Classical Mechanics I - PHYS 3201

Course Information

Instructor: Edwin Greco (ed.greco@gatech.edu)
Course Prefix and Number: PHYS 3201
Term: Fall 2026

Course Description

This course introduces the theoretical foundation of classical mechanics and dynamics, with applications to problems in other areas of physics and engineering. It covers Newtonian formulation of classical mechanics, with a particular focus on rigid-body motion in Cartesian and polar coordinates, as well as Lagrangian and Hamiltonian formalisms.

Course Learning Outcomes

By the end of this course, the students will:

- Understand the theoretical foundations of Newtonian mechanics and apply its principles to solve fundamental problems in mechanics.
- Analyze physical systems in various coordinate systems, including oscillatory dynamics and systems influenced by conservative and non-conservative forces.
- Understand the mathematical foundations of Lagrangian and Hamiltonian dynamics, and solve problems in geometry and mechanics using variational calculus.
- Apply Lagrangian and Hamiltonian mechanics to solve multidimensional problems, including systems with external constraints.

Required Course Materials

- Principal contents of the course will be drawn from the following (required) textbook:
    - *Classical Mechanics* by John R. Taylor
- Other useful references on classical mechanics and dynamics include
    - *Classical Dynamics of Particles & Systems*, J.B. Marion and S.T. Thornton [Chapters 1-9]
    - *Classical Mechanics: The Theoretical Minimum*, Leonard Susskind
    - *Classical Mechanics*, Herbert Goldstein [Chapters 1-3]
    - *Classical Dynamics: A Contemporary Approach*, J. Jose and E. Saletan
    - *Mechanics*, L.D. Landau

Grading Policy

The final grade will be based on a combination of the homework (50%), midterm (20%), and final exam (30%).

Assignments: Six homework assignments (best 5 out of 6) will count towards the final grade. Assignments will be due in two weeks and will be returned before the next assignment is due.

Late-work policy: There will be **no late credit** for assignments. Extensions and make up exams will be available only with a well-documented, serious, and valid excuse, such as a serious sickness, death in the family, or a university function. See this catalog page: https://catalog.gatech.edu/rules/4/ for more information.

Grades: The final letter grades will be based on the following scale: A = 90-100%, B = 78-89%, C = 65-77%, D = 50-64%, F = 0-49%

Attendance Policy

Each student should be aware of the regulations that are listed in the student handbook. The class attendance policy, which the Georgia Tech regulations say shall be at the discretion of the instructor, will be as follows: There will be no prescribed maximum number of unexcused absences for this class. However, if it is apparent that lack of attendance at class may be impairing a student's performance in the course, the instructor may require that the student not miss more classes, under the penalty of failing the course. Please consult http://catalog.gatech.edu/rules/4/ (Links to an external site.) for details on what constitutes an excused absence and other aspects of the Georgia Tech Attendance Policy.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please consult https://catalog.gatech.edu/rules/18/Links to an external site.. Any student suspected of cheating or plagiarizing on an assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulates some basic expectations that you can have of me and that I have of you. Additional information for research-related work is given in The Expectations of Advisors and Advisees. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.