Identification	**Subject**	PHSC 112, Physics II - 6 ECTS	
	Department	Physics and Electronics	
	Program	Undergraduate	
	Term	Fall 2023	
	Instructor	Ph.D. Shirkhan Humbatov	
	E-mail:	shirxanhumbatov@gmail.com	
	Phone:	+99477-631 32 83	
	Classroom/hours	08:30-15:35	
	Office hours		
Prerequisites	PHSC 111		
Language	English		
Compulsory/Elective	Compulsory		
Description	This course covers the principles of electromagnetism and optics. Emphasis is on conceptual development and numerical problem solving. A detailed schedule of topics can be found later in this syllabus.		
Required textbooks and course materials	**University physics with modern physics 14th edition global edition by Hugh D. Young, Roger A. Freedman, and Lewis A Ford.**		
Course website	**Class assignments**: www.edmodo.com		
Course outline	Physics II serves as a calculus-based introduction to Electromagnetism. Students will investigate the principles of introductory physics through lectures, seminars, and homework problems. The course will cover these topics- Electric Charge and Electric Field. Gauss Law, Electric Potential. Capacitance, Electric Current and Resistance, Circuits, Magnetism. Electromagnetic Induction, Electromagnetic Waves, Interference and the Wave Nature of Light. Critical thinking about physics problems is emphasized.		
Course objectives	To develop understanding of the concepts in electricity and magnetism, reinforce general problem. solving skills. Students should be able to apply the basic laws of electricity and magnetism to solve simple problems concerning the motion and distribution of charges.		
Learning outcomes	Understanding topics related to Electric and Magnetic fields. Apply the conceptual themes of Electromagnetism. Understand methods for solving electromagnetic problems in related fields of Engineering. To analyze simple Electrical Circuits. Application of fundamental methods of Circuit theory. To apply gained knowledge into practical work in Engineering.		
Teaching methods	**Lecture**		+
	Seminar		+
	Assisted work		x
	Assisted lab work		x
	Others		
Evaluation	**Methods**	**Date/deadlines**	**Percentage (%)**
	Midterm Exam		30
	Class Participation and Attendance	At each lesson	5
	Quizzes	During the semester, total 2	20

		quizzes, for each 10 points	
	Activity	At each lesson	10
	Final Exam		35
	Total		100

Policy

Preparation for class

The structure of this course makes your individual study and preparation outside the class extremely important. The lecture material will focus on the major pointsintroduced in the text. Reading the assigned chapters and having some familiaritywith them before class will greatly assist your understanding of the lecture. Afterthe lecture, you should study your notes and work relevant problems and cases from the end of the chapter and sample exam questions.

Withdrawal (pass/fail)

This course strictly follows grading policy of the School of Science and Engineering. Thus, a student is normally expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course the following term or year.

Cheating/plagiarism

Cheating or other plagiarism during the Quizzes, Mid-term and Final Examinations will lead to paper cancellation. In this case, the student will automatically get zero (0), without any considerations.

Professional behavior guidelines

The students shall behave in a way to create a favorable academic and professional environment during the class hours. Unauthorized discussions and unethical behavior are strictly prohibited.

Attendance

Students who attend the whole class will get 5 marks. for three absence student loses 1 mark.

Activity

Students who will be active during discussion of past lessons and who will solve homework problems in a seminar will be awarded with one activity mark.

Quizzes

There will be 2 quizzes examination during the semester. The quizzes will be announced in the classroom two weeks before. The quiz is based on homework problems. The homework problems will be selected from questions and problems at the end of each chapter. The number of homework problems will be announced after finishing each chapter.

The students who can pass midterm and first quiz with max points automatically get max 10 points for the second quiz.

Tentative Schedule			
Week	**Date/Day (Tentative)**	**Topics**	**Textbook/Assignments**
1	16.09.2023 16.09.2023	**ELECTRIC CHARGE AND ELECTRIC FIELD** **Short description:** Electric Charge Conductors, Insulators, and Induced Charges Coulomb's Law Electric Field and Electric Forces Electric-Field Calculations Electric Field Lines Electric Dipoles	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter 21. 2. Handnotes given by teacher
2	23.09.2023 23.09.2023	**GAUSS'S LAW** **Short description:** Charge and Electric Flux Calculating Electric Flux Gauss's Law Applications of Gauss's	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter 22. 2. Handnotes given by teacher
3	30.09.2023 30.09.2023	**ELECTRIC POTENTIAL, CAPACITANCE AND DIELECTRICS** **Short description:** Electric Potential Energy Electric Potential Calculating Electric Potential Equipotential Surfaces Potential Gradient Capacitors and Capacitance Capacitors in Series and Parallel Energy Storage in Capacitors and Electric-Field Energy Dielectrics Molecular Model of Induced Charge Gauss's Law in Dielectrics	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter 23-24. 2. Handnotes given by teacher
4	07.10.2023 07.10.2023	**CURRENT, RESISTANCE AND ELECTROMOTIVE FORCE** **Short description:** Current Resistivity	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter 25.

		Resistance Electromotive Force and Circuits Energy and Power in Electric Circuits Theory of Metallic Conduction	2. Handnotes given by teacher
5	14.10.2023 14.10.2023	**DIRECT-CURRENT CIRCUITS** **Short description:** Resistors in Series and Parallel Kirchhoff's Rules Electrical Measuring Instruments R-C Circuits Power Distribution Systems	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter 26. 2. Handnotes given by teacher
6	21.10.2023 21.10.2023	**MAGNETIC FIELD AND MAGNETIC FORCES** **Short description:** Magnetism Magnetic Field Magnetic Field Lines and Magnetic Flux Motion of Charged	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter 27. 2. Handnotes given by teacher
7	28.10.2023 28.10.2023	**SOURCES OF MAGNETIC FIELD** **Short description:** Magnetic Field of a Moving Charge Magnetic Field of a Current Element Magnetic Field of a Straight Current-Carrying Conductor Force Between Parallel Conductors Magnetic Field of a Circular Current Loop Ampere's Law Applications of Ampere's Law	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter 28. 2. Handnotes given by teacher
8	04.11.2023 04.11.2023	Midterm Exam Problem solving	
9	11.11.2023 11.11.2023	**ELECTROMAGNETIC INDUCTION** **Short description:** Induction Experiments Faraday's Law Lenz's Law Motional Electromotive Force Induced Electric Fields Eddy Currents Displacement Current and Maxwell's Equations	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter 29-30. 2. Handnotes given by teacher

		Superconductivity Mutual Inductance Self-Inductance and Inductors Magnetic-Field Energy The R-L Circuit The L-C Circuit The L-R-C Series Circuit	
10	18.11.2023 18.11.2023	Quiz Problem solving	
11	25.11.2023 25.11.2023	**ALTERNATING CURRENT** **Short description:** Phasors and Alternating Currents Resistance and Reactance The L-R-C Series Circuit Power in Alternating-Current Circuits	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter 31. 2. Handnotes given by teacher
12	02.12.2023 02.12.2023	**ELECTROMAGNETIC WAVES** **Short description:** Maxwell's Equations and Electromagnetic Waves Plane Electromagnetic Waves and the Speed of Light Sinusoidal Electromagnetic Waves Energy and Momentum in Electromagnetic Waves Standing Electromagnetic Waves	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter 32. 2. Handnotes given by teacher
13	09.12.2023 09.12.2023	**THE NATURE AND PROPAGATION OF LIGHT** **Short description:** The Nature of Light Reflection and Refraction Total Internal Reflection Dispersion Polarization Scattering of Light Huygens's Principle Summary Questions/Exercises/Problems	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter 33. 2. Handnotes given by teacher
14	16.12.2023 16.12.2023	**GEOMETRIC OPTICS** **Short description:** Reflection and Refraction at a	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter

		Plane Surface Reflection at a Spherical Surface Refraction at a Spherical Surface Thin Lenses Cameras The Eye The Magnifier Microscopes and Telescopes	34. 2. Handnotes given by teacher
15	23.12.2023 23.12.2023	**INTERFERENCE AND DIFFRACTION** **Short description:** Interference and Coherent Sources Two-Source Interference of Light Intensity in Interference Patterns Interference in Thin Films The Michelson Interferometer Fresnel and Fraunhofer Diffraction Diffraction from a Single Slit Intensity in the Single-Slit Pattern Multiple Slits The Diffraction Grating	1. **University physics with modern physics by Hugh D. Young, Roger A. Freedman and Lewis A Ford.,** Chapter 35-36. 2. Handnotes given by teacher
		Final Exam