
PHYS 0174: Physics for Science and Engineering 1

Spring-semester, 2023

(Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on Blackboard system and announced in class.)

Lecturer:

A.P. Lin Fang

Institute: Physics College, Sichuan University

Office: Room 321 Zone 3

Email: linfang@scu.edu.cn

Office-hour: Not fixed, appointment first. Online support is always available.

Time and Location:

1. 10:15 - 11:55 Monday, Room 104 Zone 3.
2. 10:15 - 11:55 Thursday, Room 104 Zone 3.

Teaching Assistant:

Mr. Hanze Qin, a senior student in Pittsburgh College, SCU.

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Catalog Description:

4 Credits.

As the first part of a two-semester introduction to general physics, this course introduces students to the basic principles of classical Newtonian mechanics and gravitation. Topics covered include description of motion, Newton's Laws, momentum and impulse, work and energy, rotational motion, angular momentum, rigid bodies and fluid dynamics.

Suggested Textbook:

Principles of Physics, 10th Edition, Halliday, Resnick, Walker. International Student Version.

Course Objective:

The goal of this course is to give students an introductory overview of the subject of physics, starting from the description of the fundamental quantities such as time, distance, and mass, and to progress through the description of nature using Newtonian mechanics and its application to gravity. **Strong mathematical skills** are needed to test the understanding of the models and theories that the students will be introduced to. As the semester progresses the students are required to:

1. Be familiar with the basic concepts and methods physicists use to analyze the world.
Interpret the different units and scales of measurable quantities.
2. Convert units of mechanical quantities.
3. Make use vectors to describe and analyze motion.
4. Describe and analyze motion with constant acceleration. Apply differential calculus to the analysis of motion. Analyze simple situations and explain them to other people.
5. Make use of motion diagrams. Acquire a thorough understanding of the concept of force
Apply newton's laws to simple physical systems.
6. Apply the principle of conservation of energy to mechanical systems. Interrelate the concepts of physical work, forces, potential, and kinetic energy. Apply the principle of conservation of linear momentum.
7. Apply concepts such as torque and angular momentum to rotation of rigid bodies. Apply newton's law of gravitation to planetary motion.
8. Assimilate new material and apply it to analyze different situations.

Course Outline:

Section 1:

Measurement (Ch. 1)

Motion along a Straight Line (Ch. 2)

Vectors (Ch. 3)

Motion in Two and Three Dimensions (Ch. 4)

Section 2:

Force and Motion (Ch. 5-6)

Energy and Work (Ch. 7)

Potential Energy and Conservative Force (Ch. 8)

Elasticity (Ch. 12)

Gravitation (Ch. 13)

Section 3:

Center of Mass and Linear Momentum (Ch. 9)

Rotation and Rigid Bodies (Ch. 10)

Rolling, Torque and Angular Momentum (Ch. 11)

Section 4:

Fluid Dynamics (Ch. 14)

Examination Schedule:

In class Quiz: Random, but it may be or may not be notified.

Final Exam: On early June(Section 3 and 4).

Course Grading:

Homework:

45%. Full score of 100 points each time.

Quiz:

10%

Final Exam:

45%

Bonus:

1. At most 10 points added to the total.
2. Several small but open and innovative problems will be given with the course going on.
3. Students can freely choose to do or not to do the works.
4. Teams can be formed of which the number of members are no more than 3.
5. Students can deliver their works by paper, presentation (in video) or animated demo.

The up-limit of total score is 100. If exceeded, it will be counted as 100.

Requirements of HW Submission (Really important)

Submission format

The homework should be submitted as **PDF document**.

The homework can be completed by typing in word and converting it into PDF.

Naming Convention

- Individual homework should be named as following:

HW Number -Chinese name-Last Four Digits of Student ID.

For example, HW1-张三-0011.

- Group homework should be named as following:

Group Number-Report/PPT – (Last Four Digits of Student ID of All Team Members)

For example, **Group 3 – Report- (0011, 0120, 0201)**

Writing requirement

- For problems, show all work and complete calculation steps for each problem.
- Homework with only the answer will be **deducted at least 50% of points**.
- For your report, you must be typed and presented in a professional and readable format in **12 pt.** font with **1.5 line** spacing, Times New Roman is recommended to be used.
- **Plagiarism, cheating, and any form of unauthorized collaboration will not be tolerated and will be handled in accordance with policies of SCU.** Penalties for cheating and plagiarism may include but not limited to: zero credit on the work, student placed on probation, submission of judicial findings in the students' permanent record, and jeopardy of the students' status in the program.

Homework Deadline

Please pay attention to the deadline of the homework. **No makeup opportunity** for any missing homework aside from documented medical reasons which students are supposed to inform TA before the homework. You will get **up to 50 points** on this assignment if you turn in your homework **late for no reasons**.

Grading Scale:

Final grades will be determined according to the table below. An additional curve may be applied, as determined by the overall final grade distribution of the class.

字母等级	A	A-	B+	B	B-	C+	C	C-	D+	D	F
中文等级	优秀		良好		中等		合格			不合格	
百分制	100~90	89~85	84~80	79~76	75~73	72~70	69~66	65~63	62~61	60	<60
绩点	4	3.7	3.3	3	2.7	2.3	2	1.7	1.3	1	0