

Physics 120 & 122: General Physics I

Time: MTWRF 10:30-11:20

Professor: Dr. Brianna Dillon Thomas

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Location: OHS 103

Office: OHS 212, x7311

Office Hours: TWRF 1:30-2:30 and by appointment

Prerequisites: *Physics 120:* algebra, trigonometry, and other pre-calculus topics. *Physics 122:* MCS-119 or MCS 121. In addition to the mathematics required for the Physics 120 version of the course, you need to know how to differentiate and integrate simple functions, and should have a conceptual understanding of what derivatives and integrals are.

Co-requisite: Concurrent enrollment in Physics 121, General Physics laboratory, is required.

Course Description: Physics 120/122 is the first of a two-semester sequence addressing topics in classical and modern physics. This semester, we'll explore kinematics, dynamics, conservation laws of mechanics, fluids, heat and transport phenomena, thermodynamics, simple harmonic motion, traveling waves, and sound.

Course Materials:

Textbook: *Principles of Physics: A Calculus-based Text*, 5th edition, Serway & Jewett

Moodle page: Physics 120, Fall 2016-17, Physics 122, Fall 2016-17

Calculator: Scientific, *non-graphing calculator*. Phone calculators or graphing calculators on exams is prohibited.

Course Objectives and Expectations:

Intended Learning Objectives:

1. Strong conceptual understanding of the physics topics covered
2. Strengthened analytical reasoning, especially in problem-solving and identifying core principles
3. Understanding of how physics explains everyday phenomena and intersects with their own discipline
4. Ability to use physics terminology appropriately
5. Understanding of the process of physics as an intellectual pursuit and of the ways in which scientific ideas evolve and become accepted

Teaching Licensure: This course fulfills some of the standards required for Minnesota teaching licensure. See http://physics.gac.edu/Education/phy120_standards.htm, or http://physics.gac.edu/Education/phy122_standards.htm

What I expect from you:

- Actively engage in class
- Complete assignments on time
- Respect and support your classmates learning in and out of class
- Advance notice of anticipated schedule conflicts
- Check email and Moodle regularly for course updates

What you can expect from me:

- Enthusiasm for physics
- An atmosphere of respect where questions are welcome
- Clear communication of expectations on assignments and exams
- Available during office hours with an open door policy
- Check and respond to email regularly during normal class meeting hours

Course Components:

Grading summary:

Written problems (WH)	23%
Concept Check homework (CH)	12%
Exams (3 hour exams, 13% each)	39%
Final Exam	26%

Grading Scale*:

A	90-100%
B	80-90%
C	70-80%
D	55-70%
F	55%

**Grade lines may shift at my discretion, but only in the direction of lowering the grade boundaries*

In-class: Class time will utilize a variety of teaching methods, including traditional lecture, demonstrations, small-group work, clicker questions, etc. Come prepared to engage your brain! Please realize that this course presents a unique challenge by having both the calculus and non-calculus students in one section. There will be times where I will use calculus proofs or provide calculus problems as example in class, during which I will point out what the non-calculus students can learn from the proof or example.

Reading: Most days have a section of the textbook associated with the class (see Moodle page). I expect you to read those sections *before* you come to class, and assume you are able to learn some basic material on your own. While you will not learn physics solely by reading the textbook, doing so will help you prepare for the fast pace of the course (roughly 1 chapter/week). I encourage you to read the text thoughtfully: first skim for an overview of the topics covered, then read more slowly, trying to answer the in-text questions, examples, and “quick quizzes”.

Homework assignments: One of the best ways to succeed in this class is to give your best effort on the homework assignments. You cannot truly learn physics without independently tackling the ideas discussed in lecture and practicing organizing your thinking. On the other hand, if you get stuck, you are encouraged to work with your classmates or consult other resources (see “**Collaboration policy**”), as long as **all work you turn in is your own**. You may find you want more practice beyond the homework to feel like you’ve fully mastered the material, in which case doing more problems from the textbook is helpful. *Remember: graphing calculator use is prohibited on exams, thus you should be sure not to rely on them for doing the algebraic portions of homework.* Homework is assigned on a per-chapter basis, with some chapters with related topics being paired. Homework has two forms:

- **Concept check homework (CH):** These will typically be due the *evening* of the day we discuss the last of the topics covered. A selection of multiple choice, fill-in-the-blank, or short answer conceptual questions will be completed on Moodle. These questions are intended to reinforce and assess your conceptual understanding of physics.
- **Written problem sets (WH):** Written homework sets are **due at the beginning of lecture**, one to two lectures after we finish the corresponding chapter(s). Due to the large number of problems assigned, only some problems will be graded in detail (10 points each), with the remaining given a “quick check” (2 points). These assignments are intended to hone and assess your analytical problem-solving skills; consequently, **detailed grading will be as much on the problem-solving process you use as on the correctness of your final answer**. See the “Problem Solving Strategy” hand-out for what components you should include. Additionally, all homework should be done on one side of the page only, not cramped, and legible (you should make a “final copy” if you find your page full of unsuccessful attempts or many erasures), and multiple pages should be stapled together.
- **Late Homework Policy:** Written sets may be turned in until 5pm on the due date (either in person or left in the folder beside my door) but will be graded at 50% (ie late grade = $0.5 \times \text{raw grade}$). At 5pm, I will turn the homework over to our grader and late homework will no longer be accepted. If you have an anticipated reason that might warrant an extension, come talk to me as soon as you are aware of it. Last-minute or after-the-fact exceptions will only be granted under extenuating circumstances; if you miss a homework due to a last-minute but excusable reason, let me know as soon as possible. Conceptual online homework will not be accepted late, but I will drop your lowest score.
- **Collaboration:** Collaboration on homework is allowed, and is encouraged if you find yourself stuck on a problem. **However, all assignments must be your own work**. The best approach is to first attempt the homework on your own, then talk and work with a classmate or other resource if you get stuck, then write out the final problem solution independently in your own words. You should also ask yourself if you would be able to solve a similar problem on your own without help – as you will have to on the exam. **The following constitute a violation of academic honesty:** Copying solutions from a classmate, an upperclassman, or the web; “co-writing” a written assignment; failing to reference non-textbook sources; or using forbidden resources.

Exams: There will be three hour exams and a comprehensive final exam. The hour exams will be given after Chapters 5, 10, and 15, *tentatively* sometime during the weeks of 9-25, 10-16 or 10-23, and 11-13, respectively; finalized dates will be announced in class a week in advance. The final exam will be on **Saturday, December 16, 10:30am-12:30pm**. All exams will include a mix of conceptual and computational problems. Exams will be closed-book and closed-notes, but you will be allowed to use a non-graphing calculator and one 3x5 index card of whatever *handwritten* information you wish to include, which you will be required to turn in along with your exam. If you have a valid school or health related conflict with attending the exam at the scheduled exam time, you must request an alternative arrangement **no later than 1 week in advance of the exam**, ideally, you should notify me as soon as you are aware of the conflict.

Other Course Policies:

Regrades: Requests for a regrade of homework or exams must be **submitted in writing within a week of your receiving the graded assignment**. You should submit the original, unaltered assignment with a cover sheet describing your request stapled to the front.

Technology use: Use of cell phones, smartphones, laptops, tablets, and other electronics is prohibited in class except by permission of the professor. Only scientific, non-graphing calculators are allowed in exams; violation of this policy constitutes violation of the honor code.

Academic Honesty policy: You are expected to live up to the expectations of the College's academic honesty policy (see below, and at https://gustavus.edu/general_catalog/current/acainfo). By writing your name on any graded assignment, or by clicking "submit" on an online assignment, you are attesting that the assignment has been completed to the standards of the honor pledge:

Honor pledge: "On my honor, I pledge that I have not given, received, or tolerated others' use of unauthorized aid in completing this work."

Accessibility resources: Gustavus Adolphus College is committed to ensuring the full participation of all students in its programs. If you have a documented disability, or you think you may have a disability of any nature (e.g., mental health, attentional, learning, chronic health, sensory, or physical) and, as a result, need reasonable academic accommodation to participate in class, take tests or benefit from the College's services, then you should speak with the Accessibility Resources staff, for a confidential discussion of your needs and appropriate plans. 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 Accessibility Resources as early as possible. Accessibility Resources (<https://gustavus.edu/advising/disability/>) is located in the Center for Academic Resources and Enhancement. Accessibility Resources Coordinator, Kelly Karstad, (kkarstad@gustavus.edu or x7138), can provide further information.

Getting Help:

If you find yourself struggling in the course, there are several avenues of getting help:

- **Physics Tutoring:** Sunday through Thursday from 7-10pm in Olin Hall, location TBA. Physics students are willing to help with confusion regarding concepts and homework problems.
- **Office Hours:** Come by any time during my office hours. If you have a schedule conflict and are unable to come during my regular office hours, feel free to send me an email to set up an alternate appointment, or check in if my office door is open.

Weekly Schedule:

The following schedule is a *rough outline* only, and is subject to change. Exam weeks are tentative and dates will be set closer to that time. See Moodle for a detailed, frequently updated schedule.

Week starting	Chapter covered
September 5	Ch 1, start 2
September 11	Ch 2 & 3
September 18	Ch 4 & 5
September 25	Ch 5 & 6
<i>Exam 1 on Ch 1-5</i>	
October 2	Ch 7
October 3-4 -- Nobel Conference – NO CLASS	
October 9	Ch 8
October 16	Ch 10
<i>Exam 2 on Ch 6-8, 10</i>	
October 23-24 Fall Break – NO CLASS	
October 25	Ch 11
October 30	Ch 12 & 13
November 6	Ch 13 & 14
November 13	Ch 15 & 16
<i>Exam 3 on Ch 11-15</i>	
November 20	Ch 16
November 22-24 – Thanksgiving Break – NO CLASS	
November 27	Ch 17
December 4	Ch 18
December 11	Ch 18 finish, review
December 14 – Reading Day	
<i>December 16 – Final Exam 10:30am-12:30pm</i>	
<i>Final exam on Ch 16-18, and cumulative</i>	