

**PHYSICS
2016-2017**

Bachelor Degree:	Software engineering	801G
Course title:	PHYSICS	816
Year/Semester:	1/2S	ECTS Credits: 6

DEPARTMENT: CHEMISTRY

Address:	MADRE DE DIOS 51				
City:	LOGROÑO	Province:	LA RIOJA	Postal code:	26006
Phone number:	+34 941 299 620	Email address:	DPTO.DP@UNIRIOJA.ES		

ENGLISH-FRIENDLY FACULTY

Name:	José Pablo Salas				
Phone number:	+34 941 299 607	Email address:	josepablo.salas@unirioja.es		
Office:		Building:	CCT		

CONTENTS

UNIT 1: The Electric Field and the Electric Potencial:

- Introduction
- Coulomb Law.
- The Electric Field. Electric field lines.
- Electric field calculation for continuous distributions of charge.
- Electric field flux. Gauss theorem and applications.
- Electric properties of conductors in a electric field.
- Electric potential. Equipotential surfaces.
- Electric potential calculation.
- Electric potential energy.

UNIT 2: Insulators. Capacitance.

- Introduction.
- Capacitance and capacitors.
- Networks of capacitors.
- Electric properties of insulators in a electric field.
- Energy stored in a capacitor.

UNIT 3: Electric Current and Direct-Current (DC) Circuits

- Introduccion.
- Electric current.
- Ohm's Law. Electric resistance.
- Conductivity and resistance.
- EMF.
- Networks of resistences.
- Direct-current circuits. Kirchhoff's laws.
- RC direct-current circuits.

UNIT 4: Magnetic Field.

- Introduction.
- The Lorentz force.
- Motion of charged particles in electrostatic fields.
- Lorentz Force on a current-carrying wire
- Torque on a coil in a magnetic field.
- The Biot-Savart Law. Applications.
- Force between current-carrying currents.
- Ampère's Law. Applications.
- Magnetism in material.
- Magnetization.
- Paramagnetism and Ferromagnetism. Hysteresis.

UNIT 5: Magnetic Induction.

- Introduction.
- Magnetic flux. Faraday's Law.
- Lenz' Law. Foucault currents.
- Motional EMF.
- Inductance and mutual inductance.
- Magnetic energy.
- RL circuits.

UNIT 6: Alternating-current (AC) circuits.

- Introduction.
- .Electric generators and motors.
- Resistance in AC circuits. RMS value.
- Inductances and capacitors in AC circuits.
- Electrical impedance.
- RL and RC circuits. Phasors.
- Complex impedance.
- Series RLC circuit. Resonance.
- Balance of electric power.
- The transformer.

UNIT 7: Maxwell Equations and Electromagnetic Waves.

- Introduction.
- Displacement currents.
- Maxwell equations.
- Electromagnetic waves. Electromagnetic spectrum.
- Overview of generation and detection of electromagnetic waves.
- Electromagnetic wave equation.



REFERENCES

Title:

Physics for Scientifics and Engineers, volume 2. Authors: P. Tipler and G. Mosca

Physics: Classical and Modern. Authors: F.J. Keller, W.E. Gettys and M.J. Skove.

EVALUATION SYSTEM

Exam 60%

Online tests 15%

Lab experiments 15%

Solution of exercises in the small classroom group 10%