Course Name : Physics

Course Code	Course Type	Regular Semester	Lecture (hours/week)	Seminar (hours/week)	Lab. (hours/week)	Credits	ECTS
CMP 117	B	Fall	3.00	1.00	0.00	3.50	5.00

Lecturer	Irma Berdufi, PhD
Assistant	Ahmet Fatih Ersoy, PhD
Course language	Albanian
Course level	Bachelor
Description	The "Physics Course" is extended over one semester and aims to meet the requirements of every scientific and engineering discipline, for knowledge of physics. During the course special attention is dedicated to understanding the basic principles that guide general phenomena of nature.
Objectives	
Core Concepts	Basic concepts and terms on which the course is built Concept 1: Electrical charges, conductors and isolators, electric fields Concept 2: Potential difference, electric potential, electrostatic potential energy Concept 3: Electrical capacity, electric current, electrical resistance, electromotive force, DC circuits Concept 4: Magnetic field, magnetic flux, magnetic energy, alternating current circuits Concept 5: Displacement current, wave equation of electromagnetic waves. Electromagnetic radiation Concept 6: Light propagation and Huygens principle, reflection and refraction, polarization

Course Outline

Week	Topic
1	Electrical field: Electric charge. Electrical field of a discrete charge distributions. Conductors and isolators. Coulomb's law. Electric field. Electric field lines. Motion of Point Charges in Electric Fields. pg. 1-26
2	Electric field of a continuous charge distribution: Calculation of the electric field through Coulomb's law. Gauss theorem. Calculation of electric field intensity by Gauss theorem. pg. 34-58
3	Electric field of a continuous charge distributions. Charges and fields on conductor surfaces. Equivalence of Gauss law with Coulomb law in electrostatics. pg. 60-68 Electrical potential: Potential difference. Potential due to a system of point charges. pg. 77-81
4	Electric potential: Calculation of electric field by potential. Calculations of V for continuous charge distributions. Equipotential surfaces. Electrostatic potential energy. pg. 81-100
5	Electrical capacity. Capacitance. Flat capacitor, cylindrical capacitor. Dielectrics, The storage of electrical energy. Combination of capacitors. pg. 110-129
6	Electric current. Current and the Motion of Charges. Resistance and Ohm's Law. Energy in Electric Circuits. Combination of resistors. pg. 141-166
7	Midterm exam
8	DC circuits. Kirchhoff's Rules. RC circuits. Ammeters, voltmeters and ohmmeters. pg. 175-201
9	Magnetic field. The force exerted by a magnetic field. Motion of a point charge in a magnetic field. Torques on current loops and magnets. Hall effect. pg. 213-238
10	Magnetic field sources: The magnetic Field of moving point charges. The magnetic field of currents, the Biot-Savart law. Gauss's law of magnetism. Ampere's law. Magnetism in matter. pg. 247-269

11	Magnetic induction: Magnetic flux. Induced EMF and Faraday's Law. Lens Law. Motional EMF. Eddy currents. Inductance. pg. 279-301
12	Magnetic induction: Magnetic energy. Circuits RL. pg. 301-306 AC circuits. Alternating current in a resistor. Alternating currents in inductors and capacitors. pg. 343-350
13	AC circuits. Rotational vectors. LC and RLC circuits without generator. The RLC circuits with a generator. The ideal transformers. pg. 353-375
14	Maxwell equations and electromagnetic Waves: Displacement current. Maxwell's equations. Wave equation of electromagnetic waves. Electromagnetic radiation. pg. 386-406
15	Properties of light: Speed of light. Light scattering. Huygens principle. Reflection and refraction. Polarization. Laws of reflection and refraction. pg. 415-442
16	Final Exam

Prerequisites	The student must attend the course at a minimum rate of 75%.
Literature	• Kursi i Fizikës 2 (Elektriciteti, Elektromagnetizmi, Optika)
References	• Physics for Scientist and Engineers (fifth edition) by Paul A. Tipler and Gene P. Mosca. W.H. Freeman and Company, 2008. • Physics for Scientists and Engineers with Modern Physics. 9th Edition by Serway R.A., Jewett J.W., 2014.

Course Outcome

1	Students must have a general understanding of the main principles of physics and how they are applied in engineering disciplines.
2	Students must demonstrate skills in using the scientific method to understand and explain physical concepts.
3	Students must be able to analyze mechanical systems using different approaches.
4	Students must solve a variety of physical problems systematically, logically, and quantitatively, using appropriate mathematical techniques.

Course Evaluation

In-term Studies	Quantity	Percentage
Midterms	1	30
Quizzes	0	0
Projects	1	15
Term Projects	0	0
Laboratory	0	0
Class Participation	1	10
Total in-term evaluation percent		**55**
Final exam percent		**45**
Total		**100**

ECTS Workload (Based on Student Workload)

Activities	Quantity	Duration (hours)	Total (hours)
Course duration (Including the exam week: 16x Total hours of the course)	16	4	64
Study hours outside the classroom (Preparation, Practice, etc.)	14	4	56
Duties	1	1	1
Midterms	1	2	2
Final Exam	1	2	2
Other	0	0	0
Total Work Load			**125**
Total Work Load / 25 (hours)			**5.00**
ECTS			**5.00**