

## **1017-212-01 University Physics II Spring Semester 2023 (2225)**

**Instructor:** Dr. Greg Trayling  
(He/him/his)

**LA:** Stanley Goodwin: sfg5318@g.rit.edu

- Office: ORN (13)-1322
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- Office Hours: WF: Noon – 1:00 PM GOS-3179  
Other times are available by appointment

**Workshops:** MWF: 8:00–9:50 AM in GOS-3179 with a brief break in the middle.

**Test Periods:** Thurs 6:30 – 7:45 PM room TBA  
(This is only used for the three Tests Weeks 5, 9 and 13)

**LA Recitation Sessions:** TBA, probably starting Week 2 (optional)

**Text:** <https://openstax.org/details/books/university-physics-volume-2> (Unit 2)  
<https://openstax.org/details/books/university-physics-volume-3> (Unit 1)

**Manual:** COS-PHYS-212 Activities Manual, Effective Fall 2019, which has been uploaded free to the course page on MyCourses under 'content'.

**Course Description:** This will be an introductory but intense course in calculus-based physics. This course is a continuation of PHYS-211, University Physics I. Topics include electrostatics, Gauss' law, electric field and potential, capacitance, resistance, DC circuits, magnetic fields, Ampere's law, inductance, and geometrical and physical optics. In this class, you'll learn about the underlying principles of calculus-based physics and strengthen your analytical abilities, which will carry over to whatever discipline you choose to pursue.

**Requirements:** Prerequisites: (PHYS-211 or PHYS-211A or PHYS-206 or PHYS-216) or (MECE-102, MECE-103 and MECE-205) and (MATH-182 or MATH-172 or MATH-182A) or equivalent courses. Grades of C- or better are required in all prerequisite courses. Any unusual cases should see Dr. Dawn Hollenbeck over in CAR-1264 for approval.

**Grading and Tests:** 12% Expert TA online homework  
12% Lab Reports (6 labs, lowest one dropped)  
12% Weekly Quizzes (14 quizzes, lowest 4 dropped)  
48% Three ~80-min in-person Tests (3 x 16%, Weeks 5, 9 and 13)  
16% 2-hour in-person Final (cumulative) during Finals week  
(Bonus 1% for attending at least 8 of the various LA sessions)

**Exam Replacement Policy:** Your Final will replace the lowest of your three Test scores, if it is to your advantage. Grading will be close to the usual scale. These cutoffs may be lowered but not raised:

Minimum Cutoffs: A-: 90%, B-: 80%, C-: 70%, D: 60%, F: <60%

**Do not bring any food of any kind into the workshops.** Violators risk having their food confiscated and possibly eaten by the professor. Water must be inside your backpack or left outside the workshop door and only consumed outside the workshop door.

**Exam Policy:** Exam make-ups are possible for valid reasons. Submit the Makeup Request form on MyCourses at least one week before the exam or ASAP after the exam. Please note that submitting a make-up form does not automatically guarantee it will be approved.

In general, if you think you might have an exam conflict or problem ahead of time, let me know as soon as possible.

Test #1: (Week 5)	Feb 16 <sup>th</sup>	Up through Gauss's Law
Test #2: (Week 9)	March 23 <sup>rd</sup>	Up to Potential through to RC Circuits
Test #3: (Week 13)	April 20 <sup>th</sup>	Up to Magnetism and Induction, RL Circuits

The tests will be in-class during the Thursday 6:30–7:45 PM time-slot.

**Policy on Cheating:** Don't.

Things that are NOT considered cheating, and are actually encouraged, include studying in groups, working on practice problems in groups and discussing or working on homework problems with other students.

**Students are expected to attend all workshops.** Attendance will be recorded for every class. The goal is always that every student will pass, but there is an extremely strong correlation between those few that skip even a few classes and those that fail. Even if you are in a technical major and you think you know all this first-year stuff, your instructors are experts in physics and there will always be something useful to pick up. In general, if you miss a workshop for any reason, e-mail me so I know what's going on and can add that e-mail to the records file to look at when it comes down to grading in the end.

**Readings:** Students are expected to read the appropriate chapters for the week's material, either ahead of time or during that week. Workshops will focus more on the basic ideas and principles, and we'll work on some techniques and examples in addition to the text material.

**How to get a high grade in physics:** There's always been this sort of cultural mystique about physics; that it's the hardest course on campus and you have to be a brainiac to even pass it. Success in this class is all about consistency. The people who end up with a passing grade in the end simply show up to every workshop, make sure they understand the points covered, and complete their homework on time. If you do this, you should do well on the exams, which make up most of the total grade for the course. More than any other discipline, physics builds up in a logical progression from one class to the next, so it's very important not to skip anything. You may not realize it at the time, but you learn quite a lot by being involved in the workshop activities. Remember: Professors don't decide grades; students decide their grades by their actions during the semester and professors just make sure that the grades are assigned correctly.

**Expert TA Information:** Note that if you used ExpertTA last semester in University Physics I, it is best to register for this course with the same e-mail so that you are linked to the same account. The cost of ExpertTA is \$32.50 per semester (up to a maximum charge of \$65).

**Student Registration Link:** (copy and paste this link into your browser).

<http://goeta.link/USU34NY-B7893E-2T7>

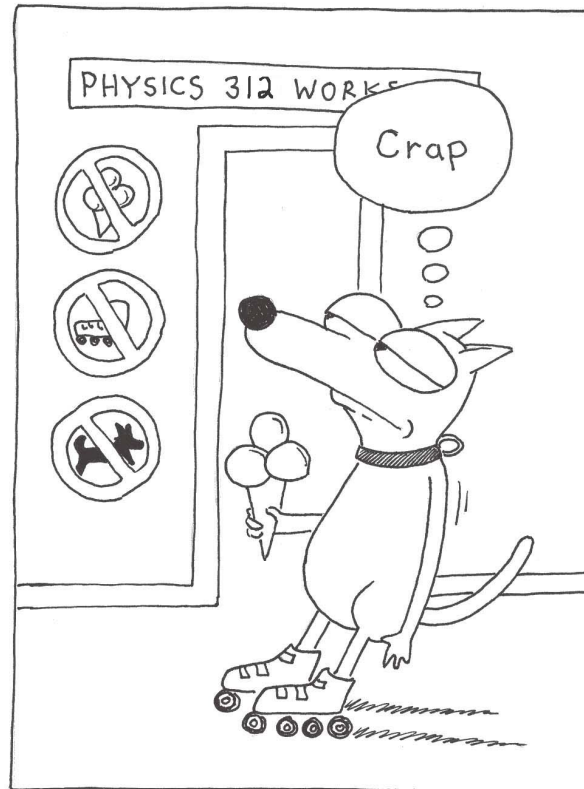
The first is due at 11:59 PM on Thursday, Jan 25<sup>th</sup> (Week 2). Assignments will be due every following week at 11:59 PM on Thursdays. It is **entirely your responsibility** to ensure that the homework is submitted on time. If your Patagonian fighting hamster escapes from its cage and gnaws the power cord to your computer the night before it's due and you miss the deadline; that is your responsibility. (Of course, Covid exceptions will made).

The ExpertTA homework is set to allow 8 attempts at each question with only 1% deducted for each incorrect answer (except more severe reductions for multiple choice questions). On the basis of the answer for your final attempt, the system will also sometimes award some partial credit. It is wise to work out the problems on paper and to record those attempts in case your initial answer has minor errors (e.g. rounding error, simple algebra error, typing error). Except in cases of encoded errors on the ExpertTA end, there will be no extra attempts granted. If you believe after a good faith effort that an answer is encoded incorrectly on the ExpertTA end, let me know about it and I will find an equitable solution to the problem.

ExpertTA homework is set up such that the credit for the assignment decays after the deadline passes. The decay rate is 4% per day (or part of a day) late, never to drop below 80% of the original value of the assignment. This means that even if you do the problems from the first assignment on the last day of the semester, you still earn some credit. There will be no individualized deadline extensions granted for ExpertTA assignments (unless it is truly due to a circumstance beyond your control).

**Academic integrity:** Students are expected to exhibit the same level of professionalism and integrity as will distinguish them in their future careers and, in particular, to act in accordance with the RIT Honor Code: <https://www.rit.edu/academicaffairs/policiesmanual/p030>. You are encouraged to work with your fellow students on all homework and workshop assignments, but you must submit your own work for a grade unless otherwise noted. On exams, you must work independently and only use resources that are allowed. Any case of academic dishonesty will be handled according to University policies: <https://www.rit.edu/academicaffairs/policiesmanual/d080>

**RIT policy on reasonable accommodations:** RIT is committed to providing reasonable accommodations to students with disabilities. If you would like to request accommodations such as special seating or testing modifications due to a disability, please contact the Disability Services Office. It is located in the Student Alumni Union, Room 1150; the web site is <https://www.rit.edu/disabilityservices/>. After you receive accommodation approval, it is imperative that you see me during office hours so that we can work out whatever arrangement is necessary.



**Syllabus modification:** Especially given the uncertainties associated with the continued presence of Covid-19, the terms specified in this syllabus should be considered tentative and may need to be modified (with notice provided) in order to optimize the class. Wearing a mask is not required but is also not discouraged in any way. Please consider wearing a mask if you have any reason to believe that you may have been exposed.

# Some sound advice pilfered off the internet from a former UP2 Learning Assistant:

By Vina-Saur

## 1. Math Skills and Previous Physics

In my opinion, this is the most important thing. With UP1 and most other Newtonian mechanics courses, you can get by without knowing how to add and multiple vectors and without knowing how to build integrals (maybe not get by *well* but you can still easily pass). This is not so true for UP2.

**Make sure coming in the first week you can;**

**a. Add vectors together (this involves trigonometry and components).**

**b. Perform dot products *and understand what they mean*.**

**c. Perform cross products *and understand what they mean*.**

**d. Review UP1 or whatever equivalent course.** Newton's second law ( $F=ma$ ), energies, work, and torques all show up again in a MASSIVE way, and there isn't time to review them with the content load. Professors will expect you know these concepts *because they'll be built upon directly*, so make sure that you do.

**e. Understand what calculus MEANS.** This is the biggest one, in UP2 it is calculus-based but you don't usually evaluate integrals themselves. The hardest part of the calculus is *setting up* the integrals: getting things in terms of an integrable variable, finding your limits, dealing with non-uniform distributions. Don't practice integration and derivative techniques, think about "if I wanted to use these every day, HOW and WHY would I use calculus?" Integrals are adding up an infinite number of things within a finite space; derivatives are finding the rate of change of something at a specific moment so any derivative is talking about how things change.

## 2. Your Own Practices and Habits

Mathematics isn't enough on its own. And honestly, even background physics isn't enough on its own. You need to actively advocate for yourself, both in your own actions and daily habits as well as when you're worried.

**a. Go To Class!!!!** Even if you've taken an Electricity and Magnetism course elsewhere, almost everyone I know says that UP2 is FAR more rigorous.

**b. Do all homeworks!!** There are some ExpertTA solutions and stuff online, and I as a member and employee of the physics department cannot endorse them. But IF you use online tools to help with homework (tbh most people do) make sure you understand WHY the answer is that. Ask yourself "if I was asked this on a test, how would I answer this question?" You will be asked that on the exam

**c. Show ALL of your work!!** Physics doesn't care about answers; it cares about solutions, which include all of the steps. The tests (especially the short-answer questions) are usually designed to test if you understand all parts of a concept, NOT if you can get an answer.

**d. Take notes!!** If you're bad at taking notes or can't for yourself for whatever reason, go to DSA or NTID notetaking and request a notetaker for the class. Having your own storage of the knowledge that you can reflect back on will be FAR more useful than any other materials the physics department or anyone else can give you

**e. Don't sit alone!!!** For 99% of students, working at a table with other people helps them out! Speaking from my own experience as an LA, we had about 4 tables with 4 or fewer students and 2-3 tables with a full 6 students. Tables with fewer student have almost all lost more than half of the members of the table, while tables with a full 6 students only lost one student to withdrawal. Other people WILL help you.

### **3. Get Help And Get Help Early.**

This is super important, because teachers and TA's know how difficult this course can be. You can do everything else listed here, but you still might struggle. That's when teachers and TA's come in. And yes, teachers want you to succeed, they don't like seeing students fail. Plus (if you're not convinced they care), just imagine the sheer bragging rights they'd have if they could have the one class of UP2 where everyone passes! But to help you, you need to go to them **early**. I'd say go to the professor's office hours at least once BEFORE the first exam, even if you are feeling good. They'll definitely remember you for the rest of the semester if you do, and it will almost certainly help out. If you try and get help too late, then your professor's hands get tied because there's nothing they can do for you within the department rules of the course, even if they'd like to. In addition, there are tons of tutoring services and study centers on campus (Bates, Sol, ASC, and HEOP if you're part of it). These will help you out so much if you use them.

### **4. Your Own Perspectives**

Physics professors are well aware about the reputation UP2 has. And yea, they recognize it's a difficult course, but also they say the rumors are blown out of proportion. One professor has told me explicitly "tell people worried about rumors that last semester the median final grade for my UP2 classes was an 82%. More than half the students got an A or a B!" On the other hand, I've seen my own close friend struggle immensely through this course, so I know the toll it takes on a student. Here are my tips.

**a. Try and Be Interested.** UP2 is a lot scarier and abstract compared to UP1 which is very concrete and intuitive for the most part. But the biggest advantage of UP2? UP2 is *instantly* applicable, while UP1 relies so much on approximation and idealization (everything is a sphere, frictionless ramps, ... ) that the applications aren't too evident. Anything from UP2 can almost immediately be used productively and innovatively just from the content of the course.

**b. Relate it to Your Other Courses.** For many majors, UP2 doesn't have many clear direct applications (I'm thinking SWEN and Computer Engineering). But the *techniques* of UP2 especially in terms of problem-solving are very applicable. Breaking problems into steps, not jumping ahead, understanding each part as well as whole systems and how they interact; all are VERY important for other classes. If you hate electricity and magnetism, treat it just as a course in problem-solving; you'll have to solve some problems you hate in your future job anyways.

**c. Know getting bad grades isn't the end of the world.** The test grades feel very ultimate and final, but from my experience, most people's final grades are usually at least a full letter grade above their test average from homework scores, quizzes, and labs. Don't let exam averages or even your own scores psych you out.

**d. Don't let the rumors get to you. You can do this.** So I'm a 3rd year physics major and a UP2 LA. But in high school, I failed every physics course I took, all of which were far easier than UP2. I know what it feels like to fail physics courses and I know what it's like to take UP2, and I can say from my own perspective that almost every single student coming into UP2 CAN pass the course. It takes effort and motivation, but you CAN do this. I've seen so many people come into UP2 as an LA and every person has a perspective on the physics that is unique and different from my own, which is incredibly exciting and engaging. You have the strength of your own perspective, and you can investigate this knowledge in ways physicists can't. Use that to your advantage, find where and how it clicks for you, because it will reflect in your grade if you do.