# PHYS 1211 (52-482) - Principles of Physics for Scientists and Engineers: Mechanics, Waves, and Thermodynamics - I

The University of Georgia, Summer 2021

Syllabus

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| **Instructor:** | Dr. Nandana Weliweriya | **Email:** | nandanaw@uga.edu |
| **Time:** | MTWRF 11:45 am - 12:45 pm | **Class:** | 202 Physics Building & Zoom |
| **Office Hours:** | by appointment (just e-mail me) | **Office:** | 234-A Physics Building |

**Introduction:** Welcome to Physics 1211!

This course is the first semester of introductory level physics sequence for science majors. This semester focuses on Mechanics, the study of motion. Understanding the motions of objects and their interactions is one of the principal goals of physics. The fundamental laws of mechanics, first enumerated by Isaac Newton in the $17^{th}$ century, can be applied to an enormous range of phenomena on scales as diverse as dust grains and galaxies.

If you are a prospective physics or astrophysics major, then this course is probably not for you. Please talk to Dr. Cooley (Physics) or Dr. Caillault (Astrophysics) about other options.

**Student Learning Outcomes:** In successfully completing this course, students will:

- Develop and demonstrate a working knowledge of the principles of mechanics to many different kinds of motion: constant-force motion, uniform circular motion, statics (lack of motion), collisions and rotations;
- Demonstrate an ability to apply conceptual understanding and quantitative reasoning skills to solve physics problems in these areas;
- Develop and demonstrate skills in gathering, sorting, analyzing, modeling and communicating scientific data.

**Prerequisites/ Co-requisites:** You are expected to have a working knowledge of differential calculus, college algebra, geometry, and trigonometry in the context of physics, and to be acquainted with basic concepts such as units and dimensions, scientific notation, and significant figures.

If you need to brush up, work through Chapter 1 and Appendix A as soon as possible.

**Important Dates:**

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| Midterm #1 | Monday, 06/28/2021 11:45 am - 12:45 pm |
| Midterm #2 | Monday, 07/12/2021 11:45 am - 12:45 pm |
| Midterm #3 | Monday, 07/26/2021 11:45 am - 12:45 pm |
| Final Exam (cumulative/comprehensive) | 08/06 (FRIDAY): Noon - 3:00 pm |

## Course Resources

### Required Materials

- *Textbook*: choose either one you wish

  **Option 1:** *Physics for Scientists and Engineers, a Strategic Approach*, 4th ed., by Randall D. Knight (Pearson). You may use older editions if you wish.

  **Option 2:** *Physics For Scientists and Engineers*, 6th ed., by Tipler and Mosca (W. H. Freeman). You may use older editions if you wish.

  But you are responsible for knowing about any changes in content;

  **As an alternative**, you may use the free electronic textbook University Physics, by Samuel J. Ling, William Moebs, and Jeff Sanney. It is published by the OpenStax open educational resources project and is available for free in various electronic formats: online, PDF, iBooks, and Kindle. You can also order a print version, if you prefer that format. You will need Volume 1 for this class (https://openstax.org/details/books/university-physics-volume-1).

- We will be using clickers throughout the semester for participatory activities (see section below regarding participation and clicker points). **You will not be able to use the physical clicker device this semester since it will not operate for the class periods that will be online**. A Turning Technologies ResponseCard NXT ("clicker") available as an application for smartphone, tablet, or laptop. A Turning Account license is also required. Instructions for setting up an account can be found at https://ctl.uga.edu/learning-technologies/student-response-systems/turning-point-for-students/; You can use the free TurningPoint app called "Responseware" on your smartphone, tablet, or laptop, but you will still need an active license and to be properly registered with the eLC. However, given the uncertainty of whether this will work, I would encourage you to work with the free app and not purchase a subscription until I let you know it will be necessary.

- You will be using GRADESCOPE https://www.gradescope.com for submitting your work during the class and exam responses. You will receive an enrollment email to your UGA email address.

- You will have regular homework assignments. Assignments will be posted online through LON-CAPA (https://spock.physast.uga.edu/) and most problems will require you to submit your answers online. More details below.

- You will be allowed to use a calculator: A simple calculator such as the TI-30X series will do just fine, but a fancier graphing calculator is also acceptable. **But**, on exams, you will be limited to the functions that a standard scientific calculator can perform. No graphing, solving, programming, etc.

### Online Resources

- Please check your UGA email daily. The UGA email system will be used (infrequently) for announcements.

- The eLearning Commons (http://www.elc.uga.edu/) will serve as a repository of course information: announcements, homework solutions and exam solutions, grades, etc.;

### Other Resources

- Tutors are available either through the through the Department of Physics and Astronomy (https://www.physast.uga.edu/tutors/) OR the Division of Academic Enhancement (https://dae.uga.edu/services/tutoring/) at Milledge Hall and Miller Learning Center.

- If you need help with understanding principles and concepts from class or homework assignments, I do encourage you to first talk to your colleagues if that is not helping come see me during my office hours. If you need additional time please set up an appointment (by email or by phone);

**Assessment:** Your overall grade will be determined from your course performance, weighted as follows;

22% Cumulative final exam grade
40% Three in-class exams (18%/13%/9% for highest/middle/lowest grades)
10% Homework grade (LON-CAPA)
15% Laboratory grade
13% In-class (in-person or Zoom) participation (include clickers and class work/ problem-solving submissions)

- Letter grades will be assigned from your overall numerical grade according to the following: **A** 90.0, **A-** 87.5, **B+** 85.0, **B** 80.0, **B-** 77.5, **C+** 75.0, **C** 70.0, **C-** 67.5, **D** 60.0, **F**
- Overall numerical grades will not be rounded (i.e., 89.99 is still an **A**−);
- Any requests for a regrade of an assignment or exam must be made no later than one week after it's returned. For a regrade I will look at the entire assignment/ exam, not just one problem, and this may ***raise*** *or* ***lower*** your score. Regrade requests (including those for online homework) should be accompanied by all your work;
- Like any other measurement, grades possess a degree of uncertainty. Factors such as improvement, effort, and participation *may* help borderline grades. Lobbying, however, will not, and requests for extra credit will be ignored, so don't ask!

**Attendance and In-Class Policy:**

- During this semester, we will be limited in our face-to-face (or in-person) meetings in order to follow social distancing guidelines. Given the ongoing pandemic, I will encourage you to stay safe and healthy and do what is in your best interest. If you do not feel comfortable coming to class, this will not affect your grade nor your performance in the class. You will have opportunities to view all materials synchronously online through Zoom and using UGA's eLC.
- Whether you are in-person or attending class online (synchronous), for each class period please bring a device to view the lecture using Zoom (laptop or tablet) as you will frequently be broken into "breakout groups" through Zoom in order to complete many group activities. You will also find it beneficial to bring a pair of headphones into the classroom. To reduce the amount of feedback in the class room, it is imperative that you bring headphones if you wish to verbally communicate with your classmates who are online.
- You will often be asked in class to work on conceptual and quantitative questions, both individually and in small groups. Some of these activities during class will require the use of the "clickers". These activities allow you to demonstrate your sincere effort and active class engagement. A fraction of these in-class activity scores will be "dropped" (similar to the fraction of dropped homework assignments) to compensate for the occasional absence, clicker malfunction, or similar issue. I will not accept a written record of your responses as a clicker substitute, or otherwise excuse any absence from class.

**Exams:**

- All the midterms and the final exam will be online.
- There will be three midterm exams and a cumulative final exam. All exams will be open-textbook, open-notes. **But, possible plagiarism/unauthorized assistance includes, but is not limited to: accessing and posting to Chegg (or similar) and/or similar during and/ or after an exam is not accepted.** The format of the exams will be discussed in class but will include conceptual as well as problem-solving questions. You may use a scientific calculator for arithmetic only, not for algebra, calculus, or graphing; all memory and programs must be cleared. I'll provide you with a formula sheet for each exam, and will also post it to eLC (at least one week) before the exam. The formula sheet's purpose is to release you from memorizing formulas, and allow you to focus your studying on understanding the principles and concepts involved;
- Since the exams will be distributed online, the written portion will need to be captured (image) or scanned and uploaded to a website to be graded. You will be using GRADESCOPE https://www.gradescope.com for submitting your exam responses.
- Exams will comprise both conceptual and problem-solving aspects, similar to homework, practice problems, and in-class examples. Unless told otherwise, you must show your work on each problem in order to receive full credit. Partial credit is awarded (based on your work) for incomplete or incorrect answers, so it is usually in your best interest to attempt every problem. Detailed solutions will be posted to eLC after each in-class exam;
- Exams are designed to test your understanding thoroughly and to distinguish among levels of performance. In order for exams to be effective assessments, raw scores will often be lower than the expectations created by the "standard" letter grade cutoffs. These raw scores will be "re-scaled" into numerical grades. This conversion is based mostly on the difficulty level of the exam and partly on the distribution of raw scores. Your re-scaled grade will never be lower than your raw score. Also, unlike a "grade curve", you are *not competing* against your peers; it is possible for everyone to get an A or B, for example;
- ***There will be no make-up midterm exams***. If you need to miss a midterm exam for a serious, documentable reason, your final exam grade will be substituted for one of your midterms, making your final exam worth 30-40% of your overall grade (depending on how this grade compares to your other midterm exam grades). This policy is designed to handle unavoidable situations like medical or family emergencies, or previously scheduled academic or athletic events. You must contact me as soon as you know of the conflict (before the exam if at all possible), and you must provide sufficient documentation in a timely fashion. (An example of unacceptable documentation is a note stating only that you visited the health center, with no indication of the severity and nature of your illness.) Do not presume that your situation or documentation merits an excused absence; that determination is not your prerogative. ***Unexcused exam absences will result in an exam grade of zero***.
- **Make-up final exams** will be given only for students with legitimate, documentable reasons and MUST be arrange PRIOR to the final exam.

**Homework:**

- Sustained practice with physics problems is crucial to understanding physics, so you will have regular homework assignments. Assignments will be posted online through LON-CAPA (https://spock.physast.uga.edu/) and most problems will require you to submit your answers online. However, a few assignments may also have a handwritten component. Detailed solutions will be posted to eLC after the due date;

- Assignments will be weighted equally unless otherwise specified. At the end of the semester, *provided that you complete a course evaluation*, I will drop your lowest two assignment percentages in calculating your overall score. (If you don't submit a course evaluation during the allotted time, then none of your assignments will be dropped.) This dropped-assignment policy compensates for the unavoidable circumstances that may occasionally prevent you from submitting homework on time (e.g., illness, scheduled event, Internet failure, etc.). *Late homework won't be accepted or excused.* However, even if you miss the deadline to submit homework answers for credit, you should still make every effort to work through all the problems on every assignment, in order to master the topics covered. You will likely do very poorly on exams if you don't work through each assignment in its entirety;

- Teamwork is an effective way to learn, so I encourage you to collaborate with your classmates. Ask them questions; critique others' work; explain your reasoning to your study partners. However, don't mistake teamwork for plagiarism. You're responsible for understanding all the details of every solution, and your solutions must be your own. Copying from any source of homework solutions is a violation of academic honesty policies. Since you can't collaborate on exams, homework is your best opportunity to develop your own problem-solving skills. If you've read this far in the syllabus, please write your favorite color under your printed name on the agreements form.

**Labs Sections:**

- It is true that that the lab is a part of this course, but the classes/instructions and the labs are conducted separately. But, at the end of the semester, I will incorporate your lab scores when calculating your letter grade for the course.

- For information about the lab section for this course, please consult the lab syllabus available at https://www.physast.uga.edu/courses

**Class Preparation:**

- On each Saturday, you will see the tentative weekly plan posted on eLC. You are required to read the assigned textbook sections *before* the class in which those topics are discussed;

- Regular reading is an important part of your preparation for class. Don't expect to understand everything in the textbook at first sight! However, your learning effectiveness class will depend on having encountered the material *prior* to class. You should jot down notes and questions as you read; this will aid in organizing your class notes and will remind you to ask for clarification.

## Course Policies

### Academic Honesty

- UGA has a comprehensive academic honesty policy, **A Culture of Honesty**, which is available from the Office of Instruction at http://honesty.uga.edu/. This policy covers all academic work. All students are responsible for fully understanding and abiding by this policy. If you have any questions about the appropriateness of your actions or your work, you are obligated to ask me for clarification;
- I take the issue of academic honesty very seriously, and it is my responsibility to uphold the University's policy. This means, among other things, that I won't hesitate to report evidence of dishonesty to the Office of the Vice President for Instruction. Typical consequences of academic dishonesty on homework or an exam range from receiving a zero for that grade, to failing the course, to being suspended from the university.
- **Possible plagiarism/unauthorized assistance includes, but is not limited to: accessing and posting to Chegg (or similar) and/or similar during and/ or after an exam is not accepted.**

### Disability Accommodations:

- I will make every reasonable effort to accommodate students with documented disabilities. Students requesting accommodations must provide documentation from the Disability Resource Center during the first two weeks of class (or within two weeks of DRC certification).

### Withdrawals/ In-completes:

- The Undergraduate Bulletin (http://www.bulletin.uga.edu/) and the Registrar's Office website describe the University policies regarding withdrawals and in-completes (http://reg.uga.edu/policies/withdrawals). If you don't complete the initial required administrative tasks of the course (e.g., the questionnaire), or are demonstrably not attending class and completing work, I may withdraw you from the course for "excessive absence";
- If you are considering withdrawing from the course, you should discuss your choice with me beforehand (In many cases, students are doing better in the course than they think they are);
- A grade of incomplete is not appropriate for a student who has missed a large portion of the course assessments, for whatever reason.
- **The Withdrawal Deadline is July 08, 2021.**

### Student Distress:

- If your course performance is significantly affected by issues beyond your control, I urge you to let me know and to seek assistance promptly from Student Care and Outreach (http://sco.uga.edu/), part of the Office of the Dean of Students. It is always easier to address exceptional circumstances when these issues are raised as early as possible. Waiting until the end of the semester to take action may limit my ability to provide appropriate support.

**Technology Policy:**

- Cell phones should be turned to silent or off during class. Texting, checking email, posting to Facebook, etc. are not allowed during class. These activities are distracting and disrespectful to your fellow students. Tablet computers and convertible laptops in tablet mode may be used with a stylus for the purpose of taking notes. Typing notes on a traditional laptop is not very effective for a class like this, because of the large number of diagrams, graphs, and equations required.

**Student Responsibilities:**

- Above all, you have the right to expect courtesy from your fellow students, and the same will be asked of you. Courtesy includes the expectation that everyone will come to class ready and willing to learn and interact, and able to ask or answer questions freely. Courtesy also implies that you arrive on time, stay until the end of class, and remain focused during class.
- Attendance (in person or Zoom) is required. Class attendance keeps you well connected to the course and to the members of your group. In physics courses, each new concept builds on earlier ones, so mastering key concepts is critical. **If your schedule makes it difficult to attend class regularly and on-time, you shouldn't take this course.**
- The most common causes of missed classes are lack of sleep and time pressure from other obligations. If this starts happening to you, you need to seek out advice on how to set priorities and manage your time effectively.
- If you miss class, it's your responsibility to find out from other students what you missed. Talk to your class-mates.
- You *must* prepare for class. Class time is valuable and limited. Using that time effectively requires that you've had some exposure to the necessary concepts, so that you can ask good questions and practice applying those concepts in class. Evidence from other courses with this format suggests that the time you spend preparing for class *significantly* reduces the amount of time needed for homework. Finally, *class discussion will not cover all of the assigned material.*
- Ask for clarification on anything you find unclear, ambiguous, or unspecified. This includes both course policies and physics topics. Ignorance is never a valid excuse. It's your responsibility to show me what you do and don't understand through your questions, so that I can help you learn. You help influence the pace of the course. Silent confusion benefits no one.
- I can't emphasize enough the importance of homework! Just as with other areas of learning, your physics problem-solving skills will improve only by practicing regularly and conscientiously. You'll get very little value out of homework if you procrastinate, or if you depend on the efforts of others. If you start to get behind, get help early before the problem gets worse!

**Coronavirus (COVID-19) Policies:**

- Transparency between students, faculty, and staff is key to a successful semester. Please follow these guidelines to keep yourself and the rest of the UGA community safe and healthy. Remember, transparency is key and I understand we are proceeding this semester in a pandemic. Therefore, if you or someone you know has COVID-19 you should quarantine according to the CDC's recommendations (https://www.

cdc.gov/coronavirus/2019-ncov/if-you-are-sick/quarantine.html). If you show any symptoms of Coronavirus, please get tested. I will work with all students to make sure any disruptions (of course we hope for none) due to COVID-19 are not a setback. If you need more information, please visit http://coronavirus.uga.edu.

- **Face Coverings:** Effective July 15, 2020, the University of Georgia—along with all University System of Georgia (USG) institutions—requires all faculty, staff, students and visitors to wear an appropriate face covering while inside campus facilities/buildings where six feet social distancing may not always be possible. Face covering use is in addition to and is not a substitute for social distancing. Anyone not using a face covering when required will be asked to wear one or must leave the area. Reasonable accommodations may be made for those who are unable to wear a face covering for documented health reasons. Students seeking an accommodation related to face coverings should contact Disability Services at https://drc.uga.edu/.

- **DawgCheck:** Please perform a quick symptom check each weekday on DawgCheck—on the UGA app or website—whether you feel sick or not. It will help health providers monitor the health situation on campus: https://dawgcheck.uga.edu/

- **What do I do if I have symptoms?**

  Students showing symptoms should self-isolate and schedule an appointment with the University Health Center by calling 706-542-1162 (Monday-Friday, 8 a.m.-5 p.m.). Please DO NOT walk-in. For emergencies and after-hours care, see https://www.uhs.uga.edu/info/emergencies.

  **Please do not come to class if you have any signs of symptoms or if you have been within 6 feet for more than 15 minutes of someone who is showing symptoms.**

- **What do I do if I am notified that I have been exposed?**

  Students who learn they have been directly exposed to COVID-19 but are not showing symptoms should self-quarantine for 14 days consistent with Department of Public Health (DPH) and Centers for Disease Control and Prevention (CDC) guidelines. Please correspond with your instructor via email, with a cc: to Student Care Outreach at sco@uga.edu, to coordinate continuing your coursework while self-quarantined. If you develop symptoms, you should contact the University Health Center to make an appointment to be tested. You should continue to monitor your symptoms daily on DawgCheck.