

**Physics 300: Mechanics**  
**Gustavus Adolphus College Fall 2021**

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**Homework help, Q&A, and more:** (a.k.a. Office hours)

Monday 9-10am, Wednesday 1:30pm-2:30pm, Friday 1:30-2:30 by appointment and any other time my door is open. **Drop by to talk!**

**Course website:** Moodle

**Textbook:** Classical Dynamics of Particles and Systems (5th Ed), by Marion and Thornton

**Recommend Textbooks:** Schaum's and Felder + Felder (from PHY250)

**Course Description and Objectives:**

This course extends the development of formal non-relativistic classical mechanics. Topics include the dynamics of particles and systems, the development and applications of the Lagrangian and Hamiltonian formulations of mechanics, and an introduction to non-linear systems and chaos. Vector calculus and differential equations will be used throughout.

In addition to providing students with a guided introduction to the subject of analytical mechanics, this course has the broader objective to prepare students for the rigors of the study of quantum mechanics, vector fields, and statistical mechanics by imparting to the student, at this crucial period between "introductory" and "advanced" physics, some degree of sophistication in handling both the formalism of the theory and the operational techniques of problem solving. To do so, this course brings together and extends the techniques introduced in previous mathematics and physics courses using an appropriate intermediate level text and gives the student many opportunities for practicing these techniques to become reasonably proficient in their use. **You should expect to average 10+ hours/week of homework and allot additional time (compared to introductory courses) to read the intermediate-level text.**

**Course Policies and Evaluation**

**1. Class Meetings:** The class will meet, on MTWRF 12:30-1:20. Students are expected to have completed assigned material to be covered before coming to class.

**2. Homework:** Problems sets will be assigned once per chapter (roughly weekly). Written homework sets should be neat and organized. Legibility and thorough explanations of answers are required and will be considered in the grade. Although you are allowed to discuss and work problems with each other (with equal effort), and encouraged to discuss with the instructor, **it is vital that you realize the importance of individual effort** in completing your homework. (Also see the academic honesty policy.)

**3. Late Homework: Homework is due at the beginning of class on the date assigned.** One late homework assignment will be accepted, up to 48 hours late, without penalty. Subsequent late assignments will begin with an increasing penalty of 25%, 50%, 75%, and 100% (no credit). An additional 25% penalty accrues every 24 hours thereafter. In addition, no assignments will be accepted after the problems have been returned to the class.

**4. In Class Group Problems:** These will be given frequently throughout the semester. There will be no make-up for problems missed due to unexcused absence.

**5. Problem Presentations:** Over the course of the semester, you will be assigned roughly twice to present a problem at the board to the class. You will be given 15 minutes to present the problem and its solution. You will be evaluated on the correctness, completeness and clarity of the solution and its presentation.

**6. Academic Honesty:** You will abide by the academic honesty policy printed in the Academic Bulletin and abide by decisions of the joint student/faculty Honor Board. **The use of internet solutions or answer books (including parts of problems) or parasitizing (including copying) other students for any assignment, quiz, or exam, unless specifically stated otherwise, is not allowed, and will result in a zero for the entire assignment, quiz, or exam and reporting to the dean of students as a minimum penalty.** It is your responsibility, as a student, to ask questions if you are not sure about what constitutes academic honesty in any other aspect of this course. Severe (even on the first incidence) or repeat offenders risk a grade of failing for the entire course at the instructor's discretion.

**7. Reading Quizzes:** Reading quizzes will be given frequently through Moodle. Reading quizzes will automatically close 10 minutes before the beginning of class. There will be no extensions for reading quizzes. Although you should read your text beforehand, you are allowed to use your text and your personal notes.

**8. Attendance:** Students are expected to attend all classes during the scheduled hours. Students are responsible for informing themselves of material and assignments covered during absences. Students must advise the instructor in writing during the first week of class of any scheduled athletic, music, or other college activities that will require their absence during the semester. Such written notice does not imply a waiver of course requirements or an agreement to reschedule exams.

**9. Exams:** There will be four one-hour exams, and a two-hour written final exam. Quizzes will be given at the discretion of the professor. There will be no separate mid-term exam. The low score of one exam will be dropped from calculation in the final grade.

**10. Missed Exams:** Students are expected to arrange in writing with the instructor more than one week in advance to take an exam at other than the announced time. Requests to reschedule exams for non-emergency personal reasons (e.g. plane tickets, not prepared, oversleeping) will be declined. Permission to make up a missed exam after the fact will be at the discretion of the instructor and will generally be granted only for emergency reasons.

**11. Incompletes:** An incomplete will only be given if, after the last day to withdraw has passed, unforeseen circumstances beyond the student's control (usually restricted to illness or emergency) preclude completion of the **remaining** work for the course by the end of the semester. Note that poor planning or having a lot of work to complete at the end of the term are not considered circumstances beyond a student's control. (College policy)

**12. Requesting Accommodations:** Gustavus Adolphus College is committed to ensuring the full participation of all students in its programs. If you have a disability and anticipate or experience barriers to equal access, please speak with the accessibility resources staff about your needs. A disability may include mental health, attentional, learning, chronic health, sensory, physical, and/or short-term conditions. Course requirements cannot be waived, but reasonable accommodations may be provided based on disability documentation and course outcomes. Accommodations cannot be made retroactively; therefore, to maximize your academic success at Gustavus, please contact the Academic Support Center as early as possible. The Accessibility Resources Coordinator can provide further information.

**13. Recording:** Students must request written permission from the instructor to record (audio or video) any component of this class (including in-person or online). Any recording that includes other students will require that the class be notified by the instructor or that those present give consent. By coming to, and remaining in class, it is assumed you give your consent to be recorded.

**14. Posting of course videos and materials:** Recordings and videos of the class, as well as those produced as part of class instruction (including excerpts, clips, etc.) and materials (including assignments, solutions, graded materials, etc.), are not to be reproduced or posted in any format or on any platform or distributed in any way without the written consent of the instructor.

**15. Copyright:** Some class materials may be copyrighted. Access to these materials is restricted to students registered for the class. These materials may not be reproduced, shared, or distributed by students. If a tutor needs access to these materials to provide you with academic support, please ask your instructor for assistance.

**16. Evaluation:** Course grades will be assigned using the following scale as a guide:

Hour exams 36% (Top 3 exams)	94-100 A	74-78 C+
Final Exam 20%	90-94 A-	70-74 C
Homework 20%	86-90 B+	66-70 C-
In class group problems 10%	82-86 B	0-66 F
Reading quizzes 10%	78-82 B-	
Problem presentations 4%		

Assignment of the final letter grades will also consider other factors including the instructor's subjective evaluation of attendance, initiative, evidence of improvement, and the quality of independent work.

**17. Flipped Classroom Format:** Much of the content covered will be presented outside of class in the form of book readings and online video lectures. In-class time will be spent on reinforcing this learning through quizzes, application, problem practice, and questions. Your sustained effort both in class and outside of class and participation in the flipped format is critical for you to be successful in this course. Some tips to be successful include:

- Read the chapter **twice** before starting the homework. (Once before class!)
- **Take notes** while watching video lectures and reading. (Do this in addition to in person class).
- Come to class **with questions prepared**. (This will be required anyway.)
- **Work** all the example problems. (Don't just read them; and try with the book closed.)
- Do homework **in advance of the due date** and ask questions. (I'm here to help!)
- **Stick with it.**

## **COVID Information:**

All classrooms will follow the most up-to-date COVID policy of the college with regard to masking, social distance, food and beverage in the classroom, and sanitizing of technology and spaces. **Individual faculty members may ask for additional COVID precautions at their discretion.**

It is the policy of Gustavus Adolphus College that all students must abide by rules and standards designed to protect the community. Refusal to comply with any COVID related rules will be handled through the student disciplinary sanction process and will be reported to the Office of Student Life.

- Upon the first and second offense of a failure to abide by COVID rules, I will ask you to leave, and you will not be invited back on that day. You will receive a score of zero for any daily class activity including possible penalty in the final grade.
- Upon the third offense, I will ask you to leave, and you will fail the class.

## **Masking**

When required by Gustavus or government mandate, correctly positioned face masks (covering both your nose and your mouth) must be worn and will be enforced as described above. **When not required by Gustavus or government mandate, it is the expectation in this classroom that masks will still be worn during high local levels of transmission.**

## **Food and Beverages**

No food will be permitted in classrooms unless there is a medical accommodation. Beverages will be permitted in classrooms, but students may only remove face coverings briefly during the time when they are actually drinking, if necessary. **Overuse of the drinking privilege may be considered a violation of the masking policy.**