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| **Identification** | **Subject (code, title, credits)** | PHSC 150 Physics I - 6 ECTS credits | |
| | **Department** | Physics and Electronics | |
| | **Program (undergraduate, graduate)** | Undergraduate | |
| | **Term** | Spring, 2022 | |
| | **Instructor** | Ahmad Asimov ph.D | |
| | **E-mail:** | fizikasimov@gmail.com | |
| | **Phone:** | +994124211093 (daxili255) | |
| | **Classroom/hours** | 302N Monday/Wednesday | |
| | **Office hours** | Tuesday: 15:00-16:00/ Thursday: 15:00-16:00 | |
| **Prerequisites** | | | |
| **Language** | English | | |
| **Compulsory** | Compulsory | | |
| **Required textbooks and course materials** | 1. Jewett and Serway, Physics for Scientists and Engineers (7th Ed.), Thomson<br>2. Giancoli, Physics for Scientists & Engineers (4th Ed.), Pearson.<br>3. Young & Freedman, University Physics, (15th Ed.) Pearson | | |
| **Course outline** | This course covers the principles of mechanics, heat, fluids, oscillations, waves and sound. Emphasis is on conceptual development and numerical problem solving. Topics include kinematics and dynamics of particles; momentum, work, and energy; gravitation; circular, angular, and harmonic motion. | | |
| **Course objectives** | Upon successful completion of this course, students will be able to:<br>1. Develop algebra-based models to describe the physical world.<br>2. Develop conceptual and quantitative models of physical phenomena.<br>3. Collaborate with others to deepen understandings and improve solutions<br>4. To gain an appreciation of how large a role physics plays in our daily life. | | |
| **Learning outcomes** | This is a calculus-based introductory physics course. After successfully completed course, students will be able to:<br>1. Use vectors in calculations. 2. Explain Newton's Laws of Motion and related applications. 3. Understand the relationship of work, energy, and power.<br>4.Use algebraic mathematics along with physical principles to effectively solve problems encountered in everyday life. 5. Apply knowledge of linear motion, gravitation filed, harmonic oscillations, pendulum, temperature, pressure, forces, energy, circular motion, and conservation of energy and momentum to explain natural physical processes and related technological advances | | |
| **Teaching methods** | **Lecture** | | ☑ |
| | **Group discussion** | | ☑ |
| | **Experiential exercise** | | ☑ |
| | **Quiz, Classroom Exams** | | ☑ |
| **Evaluation** | **Methods** | **Date/deadlines** | **Percentage (%)** |
| | **Midterm Exam** | | 30 |
| | **Class Participation** | At each lesson | 5 |
| | **Quizzes** | During the semester | 20 |
| | **Activity** | During the semester | 5 |
| | **Final Exam** | | 40 |
| | **Total** | | 100 |

| Policy | |
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| | ▪ **Preparation for class**<br>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 relevant problems and cases from the end of the chapter and sample exam questions.<br>• **Withdrawal (pass/fail)**<br>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.<br>▪ **Cheating/plagiarism**<br>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.<br>▪ **Professional behavior guidelines**<br>The students shall behave in the way to create favorable academic and professional environment during the class hours. Unauthorized discussions and unethical behavior are strictly prohibited.<br>▪ **Quizzes**<br>There will be a quiz examination per two weeks. The quizzes will be announced in the classroom two weeks before. Quiz is from homework problems.<br>The homework problems will be selected from questions and problems in the end of each chapter. The No. of homework problems will be announced after finishing each chapter. |

**Tentative Schedule**

| Week | Date/Day (tentative) | Topics | Textbook |
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| 1 | 14.02.22<br>16.02.22 | **Units, Physical Quantities and Vectors**<br>Nature of Physics, Standards and Units; Coordinate Systems; Vector and Scalar Quantities; Some Properties of Vectors; Components of a Vector and Unit Vectors | Chapter 1 |
| 2 | 21.02.22<br>23.02.22 | **Motion in One Dimension**<br>Position, Time, and Average Velocity; Instantaneous Velocity;<br>Average and Instantaneous Acceleration; Motion With Constant<br>Acceleration; Freely Falling Bodies; Velocity and Position by<br>Integration | Chapter 2 |

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| 3 | 28.02.22<br>01.03.22 | **Motion in Two or Three Dimensions**<br>Position, Velocity, Vectors and Acceleration Vector; Two-Dimensional Motion with Constant Acceleration Projectile<br>Motion; Motion in a Circle; Relative Velocity | Chapter 3 |
| 4 | 7.03.22<br>9.03.22 | **Motion in Two or Three Dimensions**<br>Position, Velocity, Vectors and Acceleration Vector; Two-Dimensional Motion with Constant Acceleration Projectile<br>Motion; Motion in a Circle; Relative Velocity | Chapter 4 |
| 5 | 14.03.22<br>16.03.22 | **Newton's Laws of Motion**<br>Force and Interactions; Newton's First Law; Newton's Second Law; Mass and Weight; Newton's Third Law; | Chapter 5 |
| 6 | 28.03.22<br>30.03.22 | **Applying Newton's Laws**<br>Using Newton's First Law: Particles in Equilibrium; Using Newton's Second Law: Dynamics of Particles; Friction Forces; Dynamics of Circular Motion; The Fundamental Forces of Nature<br>Problem solving | Chapter 6 |
| 7 | 04.04.22<br>06.04.22 | **Work and Kinetic Energy**<br>Work; Kinetic Energy and the Work-Energy theorem; Work and Energy with Varying Forces; Power | Chapter 7 |
| 8 | | **Midterm exam** | |
| 9 | 11.04.22<br>13.04.22 | **Potential Energy. Potential Energy of a System**<br>The Isolated System Conservation of Mechanical Energy. Conservative and Nonconservative Forces. Changes in Mechanical. Energy for Nonconservative Forces. Relationship Between. Conservative Forces and Potential Energy | Chapter 8 |
| 10 | 18.04.22<br>20.04.22 | **Potential Energy. Potential Energy of a System**<br>The Isolated System Conservation of Mechanical Energy. Conservative and Nonconservative Forces. Changes in Mechanical. Energy for Nonconservative Forces. Relationship Between. Conservative Forces and Potential Energy | Chapter 8 |
| 11 | 25.04.22<br>27.04.22 | **Momentum Impulse and Collisions**<br>Momentum and Impulse; Conservation of Momentum; Momentum Conservation and Collisions; Elastic Collisions; Center of Mass; Rocket Propulsion Problem solving | Chapter 9 |
| 12 | 02.05.22<br>04.05.22 | **Simple harmonic motion**<br>Simple harmonic motion. The simple pendulum. Waves. Types of waves. Period, frequency and wave speed. Wave equations. Wave intensity | Chapter 10 |
| 13 | 11.05.22<br>16.05.22 | **Kinetic theory of ideal gases.**<br>Kinetic theory of ideal gases. Barometric medium. Law of Boltzmann. The Celsius, Fahrenheit, and Kelvin Temperature Scales. | Chapter 11 |
| 14 | 18.05.22<br>23.05.22 | **Pressure. Buoyant Forces and Archimedes's Principle**<br>Information about pressure in liquids and gases. Concept of buoyancy. Concept and application of the law of Archimedes | Chapter 12 |

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| 1<br>4 | 25.05.22<br>30.05.22 | **Gravitation**<br>Newton’s Law of Gravitation; Weight; Gravitational Potential Energy; The motion of Satellites; Kepler's Laws and the Motion of Planets; Spherical Mass Distributions; Apparent Weight and the Earth’s Rotation; Black Holes | Chapter 13 |
| 14 | | Final Exam | |

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