GUÍA DOCENTE
2021 - 2022

FICHA TÉCNICA DE LA ASIGNATURA

Datos de la asignatura	
Nombre completo	Electricity and Magnetism
Código	DIE-SAP-212
Nivel	Intercambio
Cuatrimestre	Semestral
Créditos	6,0 ECTS
Carácter	Optativa
Departamento / Área	Departamento de Ingeniería Eléctrica
Responsable	Danilo Magistrali

Datos del profesorado	
Profesor	
Nombre	Danilo Magistrali
Departamento / Área	Departamento de Matemática Aplicada
Correo electrónico	dmagistrali@icai.comillas.edu

DATOS ESPECÍFICOS DE LA ASIGNATURA

Contextualización de la asignatura

Competencias - Objetivos

Competencias

Conceptual-based introduction to classical electricity and magnetism, including such topics as, electric charge and electric fields, Gauss's law, electric potential, capacitance, current, resistance, and circuits, magnetic fields, and fields due to currents, induction and inductance, magnetism of matter, Maxwell's equations, and electromagnetic oscillations. These topics are important, not only because they are extremely interesting in their own right, but also because they underlie almost all of modern technology, from computers to telecommunications, all of chemistry, and all of biology as well.

In addition to lectures, lab sessions will be held concerning electrostatic charges, LRC circuits, magnetic fields, magnetic materials, induction and the construction of a magnetic motor.

BLOQUES TEMÁTICOS Y CONTENIDOS

Contenidos – Bloques Temáticos

1. The Electric Field

1.1 Charge and Coulomb’s law

1.2 The electric field

1.3 Point-charge distributions

1.4 Continuous charge distributions

1.5 Motion of charged particles in an electric field

2. Gauss's Law

2.1 Electric flux

2.2 Gauss's law

2.3 Gauss's law and various continuous charge distributions

3. Electric Potential

3.1 Electric potential and potential difference

3.2 Potential differences in uniform electric fields

3.3 Potential and point charges

3.4 Potential and continuous charge distributions

4. Circuits 4.1 Ohm's law

4.2 Electromotive force and internal resistance

4.3 Equivalent resistance

4.4 Kirchhoff's rules

5. Magnetostatics

5.1 Magnetic force on moving charges and currents

5.2 Biot-Savart law

5.3 Ampere's law

6. Magnetic Induction

6.1 Gauss's law of magnetism

6.2 Faraday's law of induction

6.3 Lenz's law

6.4 Induced emf and electric fields

6.5 Maxwell's equations

7. Electromagnetic Waves

7.1 Polarization

7.2 Reflection and Refraction

7.3 Lenses and mirrors.

7.4 Optical Instruments

METODOLOGÍA DOCENTE

Aspectos metodológicos generales de la asignatura

EVALUACIÓN Y CRITERIOS DE CALIFICACIÓN

The grade will be determined by two midterms (25% each), homework (10%), and a final examination (40%). The exams are all closed notebook, closed textbook and no calculator. The course will not be graded on a curve, i.e., there is no bound on the numbers of A's, B's, C's etc.

Students will have the chance to retake the exam. The resulting grade will be computed as follows: 30% of midterms and 70% of the final exam.

BIBLIOGRAFÍA Y RECURSOS

Bibliografía Básica

Young, Hugh D., and Roger A. Freedman (2012). *University Physics with modern Physics*. 13th edition, San Francisco, CA: Addison-Wesley.

DIE-SAP-212 Electricity and Magnetism

SEMESTER: Fall
CREDITS: 6 ECTS (4 hrs. per week)
LANGUAGE: English
DEGREES: SAPIENS program

Course overview

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Prerequisites

Vector calculus.

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   7.2 Reflection and Refraction
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Textbook

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