

[GOA302] MATHEMATICS II

GENERAL INFORMATION

Studies	DEGREE IN INDUSTRIAL ORGANIZATION ENGINEERING	Subject	MATHEMATICS
Semester	2	Course	1
Character	BASIC TRAINING	Mention / Field of specialisation	
Plan	2022	Modality	Face-to-face
Credits	6	Hours/week	5.11
		Language	EUSKARA
		Total hours	92 class hours + 58 non-class hours = 150 total hours

PROFESSORS

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LASA ALONSO, JON	

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
MATHEMATICS I	(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		0,28
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		0,32
Total:				6

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

ENAE LEARNING RESULTS

ENAE LEARNING RESULTS	ECTS
ENAE01 - Knowledge and understanding: Knowledge and understanding of the underlying scientific and mathematical principles in their branch of engineering.	4,04
ENAE04 - Knowledge and understanding: To be aware of the multidisciplinary context of engineering.	0,28
ENAE05 - Analysis in engineering: Ability to apply their knowledge and understanding in identifying, formulating and solving engineering problems using established methods.	0,8
ENAE08 - Engineering projects: Ability to apply their knowledge in the development and completion of projects which meet specific requirements.	0,29
ENAE17 - Transversal competences: To work effectively, both individually and in a team.	0,29
ENAE18 - Transversal competences: To use different methods to communicate effectively with the engineering community and society in general.	0,29
Total:	6

SECONDARY LEARNING RESULTS

RG013 [!] *Modeliza y resuelve los problemas geométricos, los físicos y los de ingeniería, utilizando las ecuaciones diferenciales*

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.	3 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	1 h.	2 h.	3 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	9 h.		9 h.
Carrying out exercises and solving problems individually and/or in teams	12 h.	6 h.	18 h.
EVALUATION SYSTEM	<i>W</i>	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
Individual written and/or oral tests or individual coding/programming tests	90%	

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

RG0114 [!] *Utiliza el álgebra lineal para modelizar y resolver problemas de ingeniería, utilizando software matemático*

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.	11 h.	14 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	2 h.	2 h.	4 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	26 h.	2 h.	28 h.
Carrying out exercises and solving problems individually and/or in teams	31 h.	20 h.	51 h.

EVALUATION SYSTEM

	W
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	90%

MAKE-UP MECHANISMS

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

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

RG0190 [!] *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
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)

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

RG0191 [!] *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
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	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: 1 h.			
NCH - Non-class hours: 2 h.			
TH - Total hours: 3 h.			

RG0193 [!] *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	2 h.	2 h.	4 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: 2 h.			
TH - Total hours: 4 h.			

RG0194 [!] *Realiza una presentación oral y defensa del proyecto clara y concisa, haciendo 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	2 h.	2 h.	4 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)	
CH - Class hours: 2 h.			
NCH - Non-class hours: 2 h.			
TH - Total hours: 4 h.			

CONTENTS

1. Ordinary differential equations
 - First order ODEs: separable, homogeneous, linear and Bernoulli 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

Subject notes
Moodle Platform
Class presentations
Programmes
Slides of the subject

Bibliography

Kalkulu diferentziala eta integrala. Piskunov, N., Sarasola, J. R. A., & Martin, P. A. (1992).
Robert Smith, Roland Minton. Cálculo. Tomo 1 y Tomo 2. (McGraw-Hill, 2007) [
Poole, D. Álgebra lineal: una introducción moderna. (Cengage Learning Editores, 2011).
Lay, D. C. & Murrieta, J. M. Algebra lineal y sus aplicaciones. (Pearson Educación, 2007).
Álgebra lineal y teoría de matrices: R. Barbolla, P. Sanz. (1998) Pearson educación.