

Identification	Subject (Code, title, credits)	PHSC 112, Physics II - 6 ECTS credits	
	Department	Physics and Electronics	
	Program (undergraduate, graduate)	Undergraduate	
	Term	Autumn, 2024	
	Instructor	Hajiyeva Hajar	
	E-mail:	hajar.hajiyeva@khazar.org	
	Phone:	051 370 89 72	
	Classroom/hours	11 Mehseti str.(Neftchilar campus)	
	Office hours	Tuesday: 10:10-13:20/ Thursday: 10:10-13:20	
Prerequisites	PHSC 111		
Language	English		
Compulsory/Elective	Compulsory		
Required textbooks and course materials	<p>Fundamentals of Physics Extended 8th Edition by Halliday, Resnick, and Serway, Walker John Wiley, 2011 https://drive.google.com/folderview?id=0B2q6eS6QaN-pZXRDO3VCZ0xOYM&usp=sharing- Go to this page to download the textbook</p> <p>Class assignments: www.edmodo.com</p>		
Course outline	<p>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.</p>		
Course objectives	<p>To develop an understanding of the concepts of 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. The main section of the course consists of teaching electrostatics, circuits, magnetism, Kirchoff's rules, electromagnetic phenomena, as well as the duality property of light, waves, lenses, etc. Mathematical abilities will be employed throughout the course in addition to physical understanding to solve problems from a practical standpoint.</p>		
Learning outcomes	<p>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.</p> <p>Students should know by the end of the course:</p> <ul style="list-style-type: none"> • The electric field due to charged particles, Coulomb's law. • Gauss' law, the electrical potential energy of a system of charged particles and electrical conduction of dielectrics. • Current and resistance, electromagnetic field, and circuits • Magnetic fields, Biot-Savart law, Amper's law, Faraday's law • Circuits of alternative current • Working principles of electrical circuits and generators and calculating methods of amplifiers <p>Students will be able to do by the end of the course:</p> <ul style="list-style-type: none"> • Application of physical laws and phenomena in practice • The application of scientific and technical progress in the area of physical laws and phenomena • To analyze the physical processes required in modern technology and production. • To construct alternative and direct current circuits • The study of the fundamentals of signal theory and the analysis of linear circuits based on frequency and time variations. 		
Teaching methods	Lecture		<input type="checkbox"/>
	Group discussion		<input type="checkbox"/>
	Experiential exercise		<input type="checkbox"/>
	Case analysis		<input type="checkbox"/>
	Quiz, Classroom Exams		<input type="checkbox"/>
	Course paper		<input type="checkbox"/>
	Others		<input type="checkbox"/>
Evaluation	Methods	Date/deadlines	Percentage (%)

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Midterm Exam		30
Case studies		
Class Participation	At each lesson	5
Quizzes	During the semester	20
Activity	During the semester	10
Presentation		
Final Exam		35
Others		
Total		100

Policy	<ul style="list-style-type: none"> ▪ 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 points introduced in the text. Reading the assigned chapters and having some familiarity with them before class will greatly assist your understanding of the lecture. After the lecture, you should study your notes and work on relevant problems and cases from the end of the chapter and sample exam questions. ▪ Withdrawal (pass/fail) This course strictly follows the 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 consideration. ▪ 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.
Quizzes	<p>Attendance Students who attend the whole class will get 5 marks. After three absences the student loses 1 mark.</p> <ul style="list-style-type: none"> ▪ Activity Students who will be active during the discussion of past lessons and who will solve homework problems in a seminar will be awarded one activity mark. ▪ There will be 2 quizzes and examinations 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 the midterm and first quiz with max points automatically get a maximum of 10 points for the second quiz.

Tentative Schedule			
Week	Date/Day (tentative)	Topics	Textbook

1	18.09.2024 21.09.2024	<p style="text-align: center;">Electric Charge</p> <p>The Origin of Electricity, Types of Electric Charge</p> <ul style="list-style-type: none"> - Forces among two charges (Coulomb's law) - Charge quantization - Charge conservation <p>Charged Objects and the Electric Force, Conductors and Insulators, Charging by Contact and Induction, Coulomb's Law.</p>	1. Fundamentals of Physics by Halliday, Chapter 21.2. Handnotes given by teacher
2	25.09.2024 28.09.2024	<p style="text-align: center;">Electric Field</p> <p>The Electric Field, Electric Field Lines, The Electric Field Inside a Conductor.</p> <p>Calculate the electric field generated by a point charge.</p> <ul style="list-style-type: none"> - Using the principle of superposition determine the electric field created by a collection of point charges as well as continuous charge distributions. - Define the notion of an "electric dipole". Determine the net force, the net torque, exerted on an electric dipole by a uniform electric field, as well as the dipole potential energy 	1. Fundamentals of Physics by Halliday, Chapter 22. 2. Handnotes given by teacher.
3.	02.10.2024 05.10.2024	<p style="text-align: center;">Electric Potential Energy and the Electric Potential</p> <p>Potential Energy, The Electric Potential Difference, The Electric Potential Difference Created by Point Charges, Equipotential Surfaces</p>	1. Fundamentals of Physics by Halliday, Chapter 24. 2. Handnotes given by teacher.
4.	9.10.2024 12.10.2024	<p style="text-align: center;">Capacitance</p> <p>Capacitor; Capacitance, Capacitors in Parallel and in Series Potential Energy and Energy Density, Capacitance with a Gauss' Law with a Dielectric Equivalent capacitance.</p> <ul style="list-style-type: none"> -Energy stored in a capacitor. 	1. Fundamentals of Physics by Halliday, Chapter 25. 2. Handnotes given by teacher
5.	16.10.2024 19.10.2024	<p style="text-align: center;">Current and Resistance</p> <p>Current, Current Density, Drift Speed, Resistance of a Conductor, Ohm's Law, Resistivity of a Metal, Power, Resistive Dissipation, Semiconductors, Superconductors</p>	1. Fundamentals of Physics by Halliday, Chapter 26. 2. Handnotes given by teacher
6.	23.10.2024 26.10.2024	<p style="text-align: center;">MiddermExam</p> <p style="text-align: center;">Problem solving</p>	
7.	30.10.2024 02.11.2024	<p style="text-align: center;">Circuits</p> <p>Electromotive force (emf), Ideal and real emf devices, Seri wiring, Parallel wiring, Circuits partially series and partials parallel, Internal resistance.</p>	1. Fundamentals of Physics by Halliday, Chapter 27. 2. Handnotes given by a teacher
8.	06.11.2024 09.11.2024	<p style="text-align: center;">Circuits</p> <p>RC circuits, charging and discharging of a capacitor, Measurement of current, Kirchhoff's Rules, Capacitors in series and parallel</p>	1. Fundamentals of Physics by Halliday, Chapter 27. 2. Handnotes given by teacher
9.	13.11.2024 16.11.2024	<p style="text-align: center;">Magnetic Forces and Magnetic Fields</p> <p>Magnets and Magnetic Fields, Force on a Moving Charge, Motion of a Charged Particle in a Magnetic Field, Mass spectrometer. Hall effect, Force on a Current, Torque on Coil, Magnetic Fields by Currents, Magnetic Materials</p>	1. Fundamentals of Physics by Halliday, Chapter 28

			2. Handnotes given by teacher
10.	20.11.2024 23.11..2024	Quiz Problem solving	
11	27.11.2024 30.11.2024	Magnetic Forces and Magnetic Fields Hall effect, Force on a Current, Torque on Coil, Magnetic Fields by Currents, Magnetic Materials	1. Fundamentals of Physics by Halliday, Chapter 28. 2. Handnotes given by teacher
12.	04.12.2024 07.12.2024	Magnetic Fields Due to Currents The Biot-Savart Law, Magnetic Field of a Long Straight Wire, Magnetic Field of a Circular Arc, Force Between Parallel Currents, Ampere's Law, Fields of a Solenoid, and a Toroid.	1. Fundamentals of Physics by Halliday, Chapter 29. 2. Handnotes given by teacher
13	11.12.2024 14.12.2024	Induction and Inductance Magnetic Flux, Faraday's Law, Lenz's Law, Emf and the Induced Electric Field, Self-Induction, Mutual Inductance	1. Fundamentals of Physics by Halliday, Chapter 30. 2. Handnotes given by teacher
14	18.12.2024 21.12.2024	Electromagnetic Oscillations and Alternating Current LC oscillations, Damped Oscillations in an RLC Circuit, Forced Oscillations of Three Simple Circuits	1. Fundamentals of Physics by Halliday, Chapter 31. 2. Handnotes given by teacher
15	25.12.2024 28.12.2024	Electromagnetic Oscillations and Alternating Current The Series RLC Circuit, Power in Alternating-Current Circuits, Transformers	1. Fundamentals of Physics by Halliday, Chapter 31. 2. Handnotes given by teacher
		Final Exam	

This syllabus is a guide for the course and any modifications to it will be announced in advance.

