INTRODUCTION TO GENERAL PHYSICS I

Course Number: 1021
Sections: 005-008

1. Instructor Information

Name: Dr. Ergin H. Ahmed
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Office Hours: Tuesday 14:00 – 15:30, Thursday 14:00 – 15:30

2. Textbook

Title: Essential College Physics, with MasteringPhysics, Volume 1 (2010).
Authors: Andrew Rex and Richard Wolfson
Publisher: Pearson/Addison-Wesley
ISBN: 978-0321611161

3. Examination

There will be two in-class closed-book midterm exams and a final exam.

Midterm Exam 1: Thursday, October 2\textsuperscript{nd}
Midterm Exam 2: Thursday, November 6\textsuperscript{th}
Final Exam: Thursday, December 11\textsuperscript{th} 10:30 am – 12:30 pm, Barton Hall BA130.

Make-up exams may be permitted only under extraordinary circumstances (illness, family emergency etc.). If you anticipate a scheduling conflict, you may arrange to take the exam ahead of time.

In addition to the midterms and the final exam there will be online homework assignments using MasteringPhysics (course ID: MPAHMEDE27660) as well as few quizzes during the semester. The quizzes will be administered at the end of the lecture and will have duration of 15 min. The date and the material included in each quiz will be announced a week in advance.
4. Grading

- Labs 15%
- Quizzes and homework assignments 20 %
- Midterm 1 exam  15 %
- Midterm 2 exam  20 %
- Final Exam 30 %

Approximate letter grade assignment:

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<th>Grade</th>
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<td>A</td>
<td>100% to 90%</td>
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<td>A-</td>
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5. Syllabus

1. Measurement in Physics
   1.1. Distance, Time, and Mass Measurements
   1.2. Converting Units
   1.3. Fundamental Constants and Dimensional Analysis
   1.4. Measurement, Uncertainty, and Significant Figures

2. Motion in One Dimension
   2.1. Position and Displacement
   2.2. Velocity and Speed
   2.3. Acceleration
   2.4. One-Dimensional Motion with Constant Acceleration
   2.5. Free Fall

3. Motion in Two Dimensions
   3.1. Trigonometry Review
   3.2. Scalars and Vectors
   3.3. Velocity and Acceleration in Two Dimensions
   3.4. Projectile Motion
   3.5. Uniform Circular Motion

4. Force and Newton's Laws of Motion
   4.1. Force and Mass
   4.2. Newton's Laws of Motion
   4.3. Applications of Newton's Laws
4.4. Friction and Drag
4.5. Newton's Laws and Uniform Circular Motion

5. Work and Energy
   5.1. Work Done by a Constant Force
   5.2. Work Done by a Variable Force
   5.3. Kinetic Energy and the Work-Energy Theorem
   5.4. Potential Energy
   5.5. Conservation of Mechanical Energy
   5.6. Power

6. Momentum and Collisions
   6.1. Introduction to Momentum
   6.2. Conservation of Momentum
   6.3. Collisions and Explosions in One Dimension
   6.4. Collisions and Explosions in Two Dimensions
   6.5. Center of Mass

7. Oscillations
   7.1. Periodic Motion
   7.2. Simple Harmonic Motion
   7.3. Energy in Simple Harmonic Motion
   7.4. SHM and Uniform Circular Motion
   7.5. The Simple Pendulum

8. Rotational Motion
   8.1. Rotational Kinematics
   8.2. Kinematic Equations for Rotational Motion
   8.3. Rotational and Tangential Motion
   8.4. Kinetic Energy and Rotational Inertia
   8.6. Rotational Dynamics
   8.7. Mechanical Equilibrium
   8.8. Angular Momentum

9. Gravitation
   9.1. Newton's Law of Gravitation
   9.2. Planetary Motion and Kepler's Laws
   9.3. Gravitational Potential Energy
   9.4. Artificial Satellites
   9.5. Other Aspects of Gravitation

10. Solids and Fluids
    10.1. States of Matter
    10.2. Solids and Elasticity
    10.3. Fluid Pressure
    10.4. Buoyancy and Archimedes' Principle
    10.5. Fluid Motion

11. Waves and Sound
    11.1. Wave Properties
11.2. Interference and Standing Waves
11.3. Sound Waves
11.4. Musical Instruments and Harmony
11.5. The Doppler Effect

12. Temperature, Thermal Expansion, and Ideal Gases
   12.1. Temperature and Thermometers
   12.2. Thermal Expansion
   12.3. Ideal Gases
   12.4. Kinetic Theory of Gases

13. Heat
   13.2. Heat Capacity and Specific Heat
   13.3. Phase Changes
   13.4. Conduction, Convection, and Radiation

14. The Laws of Thermodynamics
   14.1. The First Law of Thermodynamics
   14.2. Thermodynamic Processes
   14.3. The Second Law of Thermodynamics
   14.4. Heat Engines and Refrigerators