



Course Code PHYS-160	Course Title General Physics II	ECTS Credits 8
Department Engineering	Semester Fall, Spring	Prerequisites PHYS-150
Type of Course Required	Field Science	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 2 nd	Lecturer(s) Dr Marios Nestoros
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

The main objectives of the course are to:

- Introduce students to the basic concepts of electricity and magnetism.
- Help students develop an understanding of the principles taught as well as analytical problem-solving ability.
- Consolidate the basic principles discussed in the theoretical section of the course with laboratory experiments and computer applets/simulations

Learning Outcomes:

After completion of the course students are expected to:

- Explain the processes of electrification of objects in terms of electron transfer and separation.
- Calculate the electric field created from discrete and continuous distribution of charge and relate it to the Coulomb force.
- Calculate the electric field from potential and vice versa.
- Explain the concept of electrical potential energy and a capacitor as an energy/charge storing device
- Explain the microscopic basis of electric current in conductors,
- Analyze electric circuits involving resistors and capacitors.
- Calculate the magnetic force on charged particles and current carrying wires.
- Describe and analyze the motion of charged particles in electric and magnetic fields.
- Investigate experimentally the above laws and principles

Course Contents:

Lectures

1. Electric charge, Coulomb's law, conductors, insulators.
2. Electric field & lines, Electric dipole. Electric flux and Gauss' law.
3. Electric potential and electrical potential energy.
4. Capacitance, capacitors in combination. Dielectrics.
5. Electric current, current density, resistance, resistivity, Ohm's law. Kirchoff's Law's, Circuit analysis (including R-C).
6. Magnetic field, magnets, magnetic force on moving charge, Laplace force, Biot-Savart law, force between two parallel conductors.

Experiments and Simulations:

Selection of Experiments and simulations from: electric field, capacitors, current, Ohm's law, Kirchoff's laws, RC circuits, magnetic field and force, transformer basics, Lenz's law. A lab manual is available at Students Intranet.

Teaching Methods:

Lectures (3.5 hours/week); Experiments & Simulations (1.5 hours/week)

Assessment Methods:

Midterm Test, Homework, Lab Work, Final Examination

Required Textbooks:

Authors	Title	Publisher	Year	ISBN
Halliday, Resnick, Walker	Fundamentals of Physics	Wiley	8 th Edition	9780470 044728

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Ben Crowel	Electricity and Magnetism	http://www.lichtandmatter.com/		