



PHY 408 Introduction to Mechanics

Summer 2023

Course Credits: 4

Contact Hours: 55 hours

Instructor: TBA

Email: TBA

COURSE OBJECTIVES

Mechanics is a subject which can explain the motion of all conceivable systems. This course will teach basic concepts from classical mechanics, mainly focus on newtonian mechanics. Students will be able to learn the specific topics: Kinetic Energy, inertia force, the laws of motion, Forced oscillations, Lagrangian and Hamiltonian formulations, etc.

1. Comprehend the basic theories and the principles of classical mechanics, especially newtonian mechanics
2. Understand the knowledge related to specific topics of mechanics
3. Apply quantitative skills to compute and manipulate quantitative data and to reach meaningful conclusions
4. Demonstrate critical thinking so that be able to analyse, evaluate, and synthesize information

PREREQUISITES

MAT 120 Calculus II

GRADING

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

ITEM	POINTS
2 Assignments	20 Points



2 Quizzes	20 Points
Midterm Exam	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:

John R. Taylor, *Classical Mechanics*, University Science, 2005.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	Topics: Topic 1: Classical Mechanics Topic 2: The Laws of Motion Topic 3: Newton's First and Second Laws Topic 4: The Third Law and Conservation of Momentum Assessments: Assignment#1
Module 2	Topics: Topic 5: Kinetic Energy Topic 6: Central Force Topic 7: Oscillations Topic 8: Resonance Assessments: Quiz#1



Module 3	Topics: Topic 9: Driven Oscillator Topic 10: Forced Oscillations and Resonance Topic 11: Lagrangian Formulations Topic 12: Hamiltonian Formulations Assessments: Midterm Test
Module 4	Topics: Topic 13: Euler's Equations Topic 14: Euler Angles Topic 15: Coupled Oscillators and Normal Modes Topic 16: Lagrangian Approach: The Double Pendulum Assessments: Assignment#2 Quiz#2
Module 5	Topics: Topic 17: Hamiltonian Mechanics Topic 18: Hamilton's Equations Topic 19: Lagrange's Equations and Hamilton's Equation Topic 20: Final Exam Reviews Assessments: Final Exam

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 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



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learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.