[GFA005] MATHEMATICAL METHODS APPLIED TO PHYSICS

GENERAL INFORMATION

Studies	ENGINEERING PHYSICS APPLIED TO INDUSTRY			**Subject**	Mathematics
Semester	2	**Course**	2	**Mention / Field of specialisation**	
Character	COMPULSORY				
Plan	2022	**Modality**	Face-to-face	**Language**	EUSKARA/ENGLISH
Credits	4,5	**Hours/week**	0	**Total hours**	73 class hours + 39.5 non-class hours = **112.5 total hours**

PROFESSORS

AGUIRRE ALONSO, MIKEL
TELLERIA ALLIKA, XABIER

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
CALCULUS I	*(No previous knowledge required)*
CALCULUS II	
Mathematical Methods Applied to Engineering	

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GFR109 - Solving any mathematical problems that may arise in engineering. Aptitude in applying knowledge of: differential equations in partial derivatives and their analytical and numerical solution		x		4,06
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		0,24
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		0,2
			Total:	4,5

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

SECONDARY LEARNING RESULTS

RGF290 **[!]** ***Muestra las habilidades para trabajar en grupo y resuelve los problemas planteados utilizando las herramientas adecuadas en cada caso.***

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		3 h.	3 h.

EVALUATION SYSTEM	W
Self-assessment	25%
Co-assessment	25%
Observation (technical capacity, attitude and participation)	50%

MAKE-UP MECHANISMS

(No mechanisms)

CH - Class hours: 0 h.
NCH - Non-class hours: 3 h.
TH - Total hours: 3 h.

RGF291 **[!]** ***Utiliza la metodología adecuada para encontrar las soluciones a los problemas y para desarrollar los proyectos: Examina bien los problemas, y busca información significativa para hacerle frente y propone las soluciones.***

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		3 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: 0 h.
NCH - Non-class hours: 3 h.
TH - Total hours: 3 h.

RGF292 **[!]** ***Comunica, busca y estructura correctamente la información de manera escrita: Redacta una memoria de proyecto clara y concisa siguiendo los criterios establecidos en la quía para la redacción de la memoria de proyectos y utilizando herramienta informá***

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.	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: 0 h.
NCH - Non-class hours: 3 h.
TH - Total hours: 3 h.

RGF293 **[!]** ***Comunica, busca y estructura correctamente la información de manera oral: Realiza una presentación oral y defensa del proyecto clara y concisa, utilizando adecuadamente los aspectos recogidos en la guía de comunicación oral y las herramientas informá***

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.

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: 0 h.
NCH - Non-class hours: 2 h.
TH - Total hours: 2 h.

RGF221 **[!]** ***Identifica los diferentes tipos de ecuaciones en derivadas parciales y conoce y aplica las diferentes técnicas para su resolución analítica.***

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		10 h.	10 h.
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	30 h.		30 h.
Carrying out exercises and solving problems individually and/or in teams	15 h.	8 h.	23 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%	Individual written and/or oral tests or individual coding/programming tests
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	20%	
Individual written and/or oral tests or individual coding/programming tests	60%	

CH - Class hours: 47 h.
NCH - Non-class hours: 18 h.
TH - Total hours: 65 h.

RGF222 **[!]** ***Identifica los diferentes tipos de ecuaciones en derivadas parciales y conoce los métodos para buscar una solución numérica.***

LEARNING ACTIVITIES	CH	NCH	TH
Computer simulation exercises, individually and/or in teams	10 h.	10,5 h.	20,5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	16 h.		16 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	80%	Individual written and/or oral tests or individual coding/programming tests
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	20%	

CH - Class hours: 26 h.
NCH - Non-class hours: 10,5 h.
TH - Total hours: 36,5 h.

CONTENTS

1. Partial Differential Equations

- Introduction

- Types of PDE's

2. Numerical methods

- Initial value problems

- Boundary value problems

3. Equations of mathematical physics

- Laplace

- Heat equation

- Wave equation

- Schrödingerequation

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Subject notes	https://labur.eus/QlzUS
Moodle Platform	