

SUBJECT TEACHING GUIDE

G767 - PHYSICS II

Degree in Chemical Engineering First Degree in Chemical Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Chemical Engineering First Degree in Chemical Engineering			Type and Year	Core. Year 2 Core. Year 2
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Physics Basic Training Module				
Course unit title and code	G767 - PHYSICS II				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. CIENCIAS DE LA TIERRA Y FISICA DE LA MATERIA CONDENSADA				
Name of lecturer	IGNACIO HERNANDEZ CAMPO				
E-mail	ignacio.hernandez@unican.es				
Office	Facultad de Ciencias. Planta: + 3. DESPACHO PROFESORES (3010)				
Other lecturers	JAVIER RUIZ FUERTES				

3.1 LEARNING OUTCOMES
- To understand the fundamental principles of electromagnetism and modern physics To develop the ability to solve practical problems of engineering involving physical interactions .
- To apply the correct modelling and mathematical formalism to describe and solve a physical problem.
- To critically consider practical and applied physical interactions in a system . To analyze and discuss experimental results in laboratory experiments . To write a report with the experimental data.

4. OBJECTIVES

- To appreciate the importance of Physics as a science and its implications in engineering .
- To know the meaning and experimental foundations of the laws of electromagnetism .
- To know the meaning and experimental foundations of the description of atoms and solids
- To employ the physical and mathematical tools to solve physical problems and present the analysis in a correct , technical way.

6. SUBJECT PROGRAM

CONTENTS	
1	ELECTRIC FIELD, ELECTRIC POTENTIAL Electric charges. Insulating and conducting materiales. Coulomb's law. Electric Field. Gauss's law. Electric potential.
2	ELECTRICITY IN MATERIAL MEDIA Capacitors. Dielectric materials. Polarization. Gauss's law. Electric current. Ohm's law and conductivity/resistance. Circuits
3	MAGNETIC FIELD Magnetic Force. Magnetic field. Biot and Savart's law. Ampère's law, Gauss's law of magnetis. Faraday's law. Inductance. R-L circuits.
4	MAGNETISM IN MATERIAL MEDIA Hall Effect. Diamagnetic, paramagnetic, ferromagnetic, antiferromagnetic materials. Susceptibility. Curie and Curie-Weiss laws. Thermal effects.
5	Wave magnitudes. Wavefunctions. Wave phenomena.
6	ELECTROMAGNETISM Maxwell's equations. Electromagnetic waves and wave phenomena.
7	MODERN PHYSICS Relativity. Quantum Physics. Hydrogen-like atoms. Schrödinger's equation. Atomic Physics. Introduction to Condensed Matter Physics: crystals and energy bands.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Laboratory reports (20% of the global grades). Attendance is mandatory.	Laboratory evaluation	Yes	Yes	20,00
Half term partial written exam (minimum grade for compensating: 3.5/10)	Written exam	No	Yes	30,00
Second partial written exam (minimum grade for compensating: 3.5/10)	Written exam	No	Yes	40,00
Final written exam. It can be employed for improving grades or failure in partials. It will encompass questions on the final part of the module. It will account for 80% of the module's grades. At least 4/10 is minimum for compensating with lab work.	Written exam	Yes	Yes	10,00
TOTAL				100,00
Observations				
Two partials / Final exam. (80%) Partials can compensate each other for grades higher than 3.5 Laboratory work and report are mandatory (20%). Failure in handing reports on time can result in negative grades (-2/10 on global grades).				
Observations for part-time students				
Attendance to practical sessions is necessary in order to produce and hand in the corresponding reports to be graded				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
Serway, R.A., Jewet, J.W., Física para Ciencias e Ingeniería, con Física Moderna, vol. 2, 7ª ed., Cengage Learning, 2009 Tipler, P.A., Mosca, G., Física para la ciencia y la tecnología, vol II 6ª ed. Freeman, 2010