Identification	**Subject**	PHSC111, Physics 1, 6 ECTS
	Department	Physics and Electronics
	Program	Undergraduate
	Term	Spring 2026
	Instructor	Sevinj Guluzade
	E-mail:	Sevinj.guluzada@khazar.org
	Phone:	
	Classroom/hours	10:00-15:00
	Office hours	
Prerequisites	No	
Language	English	
Compulsory/Elective	Compulsory	
Required textbooks and course materials	[1] - Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013 [2] - Physics for Scientists and Engineers with Modern Physics (10th ed.), Cengage Learning - Serway, R. A., and Jewett, J. W. Jr. - 2018 [3] - University Physics with Modern Physics (15th ed.), Pearson - Young, H. D., Freedman, R. A. - 2018 [4] - University Physics Volume 1. OpenStax - Ling, S. J., Sanny, J., and Moebs, W. – 2016	
Course website	https://drive.google.com/folderview?id=0B2q6eS6QaN-pZXRDQ3VCZ0xQYmM&usp=sharing- Go to this page to download the textbook Class assignments: www.edmodo.com	
Course description	This course provides an in-depth exploration of the fundamental principles of physics, covering key topics such as mechanics, heat, fluids, oscillations, waves, and sound. The course is designed to foster a solid conceptual understanding while also emphasizing the importance of numerical problem-solving. Through a balanced approach of theory and application, students will gain a comprehensive foundation in physics that will prepare them for more advanced studies in science and engineering. The course is organized into weekly modules, each focusing on a specific area of physics. Detailed schedules of topics can be found later in this syllabus. Students will be introduced to new concepts through lessons, demonstrations, and interactive discussions, followed by problem-solving sessions that reinforce these concepts. • Mechanics: Explore the laws of motion, forces, energy, and momentum, and their applications to the physical world. • Heat and Thermodynamics: Understand the principles of energy transfer, temperature, and the behavior of gases. • Fluids: Investigate the properties of liquids and gases, including pressure, buoyancy, and flow. • Oscillations and Waves: Study the motion of oscillating systems and the propagation of waves, including sound waves. • Sound: Delve into the nature of sound waves, frequency, and resonance.	

<table>
<tr><td>Course objectives</td><td colspan="3">

To develop a deep understanding of the fundamental principles of optical communication, including light propagation, fiber optics, and optical signal transmission
To enable students to analyze, design, and evaluate optical communication systems, components, and networks using both theoretical and practical approaches.
To strengthen students' quantitative, analytical, and problem-solving skills through real-world scenarios, laboratory experiments, and simulation exercises.
To foster an appreciation of the role and impact of optical communication technologies in modern telecommunication systems, data transmission, and everyday applications.
To encourage students to stay updated with emerging trends and innovations in optical communication, promoting lifelong learning and professional development in the field.

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<tr><td>Learning outcomes</td><td colspan="3">After completing this course, students will be able to:

Demonstrate a solid understanding of the principles of optical communication, including light propagation, optical fibers, and transmission media.
Identify and explain the function of key optical components such as lasers, LEDs, photodetectors, and optical amplifiers.
Analyze optical signals, including attenuation, dispersion, and non-linear effects, and evaluate their impact on communication system performance.
Design basic optical communication links, considering system parameters such as bandwidth, distance, and data rate.
Apply theoretical and mathematical methods to solve problems in optical signal transmission and reception.
Perform experiments with optical components and systems, interpret measurement results, and relate them to theoretical models.
Understand modern trends and technologies in optical communication, including fiber-optic networks, WDM systems, and photonic devices.
Evaluate and compare different optical communication system designs to optimize performance and reliability.

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<tr><td rowspan="4">Teaching methods</td><td colspan="2">Case analysis</td><td>x</td></tr>
<tr><td colspan="2">Group discussion</td><td>x</td></tr>
<tr><td colspan="2">Lecture</td><td>x</td></tr>
<tr><td colspan="2">Simulation</td><td>x</td></tr>
<tr><td rowspan="6">Evaluation Criteria</td><td>Methods</td><td>Date/deadlines</td><td>Percentage (%)</td></tr>
<tr><td>Midterm Exam</td><td></td><td>30</td></tr>
<tr><td>Attendance</td><td>At each lesson</td><td>5</td></tr>
<tr><td>Quizzes</td><td>4 quizzes during the semester</td><td>20</td></tr>
<tr><td>Activity</td><td>At each lesson</td><td>5</td></tr>
<tr><td>Final Exam</td><td></td><td>40</td></tr>
<tr><td>Total</td><td></td><td>100</td></tr>
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Class 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 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 expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course thefollowing term or year. ▪ **Cheating/plagiarism** Cheating or other plagiarism during the Quizzes, Midterm, 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 class hours. Unauthorized discussions and unethical behavior are strictly prohibited. ▪ **Attendance** Students who attend the whole class will get 5 marks. for three absences student loses 1 mark. ▪ **Activity** Students who will be active during the discussion of past lessons and who will solve homework problems in a lesson will be awarded one activity mark. ▪ **Quizzes** There will be 4 quizzes 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. 20 percent of the average score of all the quizzes will be added to the final exam scores.

Tentative Schedule

Week	Date/Day (Tentative)	Topics	Textbook/Assignments
1	16.02.2026 18.02.2026 20.02.2026	Measurement and Vectors. **Short description:** Units of measure. Concepts of vectors and action with them. Scalar and vectorial quantities.	1. Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013, Chapters 1 and 3. 2. Handnotes given by a

			teacher
2	23.02.2026 25.02.2026 27.02.2026	Motion along a straight line. **Short description:** Position, displacement, and average velocity. Apply the relationship between a particle's average speed, the total distance it moves, and the time interval for the motion.	1. Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. – 2013, Chapter 2. 2. Handnotes given by a teacher
3	02.03.2026 04.03.2026 06.03.2026	Quiz 1. (first 45 min.) Motion in two and three dimensions. (second 45 min.) **Short description:** Quiz 1- covers measurement and vectors, motion along a straight line. Description of projectile motion, uniform circular motion, and relative motion in one and two dimensions	1. Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. – 2013, Chapter 4. 2. Handnotes given by a teacher
4	11.03.2026 13.03.2026	Force and motion-1 Force and motion-2 Gravitation **Short description:** Concept of force. Description of Newtonian mechanics and application of Newton's laws. Types of force, drag force and terminal speed, uniform circular motion. Measuring the Gravitational Constant. Gravitational force. Kepler's Law and the motion of planets. The Gravitational field.	1. Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013, Chapters 5,6 and 13 2. Handnotes given by a teacher
5	16.03.2026 18.03.2026	Kinetic energy and work, Potential energy and conservation of energy **Short description:** Kinetic energy, work, and kinetic energy, work done by gravitational force, work done by a spring force, work done by a general variable force and power, potential energy, conservation of mechanical energy	1. Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013, Chapters 7 and 8. 2. Handnotes given by a teacher
6	01.04.2026 03.04.2026	Quiz 2 (first 45 min.) Center of mass and linear momentum (second 45 min.) **Short description:** Center of mass, linear momentum, collision and impulse, conservation of linear momentum, momentum and kinetic energy in collisions, elastic collisions in one and two dimensions, and system in varying mass	1. Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013, Chapters 9. 2. Handnotes given by a teacher

7	06.04.2026 08.04.2026 10.04.2026	Rotation, Rolling, torque, and angular momentum **Short description:** Rotational variables, rotation with constant angular acceleration, calculation of rotational inertia, torque, and rotational inertia, Rolling as translation and rotation combined, angular momentum, conservation of angular momentum, precision of a gyroscope	1.Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013, Chapters 10 and 11. 2. Handnotes given by a teacher
8	13.04.2026 17.04.2026	Midterm Exam Problem-solving	The midterm exam will cover Chapters 1-10 and 13
9	20.04.2026 22.04.2026 24.04.2026	Equilibrium and elasticity **Short description:** Equilibrium, elasticity, and static equilibrium	1. Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013, Chapter 12. 2. Handnotes given by a teacher
10	07.04.2026 09.04.2026 11.04.2026	Oscillations and waves **Short description:** Simple harmonic motion energy in simple harmonic motion, transverse wave, interference of wave, standing waves, and resonance	1.Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013, Chapter 15,16. 2. Hand notes given by a teacher
11	27.04.2026 29.04.2026 01.05.2026	Quiz 3 (first 45 min.) Waves (second 45 min.) **Short description:** The quiz will cover chapters 15,16,17. Speed of sound, traveling sound waves, intensity and sound level, beats, the Doppler effect	1. Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013, Chapter 17. 2. Handnotes given by a teacher
12	03.05.2026 05.05.2026 08.05.2026	Fluids **Short description:** Measuring pressure, Pascal's principle, Archimedes' principle, Bernoulli's Equation, and other applications of fluid	1. Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013, Chapter 14. 2. Handnotes given by a teacher
13	10.05.2026 12.05.2026 14.05.2026	The kinetic theory of gases **Short description:** Kinetic theory of ideal gases. Distributions of molecular speed and adiabatic expansion of an ideal gas	1. Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013, Chapter 19. 2. Handnotes given by a teacher

14	20.05.2026 22.05.2026 24.05.2026	Quiz 4 (first 45 min.) Temperature heat and the first law of Thermodynamics (second 45 min.) **Short description:** The quiz will cover chapters 14,19 Thermal expansion, the first law of thermodynamics, and the Celsius and Fahrenheit scales	1. Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013, Chapter 18. 2. Handnotes given by a teacher
15	27.05.2026 29.05.2026	Entropy and the second law of thermodynamics **Short description:** İnversible process and entropy, change in entropy, and the second law of thermodynamics	1. Fundamentals of Physics, Extended (10th ed.), Wiley - Halliday, D., Resnick, R., and Walker, J. - 2013, Chapter 20. 2. Handnotes given by a teacher
		Final Exam