Principles of Physics 1

Note: since this document is so long, a Table of Contents is included below. The corresponding Syllabus page in Canvas has in-page links to jump between sections. A link to this PDF document will be included in the Course Information section in the Canvas syllabus. ***All hyperlinks in the content have been removed from this file****; the only links that work in this PDF are the ones in the Table of Contents.*

Course Information

Course Prefix and Number: PHYS 2211
Semester: Summer 2026
Lecture sections: MN, RCH
Lab Sections: M01-M04 (in-person), N01-N08 (remote synchronous), RCL (China Summer Program)

Welcome to **Principles of Physics 1**. This is a calculus-based introductory mechanics course that uses computational methods in the lab. We'll be using **Canvas** as the hub for everything in the course: policies, communication, grades, etc. There are many **useful resources** for this course buried in the navigation menu on the left, so we encourage you to poke around and explore.

A **Summer Info Session** will be held synchronously on **THIS MS TEAMS LINK** on the first day of classes, **Monday, May 18 at 6:30pm** Atlanta time.

- Please read the **Syllabus** (this page) in its entirety.
- Course topics and assignments can be found in **Modules** organized on a week-by-week basis.
- Note that **all exams are in-person**, regardless of which lab modality you have enrolled in.
- Frequently asked questions are compiled and answered in the **FAQ** page (linked in the "Getting Started" module).
- Use **this online form** to request a GPS excused absence.

Course Description (from OSCAR)

An introductory course which will include mechanics (kinematics, dynamics, work and energy, momentum and collisions, and rotational motion and statics), and may also include oscillations and computational methods. This is a calculus-based course.

PHYS 2211 TL;DR

All administrative questions go to the Course Coordinator (Dr Alicea). This includes requests for extensions and excused absences.

If you need to be **absent from a lab meeting** due to **illness**, **personal or family emergency**, **religious obligation**, or **participation in a GT-sponsored event**, do not email the Course Coordinator but instead use **this GPS excused absence form**. Only email the Course Coordinator if your reason doesn't fall into one of those four categories.

Course **communication** will happen through **edstem** ("Ed Discussion" in the navigation links on the left).

All **lectures** are in **remote asynchronous**. Each weekly Module has a page for that week's "summer pre-lecture videos" and another page for "recorded live lectures." Make sure to watch both sets of videos each week.

Lab Meetings begin on the second week of summer (May 26), and Atlanta-campus students have options for **in-person** or **remote synchronous** modalities.

- **In-person** lab meetings (Sections M01-M04) are in the third floor of CULC
- **Remote synchronous** lab meetings (Section N01-N08) happen on MS Teams
- **China Summer Program** lab meetings will happen in-person with the GTA joining remotely.

- Each lab meeting consists of **GPS** and **Lab Experiment**. Read this page for more information about the lab meetings: **What to expect during Lab Meetings**

Lab Experiments are done on two-week cycles and get peer-graded. Read this page for more information about the lab experiments: **Everything you need to know about the Lab Experiments**

Exams happen in-person, regardless of which lab modality a student is enrolled in, during the **Monday 6:30pm meeting time**.

- Test dates: **June 15** and **July 13**
- Test locations TBD
- Read this page for more information about the exam procedures: **Test Logistics**

The Final Exam is also administered in-person.

- Final exam date: **August 3** at 6:00pm-8:50pm
- Final exam locations TBD
- If you have a **conflict** for the final exam (another final exam at the same time, or three final exams on that date, or an official GT excused absence), contact the Course Coordinator to get added to the list for the **Conflict Final**, which will take place on **Friday, August 7**, at **8am-10:50am**, location TBD.

Instructional Team

[picture]	**Course Coordinator** **Dr Emily Alicea-Muñoz (she/her)** **Contact:** ealicea@gatech.edu **Office:** Howey C-201 (Howey second floor, center hallway) **Office Hours:** TBD
[picture]	**Head TA:** Zachary Gazzillo (they/them) **Contact:** zgazzillo3@gatech.edu **Office:** Howey W-508-D (Howey fifth floor, down the weird little hallway) **Office Hours:** TBD
[illustration]	**Lab GTAs: SPREADSHEET LINK WILL BE POSTED IN CANVAS AFTER TAs HAVE BEEN ASSIGNED** • Last updated: [date]

Learning Objectives

The **topics** covered in this course include:

- The different types of matter and interactions found in nature
- Using the momentum principle to predict future motion
- An atomic model of solids
- The momentum principle in moving reference frames
- Energy conservation including relativistic energy

- Energy in macroscopic systems including thermal energy
- Multi-particle systems and the center of mass
- Collisions including relativistic particle collisions
- Angular momentum and torque

By the end of the course, you will be able to:

- Apply a small set of fundamental physical principles to a wide variety of situations.
- Use these principles to explain a wide variety of physical phenomena.
- Communicating scientific ideas is a big part of the laboratory.
- Make macro-micro connections, based on the atomic nature of matter.
- Model physical systems: make idealizations, simplifying assumptions, estimates.
- Construct computational models to predict the time evolution of system behavior.

Required Course Materials

In an effort to reduce cost to students, we are offering this course using a combination of instructor created content and open-access resources. This means you are not required to purchase a textbook or pay a lab fee. Our curriculum will, however, roughly follow the **Matter & Interactions**, Vol. I: Modern Mechanics, 4th Edition by R. Chabay & B. Sherwood (John Wiley & Sons 2015). **If you prefer having a traditional textbook as a study aid**, we recommend purchasing a used copy (even the 3rd edition should work).

The **Georgia Tech Library** has a few physical copies of the textbook available for students to borrow or to make photocopies. **Ask at the INFODesk: Grove Level, Price Gilbert; QC23.2 .C43 2015**

The textbook emphasizes the atomic nature of matter and integrates traditional mechanics with thermal physics. There is strong emphasis on the Momentum Principle (Newton's Second Law), the Energy Principle (the first law of thermodynamics) and the Angular Momentum Principle. The main goal of this course is to have students engage in a process central to science: the attempt to model a broad range of physical phenomena using a small set of powerful fundamental principles.

To aid in this goal students will develop computational models that predict the motion of interacting objects. These models will be made using the Visual Python programming language (run in your browser at **www.glowscript.org**). The course also emphasizes the atomic structure of matter, especially the ball and spring model of solids, and photon emission and absorption in quantized systems.

The lab experiments require students to have a smartphone (for video recording) and a laptop/computer (for coding and video analysis). Other materials for the lab experiments will be available in the lab rooms, or else will be household items that anyone can have access to.

Course Modality

All the **lectures** in this course are **remote asynchronous.** Students should watch the pre-lecture videos AND the recorded live lectures listed in each weekly Module.

Lab Meetings have options for in-person or remote synchronous modalities. During the lab meetings, students will work in small group problem solving (**GPS**) for about two hours, followed by about an hour of working on **lab experiments**.

- The **in-person** lab meetings happen in the physics lab rooms in the third floor of the CULC building.
- The **remote synchronous** lab meetings happen on MS Teams. To actively participate, students will need a computer with internet access, a camera, and a microphone. They should have the camera and microphone turned on during the lab meetings.

All **exams** are taken on paper, proctored **in-person**, in one or more lecture halls on campus (locations TBD).

Inclusivity and Classroom Community

We strive to create a classroom in which all students can flourish and learn. Our differences in terms of race, gender identity, sexuality, religion, ability, and age (among others) broaden and enrich our collective understanding, and our backgrounds and identities influence our individual experiences and our interactions with others. We are committed to minimizing bias in course policies and procedures and our own words and actions, and **welcome feedback** should you notice that any aspect of this course is inhibiting your ability to participate and learn.

Specific Information for the China Summer Program Section (RCH/RCL)

Students in the China Summer Program (CSP) should have enrolled in **Section RCH/RCL**. Your lab meetings happen in-person at whatever location you are at the time (while you are in China; before arriving in China your lab meetings will be remote), and your GTA will join the meeting remotely through MS Teams. Your exams will be proctored in-person by CSP staff, including the final exam.

Course Schedule

The **Modules** section, which is one of the navigation links on the left, contains the entire course schedule organized on a week-by-week basis.

The first module, **Getting Started**, contains important information (about the course in general, about lab meetings and lab experiments, about exams and assignments) that you **must** read.

Each weekly module is organized in three (or four) sections. The first section lists the **lecture topics** for the week. The second section lists what is going on in the **lab meetings** for that week. The third section lists all **assignments** due by the end of that week. An extra section for **testing** information appears in the modules for weeks in which there is an exam.

For a quick full semester schedule-at-a-glance, see this file: **schedule-2211Sum26.xlsx**

Grading Policy

Numerical ranges for final grades are as follows:

- A = 90-100 points
- B = 80-89 points
- C = 70-79 points

- D = 60-69 points
- F = 0-59 points

Final grades will not be curved.

You can use the Canvas **Grades** area to keep track of your progress in this course. However, please note that **the Canvas gradebook cannot accommodate our test weighing scheme**. This causes a small but sometimes significant error in the overall grade that Canvas reports to students.

To accurately calculate your final course grade, you **CANNOT** rely on the Canvas gradebook. Instead you MUST use the "What's my grade?" spreadsheet, which can be found under Files > Course Documents > **WhatsMyGrade-2211Summer.xlsx**. See this page in the Getting Started module for information on how to use the spreadsheet: **How to accurately calculate your final course grade**

Tests (30 points)

There are **two evening tests** that will happen on **June 15** and **July 13** and are weighted depending on the grade you receive in them: the **lowest score is 10 pts**, and the **highest score is 20 pts**.

Each test is **75 minutes** long. Students with ODS exam accommodations should contact the Course Coordinator for the specifics of their testing situation.

If you **arrive late** to the test, you have less time to work on the test. Note that you will not be allowed to take the test if you arrive after someone else has already finished and left the exam room.

The tests and the final exam follow the same general **Exam Grading Rubric**

Regrade requests will be available on Gradescope 24-hours after the test grades get posted to Canvas, and must be submitted by the Friday prior to the next test. GTAs will process regrades usually within a week of receiving them. Corrected grades in Gradescope will be synced back to Canvas on the day of the next test.

Please read this page for full details about the exams: **Test Logistics**

Final Exam (25 points)

The final exam is a **common exam**, which will happen on **Monday August 3 at 6pm**. The locations for the final exam will be communicated to you later in the semester.

If you have a **scheduling conflict** with the final exam (e.g., another final exam at the same time, or three final exams on that date, or an official GT excused absence), contact the Course Coordinator to get added to the list for the **Conflict Final**, which will take place on **Friday, August 7**, at **8am-10:50am**, location TBD.

The final exam is **2hrs 30min** long. Graded final exams are not returned to students but can be reviewed by appointment with the Course Coordinator after the start of the next semester.

Laboratory (35 points)

The laboratory points are split into **20 points** for the Lab Experiments, and **15 points** for the Group Problem Solving.

Lab Experiments (20 points)

The four **lab experiments** earn 20 of the 35 points for the laboratory. Approximately one hour of the weekly lab meetings are dedicated to working on your lab experiments.

Note that you must fully complete the majority of the lab experiments in order to pass the class. If you fail to meet this threshold, you will earn an F in the course.

There are two assignments associated with each lab experiment (except the ungraded Lab 0, which is optional and only requires submitting a link). Please read this page for **ALL** the information you must know about the lab experiments: **Everything you need to know about the Lab Experiments**

Group Problem Solving (15 points)

The remaining 15 points of the laboratory are earned by actively participating during the Group Problem Solving (**GPS**) activity and submitting your work to Canvas. These will take place during the approximately the first two hours of the scheduled weekly lab meeting time.

The lowest GPS score is dropped at the end of the semester, which means that everyone gets one free no-questions-asked absence.

Please make sure to read this page for ALL the details about the GPS, including its grading rubric: **What to expect during Lab Meetings**

Homework (10 points)

There are weekly homeworks completed online, in the **WeBWork** platform.

Each homework can have a different number of problems, and each problem can have a different number of sub-parts. There are infinite attempts for every sub-part of every problem, with no penalty for the number of attempts. Each homework is graded for accuracy, and the score is synced to Canvas expressed as a percentage.

Homework problems can be numeric or symbolic. Numerical values in homework problems are randomly assigned, so the same problem will display different numbers for different students. Look at the page **Webwork Syntax** in the Getting Started module for details on how to enter symbolic expressions into WeBWork.

The due dates for all homeworks are **Fridays at 11:59pm** Atlanta time at the **END** of each week (i.e., the Week N homework is due at the end of Week N). Each homework has a late **submission grace period** equal to one week (i.e., the Week N homework can be completed until the end of Week N+1). You can earn full credit for the homework if you submit within the grace period. Submissions after the end of the grace period earn no credit.

Extra Credit

You have the opportunity to earn **up to 1 point of extra credit** to be added to your final course grade. This can be earned by completing the Physics Pre/Post Tests.

- If you do the **Physics 1 Pre-Test** (only available during the first week of classes) you earn 0.5pt of extra credit.

- If you do the **Physics 1 Post-Test** (only available during the last week of classes), you can earn up to 0.5pt of extra credit, depending on your score in the post-test. For example: if you scored 80% in the post-test, then you earned 80% of 0.5pt, which is 0.4pt.

You can do the pre-test only, or the post-test only, or both, or neither, which means you can earn anywhere between 0 and 1 points of extra credit.

Once these assignments close on their due dates, they will not be reopened.

Course Policies

These are our general guidelines for handling absences, getting help, or academic misconduct. If you are unsure about any of the course policies, please contact the Course Coordinator for help.

Attendance Policy

Attendance to the **lab meetings** (where students work on GPS and Lab Experiments) is **mandatory**. Students who need to miss a lab meeting must complete the **GPS Excused Absence form** to be excused from the GPS.

Since Lab Experiments follow two-week cycles, missing one lab meeting does **NOT** excuse a student from completing the corresponding lab experiment.

Excused Absences

Students may be excused from assignments at the recommendation of the Dean of Students office or the office of the Registrar.

Test Absences

If you have to miss a test (e.g., because of illness, or emergency, or religious obligations, etc), you need to follow the instructions in this page to request an excused absence:
https://studentlife.gatech.edu/resources/class-attendance

Please contact the **Course Coordinator** as soon as you submit your request to the Dean of Students to let them know that you have requested documentation for an excused absence. You do NOT need to wait for the Dean of Student's office to get back to you with their decision before contacting the Course Coordinator.

The final exam score is used in place of a missing test score (we call this "**final exam replacement**"). This means that your missing test is marked as 'excused' until you take the final exam and it gets graded, then whatever grade you got in the final exam is also used in place of the missing test grade.

Final Exam Absences

A student who misses the final exam and is unable to take the makeup final during the conflict period will need to take a grade of **Incomplete (I)** for the course, and then take the final exam on the following semester to fulfill the Incomplete grade.

In order to qualify for an Incomplete grade, the student must have been passing the course up to the point where the Incomplete grade is requested.

GPS Absences

The lowest GPS score is dropped, so every student gets ONE free no-questions-asked absence from the lab meetings.

If you've already used your free absence and find yourself **ill** (e.g., if you have covid or covid-like symptoms), or have an **emergency** on the day of your lab meeting, or have a **religious obligation**, or need to attend an **Institute-approved** event, then **you must use THIS online form** to request an excused absence for the missed GPS. **Do not email the Course Coordinator for this.**

You need to sign in with your GT credentials to access the form and enter your GTID as well. Please read the instructions in the form before filling it out. You should include some kind of documentation for your excused absence (for example, a picture of a positive COVID test).

Once you have submitted the form, you will receive an automated email that confirms your submission. The Course Coordinator will apply the excused absences in the Canvas gradebook every other week.

Excuses or Extensions for Lab Experiments

Note that a GPS excused absence DOES NOT excuse you from any of the lab experiment assignments! If you need to submit a lab report late, or are unable to submit a lab report or its associated peer grades (e.g., because of illness, academic travel, etc), then you must email the Course Coordinator as soon as possible. In general, you will get an extension on the due date to submit the lab report and/or be excused from submitting peer grades. Include the phrase **"PHYS 2211 - lab report extension"** in the subject line of your email to expedite the process.

Academic Integrity

Students are expected to maintain the highest standards of academic integrity. All work submitted must be original and properly cited. Plagiarism, cheating, or any form of academic dishonesty will result in immediate consequences as outlined in the university's academic integrity policy.

The policy on academic honesty as stated in the **Honor Code** will be fully enforced during this course for both the instructors and student. All Honor code violations will be referred to the Dean of Students office.

Permitted Collaboration

Collaboration with other students in this course on homework assignments, lab assignments, and in-class activities is permitted and encouraged. For lab experiments, students are allowed to collaborate in performing the experiment and collecting data, but all data analysis, coding, and video lab reports must be individual.

- Using **Chegg** (or similar) and/or **ChatGPT** (or any other generative AI) **to copy or entirely produce any assignment** (e.g., homework, lab reports) is **NOT allowed**.
- If you use a generative AI to **assist** with **small** things in a lab report, then you must cite what AI you used and for what specific things you used it.

Prohibited Collaboration

Collaboration is NOT PERMITTED during tests or the final exam. These activities are closed internet, closed books, closed notes, with the following exceptions:

- Students are allowed a copy of the **formula sheet** found on Canvas (which will be included in the exam papers).
- Students are allowed **blank sheets of paper** (which will be included in the exam papers).
- Students are allowed a **calculator** (as long as it cannot communicate with other calculators, which means smartphone calculator apps are not allowed).

Every student must work on the tests and final exam individually and receive **no assistance** from any other person or resource. This includes, but is not limited to: other students, non-students, cheat-sheets, online resources external to Georgia Tech (e.g., Chegg), or any kind of generative AI (e.g., ChatGPT). Additionally, any exam work submitted outside of the testing period will not be graded.

Students who violate the academic misconduct policies will be reported to the Office of Student Integrity (OSI).

Use of Generative AI

(this includes ChatGPT, Gemini, Copilot, etc)

We encourage you to use AI tools to deepen your understanding, **provided you do the work yourself**. Here is how we recommend to use AI effectively in this course:

- **Lecture Synthesis.** Example: "I didn't quite catch why we have to use an integral to calculate the work done by a non-constant force. Can you summarize the key steps and explain why this is needed?"
- **Self-Quizzing.** Example: "I have a test on the Angular Momentum Principle coming up. Please generate 5 conceptual multiple-choice questions to test my understanding of cross products, torque, and angular momentum."
- **Code Debugging.** Example: "My GlowScript code has a syntax error on line 12. Can you help me find the typo?" However, you **MUST NOT** ask it to write the physics logic for you.

The "Trust but Verify" rule

AI models are often confident but wrong when working through math or physics problems. If an AI gives you an explanation that conflicts with your notes, or if you feel like you "sort of" get it but not fully, please come to Office Hours to discuss with an instructor -- and **bring the receipt!** Show your instructor what the AI told you. We can help you identify if the AI made a subtle physics error (which is common), or if it used advanced techniques beyond the scope of the class (it happens sometimes), or if there is a gap in your own understanding. Using AI should increase, not decrease, your engagement with faculty!

Prohibited Uses of AI

- **The Solver.** DO NOT input homework or exam review problems prompts to copy and paste an answer. This creates an illusion of competence that will evaporate during the exam. You may think you're just doing it to save time, but in the end it will come back to bite you, so don't do it.
- **Lab Reports.** You may not use AI to generate the script, voiceover, or slides for your video lab reports. The presentation must feature your voice and your logic.
- **Exams.** The use of any AI tools during exams is strictly prohibited.

Core Impacts

This is a **Core IMPACTS** course that is part of the Technology, Mathematics & Sciences area.

Core IMPACTS refers to the core curriculum, which provides students with essential knowledge in foundational academic areas. This course will help master course content, and support students' broad academic and career goals.

This course should direct students toward a broad **Orienting Question**:

- How do I ask scientific questions or use data, mathematics or technology to understand the universe?

Completion of this course should enable students to meet the following **Learning Outcome**:

- Students will use the scientific method and laboratory procedures or mathematical and computational methods to analyze data, solve problems and explain natural phenomena.

Course content, activities and exercises in this course should help students develop the following **Career-Ready Competencies**:

- Inquiry and Analysis
- Problem-Solving
- Teamwork

Accommodations for Students with Disabilities

A student with learning needs that require special accommodation should contact the Office of Disability Services at 404-894-2563 or **http://disabilityservices.gatech.edu/** to make an appointment to discuss their special needs and to obtain an accommodations letter. Once a letter is obtained, you should email the Course Coordinator in order to set up a time to discuss your learning needs. In general we are able to accommodate all requests given advanced notice.

Student-Faculty Expectations Agreement

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** articulate some basic expectations that you can have of us and that we have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, we encourage you to remain committed to the ideals of Georgia Tech while in this class.

How to Succeed in this Course

As a member of the Georgia Tech community, your instructors are committed to creating a learning environment in which every student feels safe and included. Because we are individuals with varying needs, we are reliant on student feedback to achieve this goal. To that end, we invite students to enter into dialogue with us about the things we can start, stop, and continue doing to make our classroom an environment in which every student feels valued and can engage actively in our learning community.

The secret to succeeding in this course is to actively participate during lectures, during lab meetings, in homeworks, and through online discussions. The more authentically you engage with the material the better you will perform during assessments. In general the course is scheduled so that during a given week an actively engaged student would spend **12-14 hours** with this course:

- **[3 hr/wk]** watch the pre-lecture videos and recorded live lectures before the start of each week, taking notes and noting important information or any things that are unclear
- **[3 hrs/wk]** attend lab meetings, actively participating, taking notes, and asking questions to clear up points of confusion
- **[1 hr/wk]** review your lecture notes and any notes taken during the GPS portion of the lab meeting, to keep up with the material and make note of any topics or skills for which you need help (e.g., make a list of questions to ask in office hours!)
- **[1-2 hrs/wk]** complete any work on the lab experiments that you weren't able to get to during the lab meeting time, including the creation of your video lab report (which cannot be done during the lab meeting time)
- **[1-2 hrs/wk]** work through the homework questions to check for understanding and not just to get the correct answer
- **[1 hr/wk]** practice solving new problems leading up to a test. Work through old exams and quizzes, attempt some of the extra problems, redo your GPS problems without looking at your notes or the solutions. **Reading written solutions or watching video solutions only *FEELS* like learning, it's not *actual* learning!** Keep in mind though that **you should not memorize** how to do those specific problems, since exam problems will be different from what's done in lectures, homeworks, GPS, and old tests. Focus on understanding the concepts and the underlying principles, and how to apply them to new problems.
- **[1 hr/wk]** get help early on and often from experts. Your instructors are available to discuss physics related problems during **office hours**. You can also get help online from other students, TAs, and instructors in our online class forum (edstem). Click on **GT Student Resources** on the navigation links to the left to find information about free tutoring services found on campus.

Any issue related to the administration of the course should be directed to the Course Coordinator. Because so many students are taking introductory physics courses, the Course Coordinator generally receives MANY emails and may take them up to a week to reply. Don't be shy about attending the office hours of the Course Coordinator or any of the instructors! If necessary, you can also schedule a on-on-one meeting with the Course Coordinator outside of office hours, especially if it's to discuss grades.

Campus Support Services

It is not usual for any of us to find ourselves in need of support during stressful periods. For a full list of student support resources please see the **GT Student Resources** link in the nav-links on the left-side menu.