

[GGB203] PHYSICS III

GENERAL INFORMATION

Studies	DEGREE IN BIOMEDICAL ENGINEERING		Subject	PHYSICS
Semester	2	Course	2	Mention / Field of specialisation
Character	COMPULSORY		Language	EUSKARA
Plan	2022	Modality	Face-to-face	Total hours
Credits	3	Hours/week	2.44	44 class hours + 31 non-class hours = 75 total hours

2030 AGENDA GOALS



PROFESSORS

MARTINEZ DE MENDIVIL VARAS, JON

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
MATHEMATICS II	(No previous knowledge required)
PHYSICS II	

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GBR213 - To apply the principles of electromagnetism to problems in the field of Biomedical Engineering		x		2,6
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		0,16
Total:				3

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

SECONDARY LEARNING RESULTS

2RGB292 Identify and accurately explain the SDGs addressed by the project carried out.

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.	1 h.	2 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: 1 h.

TH - Total hours: 2 h.

2RGB293 Write and structure the project report correctly, using language that is appropriate, inclusive, and non-discriminatory. To do this, find and use the right sources of information.

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

2RGB294 Give an oral presentation of the project using arguments they have developed themselves and making correct, inclusive, and non-discriminatory use of language.			
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.	1 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%	Observation (technical capacity, attitude and participation)	
CH - Class hours: 1 h. NCH - Non-class hours: 1 h. TH - Total hours: 2 h.			

2RGB290 Propose the objectives and planning of a project that will enable you to acquire and/or reinforce your knowledge of technologies—which are sometimes at the cutting edge of knowledge—and define an effective learning strategy.			
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.	1 h.	2 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	
CH - Class hours: 1 h. NCH - Non-class hours: 1 h. TH - Total hours: 2 h.			

RGB228 Understand and apply Maxwell's equations			
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	8 h.	4 h.	12 h.
Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning		5 h.	5 h.
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	14 h.		14 h.
Carrying out exercises and solving problems individually and/or in teams		5 h.	5 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

5%

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

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

90%

Prototype / Product

5%

CH - Class hours: 24 h.

NCH - Non-class hours: 16 h.

TH - Total hours: 40 h.

2RGB291 Establish the responsibilities of team members using appropriate techniques to promote their efficiency in project development (sharing resources, contributing ideas, seeking consensus, evaluating results, the process, etc.).

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.

1 h.

2 h.

EVALUATION SYSTEM

W

MAKE-UP MECHANISMS

Self-assessment

25%

Observation (technical capacity, attitude and participation)

Co-assessment

25%

Observation (technical capacity, attitude and participation)

50%

CH - Class hours: 1 h.

NCH - Non-class hours: 1 h.

TH - Total hours: 2 h.

RGB229 Understand and apply the fundamentals of electromagnetic wave propagation.

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

5 h.

3 h.

8 h.

Personal study and flexible development of concepts and subjects using active dynamics, to foster more meaningful learning

5 h.

5 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

7 h.

7 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

5%

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

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

90%

Prototype / Product

5%

CH - Class hours: 15 h.

NCH - Non-class hours: 10 h.

TH - Total hours: 25 h.

CONTENTS

1. Vector analysis1.1. Gradient1.2. Divertgence1.3. Rotational1.4. Laplacian2. Maxwell's equations2.1. Gauss's law for the electric field2.2. Gauss's law for the magnetic field2.3. Ampere's law2.4. Faraday's law3. Propagation of electromagnetic waves3.1. Propagation in a vacuum3.2. Propagation in lossless media3.3. Propagation in lossy media3.4. Fresnel equations3.5. Scattering4. FDTD (Finite Differences Time Domain)

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

- [!] *Plataforma Moodle*
- [!] *Presentaciones en clase*
- [!] *Apuntes de la asignatura*
- [!] *Consultas en páginas web relacionadas con el tema*

Bibliography

- David K. Cheng. Fundamentos de electromagnetismo para ingeniería
- Markus Zahn, Electromagnetic Field Theory: A Problem Solving Approach. (Massachusetts Institute of Technology: MIT OpenCourseWare)
- Rafael Boloix Tortosa. Problemas de ondas planas y medios de transmisión
- Rodrigo Chi Duran. Problemas Propuestos y Resueltos de Electromagnetismo