

INTRODUCTION TO GENERAL PHYSICS I

Course Number: **1021**

Sections: **005-008**

1. Instructor Information

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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 2nd

Midterm Exam 2: Thursday, November 6th

Final Exam: Thursday, December 11th 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: MPAHMED27660) 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:

A	100% to 90%
A-	90% to 85%
B+	85% to 80%
B	80% to 75%
B-	75% to 70%
C+	70% to 67%
C	67% to 60%
C-	60% to 55%
D	55% to 45%
F	45% to 0%

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

- 13.1. Heat and Thermal Energy
- 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