sem) Understand and apply the phases for developing, based on defined objectives and planning, a technically complex project in line with your knowledge. Reflect on your training needs, becoming aware of your limitations.**

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

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

2RGJ191 (2 sem) Contribute to the team's operating strategy by prioritizing common goals, encouraging and valuing everyone's participation, and taking responsibility for individual tasks and meeting deadlines.

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.	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: Continuous assessment. Retake is not foreseen.

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

RGJ115 They know and apply the fundamentals of statistics and vector analysis to solve engineering problems.

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.
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 h.
Computer simulation exercises, individually and/or in teams	5 h.	12 h.	17 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	16 h.		16 h.
Carrying out exercises and solving problems individually and/or in teams	2 h.	4 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	10%
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	10%
Individual written and/or oral tests or individual coding/programming tests	80%

MAKE-UP MECHANISMS

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

Comments: Final mark, if applicable, 25% of the mark of the first control point and 75% of the mark of the recovery.

CH - Class hours: 27 h.
NCH - Non-class hours: 18 h.
TH - Total hours: 45 h.

2RGJ194 (2 sem)Give a clear and concise oral presentation and defense of the project, using language correctly.

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,	100%

MAKE-UP MECHANISMS

(No mechanisms)

computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	**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.

CONTENTS

The course is divided into two parts:Part 1: Statistics.Descriptive statistics.Probability.Normal distribution.InferencePart 2: Mathematics applied to electrical circuits. Time response of first and second order systems (differential equations). Frequency response of first- and second-order systems.
2.1. Laplace transform and applications 2.2. Fourier series and applications.

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform	http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_lnk. pl?grupo=MECATRONICA12&ejecuta=20&_ST
[!]	William.H. Hayt, Jack.E. Kemmerly, Stephen.M. Durbin, Análisis de circuitos en ingeniería (8. edición). Mcgraw Hill, ISBN:978-607-15-0802-7, (2012).
Class presentations	Manoochehr. Nahvi, Joseph.A. Edminister, Circuitos eléctricos y electrónicos (4. edición). Mcgraw Hill, ISBN:84-481-4543-7, (2008).
	James.W. Nilsson, Susan.A. Riedel, Circuitos eléctricos (9. edición). Pearson Prentice Hall, ISBN 84-205-4458-2, (2011).