Login

# Politecnico di Torino

Academic Year 2009/10 (first time established in A.Y.1999/00)

01LQPDR, 01LQPAX, 01LQPJA

## Electromagnetism and Optics

1st degree and Bachelor-level of the Bologna process in Mechanical Engineering - Vercelli (I FACOLTA' DI INGEGNERIA)
1st degree and Bachelor-level of the Bologna process in Civil Engineering - Vercelli (I FACOLTA' DI INGEGNERIA)
1st degree and Bachelor-level of the Bologna process in Electronic And Computer Engineering - Vercelli (III FACOLTA' DI INGEGNERIA)

| Teacher | Status | SSD | Les | Ex | Lab | Years Stability |
|---|---|---|---|---|---|---|
| Sparavigna Amelia Carolina | RC | FIS/01 | 40 | 0 | 0 | 0 |

| SSD | CFU | Activities | Area context |
|---|---|---|---|
| FIS/01 | 4 | A - Di base | Fisica e chimica |

### Objectives of the course

This course covers the basic principles of electromagnetism and optics: electric and magnetic vectors fields, in vacuum and in the materials, Maxwell's equations, lightwaves in space and matter.
The main goal of this course is the learning of the scientific methodology.
The course is foundamental for all engineering courses.

### Expected skills

The student learns how to describe the physics phenomena.

### Prerequisites

It would be better if the student previously attended the Mathematics courses.

### Syllabus

The charge and the Coulomb's law. Electric fields for an arbitrary charge distribution. Dipoles. Gauss' Law as the first Maxwell's equation. Electric potentials.
Electric fields and charges in metals. Capacity. Electric field and energy. Dielectrics. Dielectric constant. Polarization. Semiconductors.
Currents. Ohm's Law. Principles of circuits. Thermoeletric phenomena: Seebeck and Peltier.
Magnetic fields. Lorentz interaction. First and second Laplace's laws. Ampere's law. Hall's effect.
Time-dependent phenomena and the four Maxwell's Laws.
Optics. Lightwaves. Reflection and refraction laws. Polarization of light.
Interference and diffraction.

### Laboratories and/or exercises

Exercises.

### Bibliography

Halliday, Resnick, Walker: Fundamentals of Physics, Wiley
The Feynman Lectures on Physics.

### Revisions / Exam

Examination is both written and oral. Written examination takes place first. The written part is aimed at verifying the basic knowledge of physics. In this part, the student must solve few exercises. Oral examination follows written examination and consists of discussing a subject of syllabus.

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Programma definitivo per l'A.A.2009/10

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