[GEA304] MATHEMATICS III

GENERAL INFORMATION

Studies	DEGREE IN INDUSTRIAL ELECTRONICS ENGINEERING	**Subject**	MATHEMATICS
Semester	1	**Course**	2
Character	BASIC TRAINING	**Mention / Field of specialisation**	
Plan	2022	**Modality**	Face-to-face
Language	EUSKARA/CASTELLANO		
Credits	6	**Hours/week**	5.16
Total hours	92.88 class hours + 57.12 non-class hours = **150 total hours**		

2030 AGENDA GOALS

PROFESSORS

BADIOLA AIESTARAN, XABIER
CABEZAS OLIVENZA, MIREYA
ZUBIRIA ULACIA, MARIA

REQUIRED PREVIOUS KNOWLEDGE

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

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GER206 - To solve mathematical problems that may arise in engineering; Apply knowledge about: differential geometry, differential equations, Laplace transform and Fourier series			*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.

ENA102 - Knowledge and comprehension: Knowledge and comprehension of the engineering disciplines of their speciality, at the level necessary to acquire the rest of the competencies of the degree, including notions of the latest advances.

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.

ENA109 - Research and innovation: Ability to consult and apply codes of good practice and security in their speciality.

ENA112 - Practical application of engineering: Practical competency to solve complex problems, carry out complex engineering projects, and conduct investigations specific to their speciality.

ENA113 - Practical application of engineering: Knowledge of application of materials, equipment and tools, engineering technology and processes, 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

1RGE290 (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	1,5 h.	1,5 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Observation (technical capacity, attitude and participation)	100%	Observation (technical capacity, attitude and participation) **Comments:** Continuous assessment.

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

1RGE294 (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	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%	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 **Comments:** Continuous assessment.

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

RGE209 [!] *Resuelve funciones de variables múltiples*

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	1 h.		1 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	11 h.	7 h.	18 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Individual written and/or oral tests or individual coding/programming tests **Comments:** - Control point: minimum grade 5.	100%	Individual written and/or oral tests or individual coding/programming tests **Comments:** - Students with less than a 5 at the control point must retake the exam. - Final note of the control point: control point 25% and retake 75%.

CH - Class hours: 12 h.
NCH - Non-class hours: 7 h.
TH - Total hours: 19 h.

RGE212 [!] *Diseña circuitos eléctricos según su comportamiento en el dominio frecuencial*

LEARNING ACTIVITIES	CH	NCH	TH
Carrying out work experience in real environments and writing the corresponding report	20,5 h.	12,5 h.	33 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies,	20%	Prototype / Product

computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems		**Comments:** - In the project / PBL there will not be any retake of the individual defense.
Individual written and/or oral tests or individual coding/programming tests	50%	
Prototype / Product	30%	

CH - Class hours: 20,5 h.
NCH - Non-class hours: 12,5 h.
TH - Total hours: 33 h.

1RGE291 **(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	1,5 h.	1,5 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Observation (technical capacity, attitude and participation)	100%	Observation (technical capacity, attitude and participation) **Comments:** Continuous assessment.

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

RGE211 **[!]** ***Utiliza la transformada de Laplace y las series de Fourier para resolver circuitos eléctricos en dominio temporal y frecuencial***

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	8 h.	5 h.	13 h.
Carrying out exercises and solving problems individually and/or in teams	16 h.	10 h.	26 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Individual written and/or oral tests or individual coding/programming tests	100%	Individual written and/or oral tests or individual coding/programming tests
Comments: - Control point: minimum grade 5.		**Comments:** - Students with less than a 5 at the control point must retake the exam. - Final note of the control point: control point 25% and retake 75%.

CH - Class hours: 26 h.
NCH - Non-class hours: 15 h.
TH - Total hours: 41 h.

RGE210 **[!]** ***Resuelve ecuaciones diferenciales mediante la transformada de Laplace y analiza señales periódicas mediante las series de Fourier***

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	1 h.		1 h.
Computer simulation exercises, individually and/or in teams	1 h.	2 h.	3 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	24 h.	14 h.	38 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%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems
Individual written and/or oral tests or individual coding/programming tests	80%	Individual written and/or oral tests or individual coding/programming tests
Comments: - Control point: minimum grade 5.		**Comments:** - Students with less than a 5 at the control point must retake the exam. - Final note of the control point: control point 25% and retake 75%.

CH - Class hours: 26 h.
NCH - Non-class hours: 16 h.
TH - Total hours: 42 h.

1RGE293 **(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	1,88 h.	1,12 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%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems
		Comments: - Continuous assessment. - It may be asked to redo the document.

CH - Class hours: 1,88 h.
NCH - Non-class hours: 1,12 h.
TH - Total hours: 3 h.

1RGE292 **(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	1,5 h.	1,5 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Observation (technical capacity, attitude and participation)	100%	Observation (technical capacity, attitude and participation)
		Comments: Continuous assessment.

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

CONTENTS

Multivariate functions Scope Limit and continuity Partial and total differential derivatives Maxima and minima, LagrangeFourier sequence Development of peridic functions using trigonometric functions. When the development is 2π, 2l Odd and even functions, function extension The complex Fourier developmentLaplace transform Definition and properties Inverse Laplace transform Transfer function and modeling of electrical circuits Transient response of electrical circuits Frequency response of electrical circuits: Bode diagramFourier analysis Wavelet spectrum Mean and effective value Total Harmonic Distortion (THD)

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform Labs Subject notes	http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_lnk.pl?grupo=ELCINDUSTRIAL21&ejecuta=5