UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Fisica II

1920-2-E3002Q009

Aims

The course Fisica II is aimed at:

- providing the students with the basic knowledge of classical electromagnetic theory, from electrostatic and magnetistaic to time-depedent fields and electromagnetic waves;

- guiding the students to gain a good confidence with the basis of geometrical and physical optics, as obtained from Maxwell equations.

Contents

ELECTRIC FIELD

MAGNETIC FIELD

ELECTROMAGNETIC INDUCTION

MAXWELL EQUATIONS

Detailed program

ELECTRIC FIELD

Electric charge; Coulomb law; electric field and its properties; electric field calculation by the Coulomb law; force lines of the electric field; Gauss law; electric field calculation by the Gauss law; electrostatic properties of a conductos; potential energy in the electric field; electric potential; voltage; relation betwee electric field and voltage; capacity and capacitors; series and parallel configurations of capacitors; electrostatic energy; electrical current and resistence; Ohm law; series and parallel configurations of resistors; electromotive force; electric energy and power; capacitor charge and discharge.

MAGNETIC FIELD

Lorentz force; force on a conductor with electric current; torque acting on a coil; Biot-Savart law; magnetic field calculation by the Biot-Savart law; Ampère law; magnetic field calculation by the Ampère law; magetic field in a coil; force acting between conductors with electric currents; Gauss law for magnetic fields; displacement current and changes of the Ampère law.

ELECTROMAGNETIC INDUCTION

Faraday law; Lenz rinciple; electromotive force during motion; power supplies; induced electric field; self-induction; energy in RL circuits; mutual induction; transformers.

MAXWELL EQUATIONS

Armonic waves and wave equation; plane waves; relation between electric field and magnetic field in plane waves; wave equation for electric field and magnetic field; electromagnetic field; energy carried by electromagnetic waves; Poynting vector.

Prerequisites

Basic knowledge from teh courses of Mathematics I and Physics I.

Teaching form

Lessons and exercices.

Textbook and teaching resource

Book on classic electromagnetism.

Semester

II year, II semester.

Assessment method

Written exam with problems similar as those discussed during the year; four possible levels: A, B, C, D.

For the students raching at least level B, oral exam.

The final mark considers both the written and oral exam.

Office hours

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