[GEA302] MATHEMATICS II

GENERAL INFORMATION

Studies	DEGREE IN INDUSTRIAL ELECTRONICS ENGINEERING			**Subject**	MATHEMATICS
Semester	2	**Course**	1	**Mention / Field of specialisation**	
Character	BASIC TRAINING				
Plan	2022	**Modality**	Face-to-face	**Language**	EUSKARA/CASTELLANO
Credits	6	**Hours/week**	5.19	**Total hours**	93.5 class hours + 56.5 non-class hours = **150 total hours**

2030 AGENDA GOALS

PROFESSORS

FERNANDEZ LIZARRIBAR, GARBIÑE

REQUIRED PREVIOUS KNOWLEDGE

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

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
G-RA07 - To solve mathematical problems that may arise in engineering, demonstrating the ability to apply knowledge of: linear algebra; geometry; differential geometry and differential and partial differential equations		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.

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.

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.

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

RGE114 [!] ***Utiliza el álgebra lineal para modelizar y resolver problemas de ingeniería, utilizando software matemático***

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.	5 h.	7 h.
Computer simulation exercises, individually and/or in teams	1 h.	7 h.	8 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	17 h.	3 h.	20 h.
Carrying out exercises and solving problems individually and/or in teams	36 h.	17 h.	53 h.
Carrying out work experience in real environments and writing the corresponding report	6 h.	5 h.	11 h.

Comments: *Some exercises will be solved with MATLAB. MATLAB is a leading programming and numerical calculation platform used

by millions of engineers and scientists to analyze data, develop algorithms and create models.

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	11%	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	85,6%	Individual written and/or oral tests or individual coding/programming tests
Prototype / Product	3,4%	Observation (technical capacity, attitude and participation)

Comments: - Control point: minimum grade 5. - Courseworks: minimum grade 5. - PBL project grade: 30% product, 20% technical content of the report and 50% individual technical defense.

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%. - For the courseworks, their correction will be asked. The maximum mark for the corrected courseworks will be 5.0. - In the project / PBL there will not be any retake of the individual defense.

CH - Class hours: 62 h.
NCH - Non-class hours: 37 h.
TH - Total hours: 99 h.

2RGE190 (2 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.

2RGE191 (2 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
Observation (technical capacity, attitude and participation)	100%	Observation (technical capacity, attitude and participation) **Comments:** Continuous assessment.

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

2RGE193 (2 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	1,5 h.	1,5 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: 1,5 h.
NCH - Non-class hours: 1,5 h.
TH - Total hours: 3 h.

2RGE194 (2 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	1,5 h.	1,5 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: 1,5 h.
NCH - Non-class hours: 1,5 h.
TH - Total hours: 3 h.

RGE113 [!] *Modeliza y resuelve los problemas geométricos, los físicos y los de ingeniería, utilizando las ecuaciones diferenciales*

LEARNING ACTIVITIES	CH	NCH	TH
Conducting tests, giving presentations, presenting defences, taking examinations and/or doing checkpoints	2 h.		2 h.
Computer simulation exercises, individually and/or in teams	1 h.	3 h.	4 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	8 h.	2 h.	10 h.
Carrying out exercises and solving problems individually and/or in teams	10 h.	6 h.	16 h.
Carrying out work experience in real environments and writing the corresponding report	2 h.	2 h.	4 h.

Comments: *Some exercises will be solved with MATLAB. MATLAB is a leading programming and numerical calculation platform used by millions of engineers and scientists to analyze data, develop algorithms and create models.

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	13,2%	Individual written and/or oral tests or individual coding/programming tests Prototype / Product **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%. - For the courseworks, their correction will be asked. The maximum mark for the corrected courseworks will be 5.0. - 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	83,5%	
Prototype / Product	3,3%	

Comments: - Control point: minimum grade 5. - Courseworks: minimum grade 5. - PBL project grade: 30% product, 20% technical content of the report and 50% individual technical defense.

CH - Class hours: 23 h.
NCH - Non-class hours: 13 h.
TH - Total hours: 36 h.

2RGE192 **(2 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
Observation (technical capacity, attitude and participation)	100%

MAKE-UP MECHANISMS

Observation (technical capacity, attitude and participation)

Comments: Continuous assessment.

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

CONTENTS

1. Ordinary differential equations

- First order ODEs: separable, homogeneous, linear and Bernouilli type

- Second and higher order ODE

- Resolution of problems in Physics and Mathematics

2. Linear algebra

- Systems of linear equations

- Matrix algebra

- Determinants

- Vector spaces

- Diagonalization: eigenvalues and eigenvectors

- Inner product, norm and orthogonality

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Moodle Platform
Class presentations
Computer practical training
Slides of the subject
Video projections
Subject notes

Bibliography

Poole, D. (2011). Álgebra lineal. Una introducción moderna. Cengage Learning Editores.

Piskunov, N., Sarasola, J. R. A., & Martin, P. A. (1992). Kalkulu diferentziala eta integrala.

Larson, r. and Edwards, B. and Hostetler, R. (1995) Cálculo y geometría analítica, Vol 2

Smith, R. T., & Minton, R. B. (2003). Cálculo y geometria analítica: Tomo 1.

Smith, R. T., Minton, R. B. (2003). Cálculo y geometria analítica: Tomo 2.

Lay, D. C., Murrieta, J. M. (2007). Algebra lineal y sus aplicaciones. J. E. M. Murrieta (Ed.). Pearson educación.