



蘇州大學  
Soochow University

## **PHY 132 Introductory Mechanics and Thermodynamics**

**Summer 2024**

**Course Credits:** 4

**Contact Hours:** 56 hours

**Instructor:** TBA

**Email:**TBA

### **COURSE OBJECTIVES**

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This is a calculus-based physics course. This course introduces to the basic Physics principle in Mechanics and Thermodynamics field. Topic covered in this course include energy conservation law of mechanics, work and power, potential energy, kinematics, gravitation and motions, fluid dynamics, temperature and amount of heat, mechanical oscillations, and also laws of thermodynamics. By learning the course, students will develop basic ability of solving problems by combining physical laws with math tools.

Upon Completion of this Course, students will be able to:

1. Understand the fundamental principles of classical mechanics, including kinematics, dynamics, and energy conservation.
2. Comprehend the laws of thermodynamics and their applications to heat, energy transfer, and thermodynamic processes.
3. Analyze real-world scenarios involving mechanical systems and thermal interactions.
4. Develop critical thinking skills for problem-solving and applying theoretical concepts to practical situations.

### **PREREQUISITES**

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MAT 110 Calculus I

### **GRADING**

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Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
4 Labs	20 Points
2 Lab Reports	20 Points
Midterm	25 Points
Final Exam	35 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F.$$

We reserve the right to make adjustments to the overall grading policy.

## COURSE MATERIALS

### **Required Texts:**

Wolfgang Demtröder, *Mechanics and Thermodynamics*, Springer International Publishing, 2017.

### **Recommended (Optional) Texts or Other Materials:**

None

## COURSE TOPICS

MODULE	TASKS
Module 1	<b>Topics:</b> Topic 1: Introduction and Survey Topic 2: Relations Between Physics and Other Sciences Topic 3: Mechanics of a Point Mass Topic 4: Forces <b>Assessments:</b> Lab#1



Module 2	<p><b>Topics:</b> Topic 5: The Basic Equations of Mechanics Topic 6: Energy Conservation Law of Mechanics Topic 7: Work and Power; Potential Energy Topic 8: Gravitation and the Planetary Motions Topic 9: Newton's Law of Gravity</p> <p><b>Assessments:</b> Lab#2 Lab Report#1</p>
Module 3	<p><b>Topics:</b> Topic 10: Dynamics of rigid Bodies Topic 11: Moving Coordinate Systems and Special Relativity Topic 12: Systems of Point Masses; Collisions . Topic 13: Fluid Dynamics Topic 14: Liquids and Gases in Motion</p> <p><b>Assessments:</b> Midterm Lab#3</p>
Module 4	<p><b>Topics:</b> Topic 15: Real Solid and Liquid Bodies Topic 16: Hooke's Law Topic 17: Thermodynamics Topic 18: Temperature and Amount of Heat Topic 19: Heat Transport</p> <p><b>Assessments:</b> Lab#4 Lab Report#2</p>
Module 5	<p><b>Topics:</b> Topic 20: The Three Laws of Thermodynamics Topic 21: Mechanical Oscillations and Waves Topic 22: Parametric Oscillator and Coupled Oscillators Topic 23: Superposition of Oscillations Topic 24: Nonlinear Dynamics and Chaos Topic 25: Stability of Dynamical Systems</p> <p><b>Assessments:</b> Final Exam</p>

## ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.



Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

## **LEARNING REQUIREMENTS**

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

## **TECHNOLOGY POLICY**

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

## **ACADEMIC INTEGRITY POLICY**

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors



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and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

## **DISABILITY ACCOMMODATION**

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.