Physics 1 – PHY 0174
Fall 2024

Sichuan University - Pittsburgh Institute

Instructor

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Office: N412 New Building

Classroom: **Teaching Building I – A603**
Lectures: Section 5 - Tuesday 10:15 – 11:55
Thursday, 8:15 – 9.55

Office Hours: Wednesday 14:45 – 15:30, Thursday 11:10 – 11:55

Teaching Assistants
Cooper Du & Josie Liu
Tutorials: TBA

Course Description

This course aims to prepare students for further study in science and engineering. The course provides a conceptually based exposure to the fundamental principles, comprehensive knowledge and a sound understanding of physics together with a physicist's analytical, mathematical, and practical skills. This course will cover mechanics or the study of how objects move. Students cultivate their understanding of physics through classroom study, in-class activity, and hands-on, inquiry-based laboratory work as they explore concepts like systems, fields, force interactions, change, and conservation. The course framework specifies what students must know, be able to do, and understand, focusing on six big ideas that encompass core principles, theories, and physics processes. The framework also encourages instruction that prepares students to connect across domains through a broader way of thinking about the physical world. This course uses a calculus-based mathematical representation and addresses the fundamental concepts in mechanics. This semester, we will study motion, forces, gravity, and rotation.

Prerequisites

Students are assumed to have a basic understanding of the principles and practices of Senior Secondary Physics and concurrently taking Calculus I.

Course Learning Objectives (CLOs)

This is a calculus based introductory physics course on the mechanics of objects. By the end of the course, students should

CLO1 Demonstrate a knowledge of the fundamental physical laws of mechanics.
CLO2 Apply the fundamental laws of mechanics to solve various practical problems.
CLO3 Recognize how physics is relevant to the world around them.
CLO4 Apply physical laws of dynamics involving gravitation,
CLO5 Analyse the properties of translational and rotational motion,
CLO6 Employ Newton's equations and conservation laws.
CLO7 Analyse the dynamics of waves and oscillations.

Student Learning Outcomes (SLOs)

On satisfying the requirements of this course, students will have the knowledge and skills to:

SLO1 Demonstrate conceptual understanding of physics and skills to creatively and concisely summarize, synthesize, and interpret information into grammatically correct sentences through written communication.
SLO2 Demonstrate basic knowledge of principles, theories, and laws of physics by describing physical systems and understanding the physical environment in terms of the concepts listed in the course content.
SLO3 Demonstrate the ability to think creatively and critically and to use appropriate concepts to analyse qualitatively problems or situations involving the fundamental principles of physics.
SLO4 Demonstrate the ability to use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics.
SLO5 Collect and appropriately analyse data working independently and in collaboration with others (experimentation, data collection, model-based computation, and literature research using basic and state-of-the-art technology)
SLO6 Communicate physics understanding using qualitative and quantitative representations in appropriate modes and genres.
SLO7 Be able to combine multiple concepts and apply them to real-world concepts you are likely to see in a career in science, technology, or engineering.

Resources

***Prescribed Textbook**:*
Principles of Physics***,*** 12th Edition, International Student Version, Robert Resnick, David Halliday and Jeal Walker, 2023, John Wiley & Sons, 2023

Supplementary/Further Reading:
College Physics: Reasoning and Relationships, First Edition, Nicholas J. Giordano, Cengage Learning 2010.

Technological Resources (Virtual Lab)

Students may find the virtual simulations an effective tool for the operations of real-world processes or systems. The computer simulations are widely used and are available for free at

https://phet.colorado.edu/en/simulations/category/physics

http://www.animations.physics.unsw.edu.au/

http://www.walter-fendt.de/ph14e/

Blackboard

Please regularly log on and check https://learn.scupi.cn/. Lecture notes, online quizzes, assignments, projects, announcements, and your grades will be uploaded on the PHY 0174 page of the Blackboard.

Course Content

We will cover most of the textbook material from Chapters 1-17.

Class Structure

Lectures.

Tutorials

Tutorials run by our TAs will start in Week 02.

Course Assessment

The final grade will be computed based on the score of weekly assignments, quizzes, midterm, and final exams.

Exams

Two midterm exams and a final exam will be given in the semester. All exams are closed-book, and cheating is not tolerated. No electronic devices will be permitted during exams. Note that the final exam is comprehensive.

Midterm Exam 1:	Week 8,	2 hours duration - TBD
Midterm Exam 2:	Week 14,	2 hours duration - TBD
Final Exam:	Final Week,	2 hours Comprehensive

Final Grade

The final grade will be computed according to the following scheme:

Assignments and Attendance:	10~13%
Quizzes :	7~10%
Midterm 1:	25%
Midterm 2:	25%
Final Exam:	30%

Cutoffs

A [90, 100], A- [85, 90), B+ [80, 85), B [76, 80), B- [73, 76), C+ [70, 73), C [66, 70), C- [63, 66), D+ [61, 63), D [60, 61), F (60, 0).

Assignments

Homework will be assigned on Friday every week and due by the following week on Friday at the beginning of the class. No late homework is accepted, and plagiarism is not tolerated. The lowest grade of the assignment will be dropped when computing the final grade. Discussions of the assignment problems are encouraged, but each student must submit his/her assignment. Each homework must include a Name, Student ID, and Assignment Title. Homework must be done in a structured, logical, and orderly manner, enabling the grader to verify steps, equations, and methods used readily. For collaborative assignments, grading rubrics are used for *objective and consistent assessment of various performances, assignments, and activities.* The rubrics for the collaborative projects/assignments will be uploaded to the Blackboard.

Quizzes: In-class/online quizzes will be given on some lecture days and every tutorial session.

Course Policies

During Class

Computers may be allowed in class for the electronic recording of notes. But please refrain from using computers for any activities unrelated to the course. Phones are prohibited as they are rarely helpful for anything in the course. Eating and drinking are allowed in class, but please keep from it affecting the course.

Attendance Policy

Attendance is expected in all lectures. Valid excuses for absence will be accepted before class. In extenuating circumstances, valid excuses with proof will be accepted after class.

Policies on Late Assignments and Exams

Students should start their homework assignments immediately after they are given, and DO NOT wait until the last minute to meet the deadlines. Late assignments will be NOT accepted except for emergencies and health issues. Any other late assignments handed in will be marked but will be given a zero mark. At most, two extensions for assignments will be given in this course. All assignments will be counted in your total grade. Late submission for previous assignments during the final exam period will NOT be accepted in any form for any excuses.
All tests and the final exam are mandatory. There will be no makeup exam for each test. If you miss the final, a makeup exam may be given for the final exam if the student has approval from the instructor or emergencies and health issues with valid proof. I will not accept the student deceleration for absence form for the final exam.

Academic Assistance

You are encouraged to attend office hours if you have questions regarding class materials, homework problems, grading issues, etc. Otherwise, you may email the TA or the instructor. Please allow 24 to 48 hours for any response to emails. The subject of each email must include "[PHY 0174]". For example, if you have a question regarding a homework problem, the email's subject could be [PHY 0174] Question about Problem X of Assignment X. Please make sure that you sign off with your official name (the one that appears in Blackboard). You are encouraged to use academic language in your posts.

Academic Integrity

At Sichuan University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect (The Centre for Academic Integrity, Duke University, 1999). As a student, you must demonstrate these values in all your work. Everyone at SCUPI is expected to treat others with dignity and respect. The Code of Student Conduct allows Sichuan University to take disciplinary action if students do not follow this community expectation.

***Special Needs*:**
The Office of Special Needs Services at Sichuan University ensures that students with special needs have equal access to the campus and course materials. We will work with the Office of Special Needs to provide adequate services to students with special needs.

Course Outline and Weekly Learning Schedule

The schedule is tentative and subject to change. The listed objects below should be viewed as the key concepts you should grasp after each week and also as a study guide before each exam and at the end of the semester. Each test will be based on material taught until the second week before the test; namely, Test 1 covers Weeks 01-07, and Test 2 is based on Weeks 08-15. The final exam will cover all topics taught in this semester.

Week	Dates	Chapter/Section	Topics
03	09/16 – 09/20	Chap 1	• Measurement & Motion
04	09/23 – 09/27	Chaps 2 & 3	• Vectors
05	09/30 – 10/04	Chaps 4	• Motion in two- and Three-Dimensions
06	10/07 – 10/11	Chaps 5	• Force and Motion - I
07	10/14 – 10/18	Chaps 6	• Force and Motion - II
08	10/21 - 10/25	Chaps 7 and Review	• Work and Energy
09	10/28 - 11/01	Chaps 8 **Midterm 1**	• Conservation of Energy and Momentum
10	11/04 - 11/08	Chaps 9	• Centre of Mass and Linear Momentum
11	11/11 - 11/15	Chaps 10	• Rotation
12	11/18 - 11/22	Chaps 11	• Angular Momentum and Torq
13	11/25 - 11/29	Chaps 11 (Contd.)	• Conservation of Angular Momentum
14	12/02 – 12/06	Chap 13	• Gravitation
15	12/09 – 12/13	Chaps 13 & Review	• Gravitation (Contd.)
16	12/16 – 12/20	Chaps 15 & **Midterm 2**	• Oscillations
17	12/23 – 12/27	Chaps 16	• Wave I
18	12/30 – 01/03	Chaps 17	• Wave - II
19	01/06 - 01/10		**Final Exam Week**