TROY UNIVERSITY

GENERAL PHYSICS I

AT HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY (HUST)

(July 2024 – August 2024)

I. GENERAL INFORMATION

- Course code: 2252
- Course Title: General Physics I
- Term: Summer 20233
- Location: HUST, D7 – 503 / or D9 -204
- Semester Hours: 04 credits
- Class hours: (1) Monday & Friday 8:30am–11:15am
  or (2) Monday & Friday 14:00am–16:45am

- Lecturer: Thoan Nguyen (Nguyen Hoang Thoan), Dr. Asso. Prof.
Department of Optics and Optoelectronics
Faculty of Engineering Physics
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II. COURSE DESCRIPTION

- Emphasis is on the laws of mechanics and thermodynamics, including linear motion, laws of motion, energy and momentum, rotational motion and dynamics, thermal processes and laws of thermodynamics.
- Laboratory experiments in basic Physics.

III. TEXTBOOK

- **"College Physics"** Volume 1, 9th edition by Raymond A. Serway, and Chris Vuille, 2011.

IV. COURSE OBJECTIVES

A basic knowledge of the first-year college physics based on the textbook to include:

1. System International (SI) units (m, kg, s) and conversion of various units.
2. Measurement of distance, speed, and acceleration in one dimensional kinematics and its dependence on time.
3. Difference between scalars and vectors and the means to work with vectors.
4. Newton's laws of motion and the nature of the forces (weight, friction, normal force, tension, etc.) involved in a given problem or a real physical situation.

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5. Work and energy, difference between kinetic and potential energies, momentum and energy conservations in collisions.
6. Difference between temperature and heat, heat transfer and thermodynamic processes in solid, liquid, and gas.
7. Ideal gas law, quantitative behavior and kinetic theory of gases.
8. Use critical thinking and problem solving strategies in the application of basic mechanics and thermodynamics concepts.

In the laboratory portion of the course, students will learn the scientific methods of conducting experiments, gathering and analyzing data, and reporting conclusions.

V. REQUIREMENTS

For a student to complete the course, he/she needs to:

- attend at least 80% the class hours,
- Do lab. Experiments and handin lab. Reports.
- submit all assignments/homeworks, where at least 80% are in time, and
- take all midterm and final exams.

VI. EVALUATIONS

- Attendance, Assignments and homeworks: 25%
- Midterm exam: 25% (week 5: chapters 1, 2, 3, 4, 5)
- Lab. Reports : 10 %
- Final exam : 40% (end of week 8)

VII. GRADING SYSTEM

- Grade A: 90% – 100%
- Grade B: 80% – 89%
- Grade C: 70% – 79%
- Grade D: 60% – 69%
- Grade F: 59% or lower

VIII. COURSE OUTLINE OF TOPICS

1. Standards of measurements and units
2. Linear motion (displacement, velocity, and acceleration) in one dimension
3. Vectors and motion in two dimensions
4. Newton's laws of motion and forces
5. Work and energy

6. Momentum and collisions
7. Rotational motion, angular momentum, and torque
8. Temperature and the laws of thermodynamics
9. Ideal gas law and kinetic theory of gases
10. Heat and thermal processes

IX. LABORATORY EXPERIMENTS

(Labs will be selected by the instructor during the course, within the following labs.)

Lab 1. Density of a metal

Lab 2. Free fall

Lab 3. Conservation of momentum

Lab 4. Thermal expansion

Lab 5. Thermal transfer

Lab Manual(s): Handout.

X. Rules and Comments

- ✓ Absolutely no food or drinks are allowed in the classrooms or laboratories.
- ✓ All exams are closed book and closed notes unless stated otherwise.
- ✓ Final exam is comprehensive. Failing to take the final exam will result in a grade of "F."
- ✓ No make-up labs, Quizzes, Homework, or exams are permitted unless prior arrangement with the instructor has been made.
- ✓ You are responsible for any information and/or assignments given during class, whether you are present or not.
- ✓ You are expected to be in class on time, and to remain in class for the entire period unless permission to leave early has been granted by the instructor. It is disruptive to arrive or depart while class is in session.
- ✓ **More than 3 unexcused lecture absences could result in a grade of "F" for the course.**
- ✓ Cellular phones must be turned off or put on silent mode during class. No surfing the net, checking e-mail, or chat room is permitted during the class/lab periods.

XI. ORITENTED EXERCISES

List of Homeworks

1st week:

Chapter 1: Units, Estimation, Dimensional analysis, Coordinate system, Uncertainty in Measurement, Trigonometry: (1) -39, 43, 55

Chapter 2: Motion in one dimension: (2) - 6, 11, 18, 20, 21, 33, 37, 47, 59

2nd week:

Chapter 3: Vectors and Two-dimensional motion: (3) - 14, 23 , 41, 58

Chapter 4: The laws of Motion (4) -7,15,21, 38,41

3rd week:

Chapter 7: Rotation Motion and the Law of Gravity: (7) – 3, 4, 14, 15, 25, 27, 34, 63,70

4th week:

Chapter 5: Energy, (5) – 8, 15, 20, 45, 61

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Chapter 6: Momentum and Collisions (6) – 9,15,25,38,40,56

5th week:

Chapter 8: Rotational Equilibrium and Rotational Dynamics (8)–2, 11, 30, 52, 56, 65, 70, 80, 84

6th Week:

Chapter 10: Thermal Physics (10)– 29,31,33,39,43,44

7th Week: **The laws of Thermodynamics**

Chapter 12: Heat engine – (12). 3,5,15,27,29,33,37

8th Week. Real gases

Supplemental exercises

Note: All excercises/problems (if there are no supplement information) are in **"College Physics"** Volume 1, 9th edition by Raymond A. Serway, and Chris Vuille, 2011.



Nguyen Hoang Thoan