PHYSICS GTA PREPARATION

Note: since this syllabus is so long, the Canvas syllabus page will have in-page links to jump between sections; a link to this PDF will also be included near the top of the Canvas page

Course Information

Instructor: Steven Tarr (steventarr@gatech.edu)
Course Prefix and Number: PHYS 6803 A
Term: Fall 2026

The **Physics GTA Preparation** course is designed to support your responsibility to provide our undergraduates with the **high-quality education** that we desire in the School of Physics. In addition, your teaching experience will hone **transferable skills** that enhance your professional development regardless of your intended career path. This class is **highly interactive** and is taught in workshop format, where everyone is expected to participate.

During this course, you will build a foundation for **learner-centered teaching**. By the end of the semester, you will have the foundation you need to be a great teacher and to continue your career development beyond the classroom.

This course is a required accompaniment to your **first semester** as a member of the School of Physics teaching staff (i.e., your first semester as a Graduate Teaching Assistant, or **GTA**). We ask that you take part in the ownership of your education as a co-educator, rather than being a "student" in the more traditional passive sense.

It is our expectation that as a co-educator you will:

- Participate actively and thoughtfully at all times.
- Have the conviction to ask and answer difficult questions, take what may seem to be unpopular positions, and admit when you do not know something.
- Have patience to listen to and respect others.
- Think, write, and engage with your peers in a scholarly manner; foster a collegial learning environment that is purposeful, open, disciplined, caring, and celebrative.

Scroll down this page to see all details about the **course instructor and GTA**, the course **objectives**, **structure** and **content**, a detailed course **schedule** including due dates for assignments, the **grading scale**, course **policies**, and **additional teaching resources**.

Announcements is where all class communications will be posted. Please make sure to set your canvas notification preferences to receive email notifications for new announcements. If you don't, you're likely to miss out on important announcements.

The **Modules** page contains links to all the important information for each class meeting, with each class meeting as a separate module. Please go in there to see links to important and useful resources such as the pages that list the GTA duties.

If you're curious about the effectiveness of this class, we welcome you to read the course author's PhD Dissertation, **Transforming the Preparation of Physics Graduate Teaching Assistants** (Georgia Tech, 2020).

Course Description (from OSCAR)

An introduction to learner-centered teaching methods and best practices for new physics graduate teaching assistants.

Course Instructor and GTA

[picture]	**Instructor:** Steven Tarr (he/him) **Contact:** steventarr@gatech.edu **Office:** Howey E-201 (Howey second floor, across from restrooms) **Office Hours:** Anytime, remote or in-person, either scheduled by email appointment, or MS Teams private message, or Slack private message, or just dropping by if the door is open and I'm not otherwise occupied
[picture]	**GTA:** TBD (TBD) **Contact:** TBD **Office:** TBD **Office Hours:** By email appointment

Course Learning Outcomes

In this course, you will:

1. Develop and apply learner-centered teaching practices to create a valuable, student-centered, learning experience.

2. Identify active learning techniques to explain physics concepts, address students' preconceptions, and facilitate problem solving.
3. Apply teaching principles to giving and receiving feedback, and revise your teaching practice based on feedback received.
4. Discuss how to manage classroom dynamics and develop efficient and effective ways of assessing students' work.
5. Reflect on your professional identity as a GTA and identify transferable skills utilized in teaching that are useful for your future career as a professional physicist.

Required Course Materials

There is no required textbook for this course. All reading materials will be made available to students either electronically via Canvas > Files, or as printed copies during class.

Course Structure and Content

The class is structured in two primary parts. The first part is the **Orientation**, which consists of a series of workshops to introduce you to life as a GTA and help you develop the skills you need before entering the classroom. This portion of the class begins before the start of the semester. The second part is the **Follow-Up Meetings**, which are 50-minute Friday morning class meetings that serve as pedagogical reinforcement during the semester. The **GAP Mentoring Meetings** happen during the semester, as a separate sub-set of the Follow-Up Meetings.

Orientation

1. **Introduction and Policies** – Welcome, overview, and introductions; GTA duties and expectations; Georgia Tech policies.
2. **Teaching Physics** – Brief introduction to active learning; explaining concepts and addressing student preconceptions; the novice/expert divide and anticipating student questions; facilitating problem-solving in physics; introduction to the Microteaching activity.
3. **Classroom Management** – Strategies for classroom management; facilitation of group work in labs or recitations; how to keep students motivated; introduction to Classroom Observations.
4. **Lab Simulation** – Practice teaching in a lab environment, using real introductory physics lab experiments, while your peers play the parts of students.
5. **Microteaching** – Practice teaching problem-solving, and receive feedback from your peers and instructor; practice giving teaching feedback to your peers.

Follow-Up Meetings

1. **Grading** – Strategies for fair and efficient grading, including rubrics; grading practice of real student solutions to old exam problems; how to use the Gradescope platform to grade exams
2. **Midterm Evaluations** – Strategies for collecting teaching feedback from students.
3. Time Management – Strategies for effectively managing the time you spend on your different tasks.
4. **Video Discussions** – Watch video recordings of physics GTAs at Georgia Tech and critique their use of the teaching strategies you've learned about in this class.
5. **Teaching and Research** – Identifying transferrable skills in teaching that can help in your career beyond the classroom.
6. **Concluding Remarks** – Final thoughts and reflections at the end of your first semester of graduate school.

GAP Mentoring Meetings

The Graduate Association of Physicists (GAP) will host three mentoring meetings for you during the semester:

- **GAP1: Advisors and Special Problems.** Departmental resources and where to go for particular questions; tips for first-year success; what is Special Problems; how to find an advisor & a timeline; respect in the workplace.
- **GAP2: Tailoring Your PhD to You.** Career statistics; things you can do during your PhD to further your goals; Individual Development Plans (IDP)
- **GAP3: Surviving Your PhD.** Graduation requirements and timeline; mental health resources and advice; how to effectively communicate with your advisor.

Course Schedule

TBD

Grading Policy

This class is **PASS/FAIL**, with a 75% cutoff. Earning **75% or above means you pass**, earning **below 75% means you fail**. Your performance in this class will be measured via five assessment categories:

Written assignments will be evaluated using this **Rubric for Written Assignments**.

Attendance and Participation (10%)

This class is taught with practical exercises that you can apply directly to your teaching. You must be present AND engaged in participation in order to benefit from them and earn AP points.

Pre/Post Tests (5%)

These are two diagnostics tools (the **Knowledge Quiz** and the **ATI, Approaches to Teaching Inventory**) designed to measure your knowledge and opinions about teaching before and after you take this class. Both diagnostics tests will be delivered online through the **Qualtrics** platform. You must do the pre-tests before we meet for the first time in the Orientation, and you must do the post-test by the deadline indicated in the course schedule.

Workload surveys (5%)

I will send you a very short survey at the end of each week, from Week 2 to Week 15, for you to list how many hours you have spent working as a GTA that week. This will help you identify time-sinks, and it will allow me to check that you are not being overworked (GTA duties should take **no more than 13 hours per week on average**). Note that statistically aggregated results may be shared with the GTA supervisors but individually identifiable answers will NOT be shared.

Teaching Activities and Projects (50%)

There are four teaching activities/projects for you to work on this semester:

1. **Lab Simulation** - You will facilitate a simulated introductory physics lab experience where your peers will be the students doing the lab experiments, and you'll give feedback to your peers when they do the same. At the end, after everyone has acted as facilitator, you'll answer a short set of review questions about the experience.
2. **Microteaching** - You will facilitate solving a physics problem for your peers and receive feedback on your teaching, and you will also provide feedback on your peers' teaching as well. After the activity, you'll answer a set of debrief questions (in short essay format) about the activity and the feedback you receive.
3. **Midterm Evaluations** - About halfway into the semester, you will collect feedback from your students, and then you'll write a one-page report on the results you obtained.
4. **Classroom Observations** - An instructor will stop by your classroom on a pre-arranged date and time to observe your teaching and give you feedback. Afterwards you will answer a short debrief about the feedback you received.

Reflections (30%)

There are two reflection assignments this semester:

1. **My First Week as a GTA** - At the end of your first week of teaching duties, you will reflect on how it went during your first week of teaching.
2. **Final Reflection** - At the end of the semester, after all the class meetings are over and all other assignments have been turned in, you will write an essay summarizing your experiences in this class and in teaching.

Course Policies

These are the general guidelines we will be following for handling absences, getting help, academic misconduct, and late work.

Attendance Policy

You **MUST** attend **every** class meeting. If you need to be absent due to a reasonable excuse (e.g., illness, professional travel, etc), then you need to **notify the instructor about your absence as soon as possible**, preferably before the absence happens. The instructor will then provide you with a way to make up for the missed materials and points. If you miss a class meeting without notification, then you will lose the attendance/participation points for the missed session and you'll miss out on the class content.

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.

The use of generative AI (e.g., ChatGPT, Copilot, Gemini, etc) to complete assignments is strictly prohibited.

A Teaching Assistant (TA) at Georgia Tech holds a dual role, serving both as a student and an instructional team member. Because of this, TAs are held to the same standards of academic integrity that govern all students at the Institute. These expectations extend to every aspect of their TA responsibilities, including, but not limited to, grading, handling course materials,

supporting instruction, and interacting with students. Any breach of academic integrity while fulfilling TA duties is subject to the same institutional policies, procedures, and consequences that apply to students in their academic work.

Late Work

Each assignment has a **Friday 11:59pm deadline** and a **two-day grace period** that extends the deadline to Sunday at 11:59pm.

Late work will NOT be accepted beyond the end of the grace period.

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.

Expectations for Graduate Teaching Assistants

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 students have of instructors and that instructors have of students. In addition, a TA must meet the employment performance expectations and conduct outlined in the **Graduate Student Employment Manual**. 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.

Additional Teaching Resources

The **Teaching at Georgia Tech** guidebook can be found here: **https://ctl.gatech.edu/teaching-at-georgia-tech-guidebook**

Physics Education Research (PER) is the field of research that specializes in investigating all aspects of teaching and learning physics, and develops recommendations for research-validated teaching practices that enhance student learning outcomes. The Top 10 results obtained by PER were collected by Sam McKagan from the American Association of Physics Teachers (AAPT) and you can find them in these slides: **Top 10 Results of Physics Education Research that every physics instructor should know**

PhysPort (**https://www.physport.org/**) has lots of resources for teaching backed by Physics Education Research. For example: **PhysPort expert recommendations for active learning**

PhET Simulations (**https://phet.colorado.edu/**) can be useful for demonstrating concepts to students.

The **Center for Teaching and Learning** (**https://ctl.gatech.edu/**) also has many resources to support GTAs.

Campus Resources

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.