

Course Information

<http://www.bucknell.edu/phys212>

To whom do I go with questions about the course itself?

Ben Vollmayr-Lee (bvollmay@bucknell.edu) and Katharina Vollmayr-Lee (kvollmay@bucknell.edu) are responsible for course administration, and Cheslee Hibler (ch058@bucknell.edu) for lab administration. You should also feel free to speak with the problem session instructors if you have any questions or comments. For questions about the course material, see below.

How is PHYS 212 structured?

Each student is scheduled for **lectures** on Tuesdays and Thursdays, **problem sessions** on Wednesdays and Fridays, and a **3-hour laboratory** at some time during the week.

What materials should I buy?

You should obtain the following:

- ESSENTIAL UNIVERSITY PHYSICS, Volume 2, Fourth Edition, by Wolfson.
- PHYSICS 212 SUPPLEMENTARY READING FOR 2025 (available as PDF from webpage).
- A spiral-bound, quad-ruled lab notebook.
- A scientific calculator for problem sessions and lab. A graphing calculator is *not* required.

All of these are available at the Bucknell Bookstore. The Wolfson text can also be obtained online through First Day on Moodle.

When are the mid-term tests?

In addition to the final exam and the regular weekly labs, graded homework and quizzes, there are three mid-term exams. The exams will be on Thursday **evenings**, from 7:00–9:00 PM on the following dates: **February 13**, **March 20**, and **April 17**. Put these dates in your calendar!! You must take the exam during this time!! You will not have lecture on those exams days.

NOTE: There are also graded exercises planned in your regularly-scheduled problem session on the days immediately before and after each exam.

Learning Objectives

At the end of this course, students should be able to:

1. Demonstrate an understanding of the fundamental concepts of electricity and magnetism, waves and interference, quantum mechanics, and elementary particle physics.
2. Solve basic, quantitative problems in electricity and magnetism, waves and interference, quantum mechanics, and elementary particle physics.
3. Develop an appreciation for the methods of scientific inquiry through laboratory experiences.

In PHYS 212 we are committed to creating an environment where everyone is treated with respect. An essential part of the learning process is taking risks, struggling and making mistakes — these are all normal. **Struggling and making mistakes is a good thing!!** *Everyone* struggles with the material and, in fact, the students who struggle the most are the ones who learn the most. Problem sessions and labs are interactive so that you can explore and discuss your thoughts and then confirm them or correct them in real time. These discussions with your instructors and your classmates are valuable opportunities for learning the course material.

Access Statement

Any student who may need an accommodation based on the impact of a disability should contact Professor K. Vollmayr-Lee or Professor B. Vollmayr-Lee and also contact the Office of Accessibility Resources (OAR@bucknell.edu), who will help coordinate accommodations for those students with documented disabilities. **Note that ALL students will be given 100% additional time on all three mid-term exams.**

What is on the PHYS 212 website?

The PHYS 212 website (www.bucknell.edu/phys212) is where you will take weekly drills and reading quizzes. The website also contains the course calendar (with videos of example problems), announcements, copies of handouts, homework solutions, pooled office hours, and a questions board. You will also be able to access all your scores.

What equations will be provided on the hour exams?

None, although fundamental constants and physical data will be provided. More information about the format of the exams will be forthcoming. To receive full credit for quantitative problems, you *must* be clear about the method that you are using on the problem, showing relevant sketches and indicating which equations you are using before plugging numbers into them. Any answer that starts with numbers alone will automatically result in *significant* deductions, even if the answer is correct. You should consider this as you work on assigned and hand-in problems, and develop careful and thorough problem-solving skills.

What should I do if I need help with the course material/homework?

There are numerous opportunities for you to get help in this course. Some questions can be addressed in lecture; however, in the large group setting it is often impossible to answer your questions in depth. Problem sessions are structured to allow you to ask questions and get help with the assigned problems. However, even problem sessions are not always enough; if you still have questions after problem session, go see any of the problem session instructors during their pooled office hours.

Additionally, there are help sessions run by upperclass physics students on Wednesdays and Sundays from 8–10 pm in Olin 264. Another option is to join one of the Teaching and Learning Center (TLC) study groups. This program requires a weekly commitment to meet and work in a small group with a facilitator, and many students have found this regular interaction to be useful. The TLC also offers one-on-one tutoring by appointment. See <https://www.bucknell.edu/academics/beyond-classroom/academic-centers-institutes/teaching-learning-center/students> for more information.

Above all else: Don't give up if you are having difficulties! Our job is to help you learn this material, but we need you to come see us when you need help.

Should I take notes during lecture?

Frankly, yes. Primarily because taking notes helps you concentrate on the material. Also, some of the questions on the exams will deal with demonstrations or concepts shown or discussed only in lecture.

What is expected of me outside of class?

We expect that you will spend a significant amount of time outside of class working on PHYS 212. Physics is a challenging subject that will require you to put forth consistent effort, and the course is designed so that there is something for you to do outside of class almost every day: reading to be completed *before* lectures, problems to be attempted *before* each problem session, online reading quizzes and drills, and weekly hand-in problems. On the week of an exam, you will also want to review the work you have done previously.

The Lecture Schedule, Reading Assignments, Problem Assignments, and Learning Objectives will be available throughout the semester on the calendar pages of the course website, and in pdf format in the Handouts section of the website.

Below is a detailed list of what you will need to do *outside* of class in a typical week.

- **Complete the reading assignment:** Readings should be done before each of the Tuesday/Thursday lectures. Read the text and study carefully those items listed as “Study” *before* coming to lecture. This is important because lectures are designed with the assumption that you have done the reading.
- **Study the day’s objectives:** These tell what you should get out of the reading and lectures.
- **Complete the Monday-evening reading quiz:** Complete the (open book!) online reading quiz by 8AM on Tuesday before the lecture (better yet: do it Monday evening!). You score 4 points if you get 4 or 5 questions right on the reading quiz; 3 points for 3 correct answers, 2 points for 2 correct and 1 point for 1 correct.
- **Complete the Thursday-evening drill set:** Following every Thursday lecture, complete the online Drills (due before your Friday problem session). You score 4 points if you complete the Drill set (and survey/reflection) on time.
- **Work on the Assigned Problems:** You should get as far as possible on each assigned problem *before* coming to problem session. You should try these individually and get as far as you can, but if you get stuck you can work in groups also. You can then use the problem sessions to ask questions about concepts or problems you had difficulty with and to help other students.
- **Complete the Hand-In Problems:** A full set consists of around 10 problems and must be placed in the drop-box outside Olin 260 (the 212 lab room) no later than 4:30 PM of the due date (all hand-in sets are due on Mondays). *No hand-in assignments will be accepted after this time.* Complete solutions to all the hand-in homework assignments will be posted at the course website.

Academic Integrity

It is assumed that all students in PHYS 212 will abide by the Bucknell Honor Code <https://www.bucknell.edu/academics/current-students/academic-support-responsibility/academic-responsibility>. We encourage collaboration during problem sessions, labs, and when working on homework problems, but all work that you hand in must be your own articulation of the solutions to the problems.

What's the attendance policy? Can I make up missed exams, labs, etc.?

You are required to attend all lectures, problem sessions, and labs, at their scheduled times, unless you are sick or have another excused reason for being absent (contact your instructor to discuss any absences).

We do not give make-up hour exams. If you know ahead of time that you must miss a test for a legitimate reason, and you give us appropriate notice, a resolution can be worked out. You must discuss exam conflicts in advance with Professor K. Vollmayr-Lee or Professor B. Vollmayr-Lee. For last-minute medical issues we will be guided by the Bucknell Medical Excuse Policy, which states the student “must meet significant clinical criteria as judged by a medical professional to warrant missing exams or classes.” In a nutshell, you should visit the Student Health Services right away for an evaluation, and you should also notify your problem session instructor, Professor K. Vollmayr-Lee, Professor B. Vollmayr-Lee, or the Physics & Astronomy Department office (570-577-1207). If your fitness for taking an exam is in question you should resolve the question *before* the start of the exam — completed exam scores will stand.

If you must miss your regular lab session, you must notify your lab instructor *ahead of time*, particularly if your absence is due to symptoms of an illness. If this is not possible (e.g., last-minute emergencies), you must in every case contact your lab instructor *as soon as possible*. Waiting to contact your instructor until your next lab session is too late, since if a make-up lab is permitted, it will usually occur during the same week as the lab session you missed. Missing points from incomplete labs can easily result in a lower final letter grade in the overall course.

You are expected to attend **all** of your regularly-scheduled problem sessions. Several of them have graded exercises (quizzes, pre- and post-exam exercises) and you must show up **on time** to do these exercises and receive credit for them. If you have a conflict, you **MUST** notify your problem session instructor in advance (or as soon as possible if there is an emergency).

How will I be evaluated?

Over the course of the semester, you will be able to earn up to a total of 1000 points, distributed as follows:

100 points for each of 3 mid-term tests (including some lab content)

200 points for a comprehensive final exam

150 points for the laboratory sessions.

60 points for two lab practica, given during two of the regular lab meetings

100 points for problem session grades (quizzes, pre-exam review exercises, and post-exam exercises). Note: we drop the three lowest quiz scores.

108 points for your 9 highest weekly hand-in homework assignments

80 points for online drills and reading quizzes

2 points for being enrolled in the course ☺

How do I know my letter grade?

We do not associate letter grades with individual exams or assignments; rather the final course grade is based solely on the total score earned by the end of the course. Although the exact matching of total scores with final letter grades is not pre-determined, a total of 90%, 80%, 70% or 60% will ensure at least an A–, B–, C– or D, respectively.

NOTE that nearly half of the course points are based on effort – the intention of this grading scheme is that if you show up regularly for all lectures, problem sessions and labs and if you make a solid effort on all of the work, you will likely get at least a C– in the course, even if you do poorly on the exams.