Study Program: Physics

Type and level of studies: Bachelor studies

Course name: Electromagnetism 2

Lecturer**: Dragan M. Petković**

Status: Compulsory

ECTS: 8

Attendance prerequisites: Electromagnetism 1

Course aims

Acquiring basic knowledge of electromagnetism and creating a basis for attending other courses in the field of physics.

Course outcome

Introduction to the basic laws of electrostatics and the laws of constant flow direct currents. Solving specific experimental and computational problems in the field electrostatics and direct currents. Skills in using electrical measuring instruments and device. Connecting basic knowledge from different fields of classical physics and their application. Basic preparation for the adoption of the laws of quantum physics.

Course content

Theoretical part

ELECTROMAGNETISM: Electromagnetic force and magnetic induction vector. Lorentz force, the movement of charge in a magnetic field. Hall effect. Biot-Savart law. The force between currents elements. Ampere's law. Magnetic flux, the law of magnetic flux conservation. Magnetic field in matter, ferromagnetics. Magnetic circuit. Faraday's law of EM induction. Converting electricity into mechanical work. The principle of operation of electric machines. Self-induction. Magnetic field energy. Mutual induction. Formulation of Maxwell's EM field equations

Alternating current (**AC**): Simple harmonic quantities. Resistor, coil and capacitor in the AC circuit. Impedance. Power in an AC circuit. Phasor diagrams. Representing alternating quantities by complex numbers, complex impedance, complex power. Inductively coupled coils, transformers. Resonant and antiresonant circuits. Three-phase systems. Rotating electromagnetic field. Asynchronous and synchronous machines. Electrical oscillations. Tesla's transformer. Hertz's experiments. EM waves. Basics of radio engineering. Microphone and speaker. Cathode ray tube. LCD, TFT and plasma monitors. Principle of image transmission, television. Radar.

Practical part

Computational exercises: solving computational problems in electromagnetism and AC currents

Laboratory exercises: experimental exercises in magnetism and AC currents.

Literature

1. В. Вучић, Д. Ивановић: Физика II, Грађевинска књига, Београд
2. П. Димитријевић: Физика – Електромагнетизам, Универзитет у Нишу, Ниш 2003.
3. Ј. Сурутка: Основи електротехнике I-IV, Академска мисао, Београд 2002.
4. Б. Павловић, Ц. Милојевић: Практикум рачунских вежбања из физике, Београд 1979.
5. И. Е. Иродов: Збирка Задатака из опште физике, Подгорица 1998.
6. М. Одаловић: Задаци из електромагнетизма и оптике, скрипта
7. Д. Петковић, М. Одаловић: Практикум лабораторијских вежби из електромагнетизма, скрипта

Number of active classes				Other classes
Lectures: 3	Practical classes: 2	Other forms of teaching:		

Teaching methods

Lectures (3 classes per week during the semester), experimental exercises at clinics (2 classes per week) during the semester), laboratory exercises at clinics (1 class per week) during the semester).

Assessment (maximum 100 points)

Course assignments	**points**	Final exam	**points**
Lectures	10	written exam	30
Computational exercises	10	oral exam	30
Laboratory exercises	20	.....	
Total	**40**		*60*

Two term tests which include theoretical questions and computational problems: 2x30=60 points

Note: By passing both term tests (50% for both theory-related questions and computational problems) the student may obtain a grade before the official exam.