

# Physics 212: Physics for Science and Engineering II

## Section 4, Spring 2025

Instructor: Dr. Bin Xiao  
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Office: Lewis 106  
Office Hours: MWF 2:50-3:50 pm  
and by appointment

TA: Andrew Schrader (awschrad@go.olemiss.edu)

Class Time: MWF 2:00-2:50 pm @ CSTI 135  
Discussion Session: TH 5:30-6:50 pm  
Discussion Session Location: CSTI 134

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### Course Description

This is a three credit-hour, calculus-based physics course which covers electricity and magnetism, modern physics, and physical optics. This course deals with electric and magnetic interactions, which are central to the structure of matter, to chemical and biological phenomena, and to the design and operation of most modern technology.

### Course Prerequisites and Corequisites

- Prerequisite: Physics 211
- Corequisite: Physics 222 and Math 262

### Course Objectives

Students should be able to complete the textbook learning objectives given in each section. Homework, in class activities, quizzes, and tests are intended to assess whether students have achieved these objectives.

### Teaching Philosophy and Approach

Qualitative reasoning and quantitative evaluation are emphasized in this course. This is done through the SCALE-UP active learning approach; problem-solving in physics using interactive instruction, collaborative learning and computer applications. Students are required to perform group tasks and problem solving in class.

**SCALE-UP** is a Student-Centered Active Learning Environment with Upside-down Pedagogies. In this approach, students spend most of the class time doing hands-on activities, studying and solving interesting questions and problems, or creating simulations, complemented by focused mini-lectures by the instructor. Students are expected to prepare for class by doing the assigned reading in order to learn the basic material and start working with it before class. Otherwise it will be very difficult to do well on the collaborative in-class activities and problems, which are graded.

## Required Text

*University Physics* Volume 2 and 3, by OpenStax.

<https://openstax.org/details/books/university-physics-volume-2>

<https://openstax.org/details/books/university-physics-volume-3>

This is an open source textbook from OpenStax at Rice University. It is available for free online in a variety of formats, including html, pdf, Apple iBooks, and Amazon Kindle. If you prefer, you can also purchase a print version via OpenStax on Amazon.com. If you do choose to buy from Amazon, be sure to use the link on the textbook page at openstax.org to ensure that you get the official OpenStax print version.

## Other Required Items

- *Online homework and classroom activity system: Webassign.* The system can be accessed through Blackboard (blackboard.olemiss.edu). Students must purchase access to Webassign for this class.
- *Classroom response system: Top Hat.* Students must purchase access to TopHat for use in class.
- *Scientific calculator.* Any calculator with trigonometric functions, exponential functions and scientific notation.

## Expectations

### Class participation

- **Students should expect to spend about 8 hours per week reading, doing homework and preparing for class in order to do well.**
- Study the textbook regularly. Do not wait until just before the homework is due or a test is imminent. Class discussion will not cover all of the assigned material, but students will have the opportunity to ask questions about any of the assigned material.
- When reading the assigned textbook sections, complete the *Check your understanding* problems interspersed in the text.
- Identify concepts or reasoning that were not clear to you from the reading.
- Complete the WebAssign questions after reading. It will take longer to complete the WebAssign homework if the textbook reading assignments are not completed first.

### In Class

- Collaborative Work
  - You will be assigned to a group. Class activities are to be performed collaboratively by the group. Each group must designate a manager to organize the work and make certain everyone understands who is supposed to be doing what, a recorder to prepare the final solution, and one or two skeptics/checkers, to check the final solutions for correctness and to verify that everyone in the group understands all the solutions. These roles can rotate frequently. Group roles will be explained in class.
  - Members of the group must agree to a group contract that details the responsibilities of the members. Sample contracts for group members are available. If anyone is unsatisfied with the way the group is working, first discuss it with the group members. If this cannot be solved within the group, discuss this with your instructor.
  - Groups may change after each test.
  - If a group has an average of >80% on a test, then each group member will get a 5% bonus on that test.

- In every class there are group classroom activities and assignments that are graded. Students are required to participate in classroom activities to receive credit. There are no make-ups for in class assignments.
- If you miss class, it is your responsibility to find out what you missed from members of your group before the next class.

## Assessments

- Formative Quizzes (10%) Formative quizzes will be given weekly. These quizzes are intended primarily to show students where their understanding is weakest and help to focus their study topics. All quizzes are closed book (no books, notes or "cheat-sheets"), individual assignments. Calculators are allowed and a formula sheet will be provided.
- Summative Quizzes (25%) No tests will be given during the semester. Instead, more detailed, summative quizzes will be given approximately every third week to gauge students' level of understanding of the material. The summative quizzes will be longer than formative quizzes and will cover all material discussed over the approximately three week period. All quizzes are closed book (no books, notes or "cheat-sheets"), individual assignments. Calculators are allowed and a formula sheet will be provided. Summative quizzes will likely be given during the discussion session on Thursdays.
- Homework (15%) Homework sets will be assigned using the WebAssign online homework system that can be accessed through Blackboard. It is very important to start early and finish homework on time. There is a 25% penalty for each submission beyond 3. To avoid this penalty, students should work each problem carefully on paper before submitting solutions. This will also be very helpful when studying for tests.
  - As scientists and engineers normally work in groups, students are encouraged to work together on homework to teach and learn from each other. However, each student is responsible for understanding all details of a problem solution.
  - Homework help sites such as Chegg are a liability, not a resource. Depending on sites like these is a sure way to do poorly on a quiz or exam. Instead, work with group members, the TA, or the instructor. Teaching peers is a great way to solidify your understanding!
  - Students may be required to turn in written homework solutions or video descriptions for grading. This will be done through Blackboard. Students should use a good problem-solving strategy, such as the GOAL strategy outlined in additional handouts.
  - There is no penalty for extensions past the due date during the first two weeks of class.  
**After the first two weeks, there will be a 20% penalty per extension. Extensions will be for two days past the due date.**
- Pre-class assignments (10%) Pre-class assignments include reading textbook, watching mini-lecture videos, reading study guides and finishing simple questions.
- In-class activities (15%) In-class activities will include hands-on table-top activities, whiteboard activities, WebAssign problem solving and in-class games.
- Participation (5%) Students are expected to attend all classes and participate in all in-class activities. Participation points will be determined from Top Hat.  
**Every three un-excused absences will lower one letter grade for the course, according to the grading scale below.**
- Final exam (20%) The final exam is comprehensive and will include multiple question formats, including true-or-false, multiple choice, fill-in-the-blank, and free-response.  
**The final exam date is Monday, May 5th, at 4 - 7 pm**

## Grading Scale

- $92\% \leq A \leq 100\%$
- $88\% \leq A- < 92\%$
- $84\% \leq B+ < 88\%$
- $80\% \leq B < 84\%$
- $76\% \leq B- < 80\%$
- $72\% \leq C+ < 76\%$
- $68\% \leq C < 72\%$
- $64\% \leq C- < 68\%$
- $60\% \leq D < 64\%$
- $F < 60\%$

## Policies

### Academic Integrity

Every student of the University of Mississippi, by virtue of choosing to be part of the university community agrees to abide by the University of Mississippi Creed and the UM Academic Integrity Policy which covers academic integrity. Please consult the M-Book, Academic Integrity document for details on university policy and the academic creed.

Cheating is forbidden and will result in a zero grade on the assignment. If a second case of cheating occurs, this will result in an F for the entire course.

*UM Creed* The University of Mississippi is a community of learning dedicated to nurturing excellence in intellectual inquiry and personal character in an open and diverse environment. As a voluntary member of this community:

- I believe in respect for the dignity of each person
- I believe in fairness and civility
- I believe in personal and professional integrity
- I believe in academic honesty
- I believe in academic freedom
- I believe in good stewardship of our resources
- I pledge to uphold these values and encourage others to follow my example

All materials distributed electronically and in hard copy in this class are protected under intellectual copyright. Any attempt to upload these documents onto the Internet (or to distribute them by some other means) or to profit from the distribution (by Internet or other means) of these documents constitutes theft and will be in violation of intellectual property law and the UM Academic Conduct Code unless expressly permitted for by the instructor. Accessing such materials for your own use is also in violation of the UM Academic Conduct Code.

### Disability Access and Inclusion:

Disability Access and Inclusion: The University of Mississippi is committed to the creation of inclusive learning environments for all students. If there are aspects of the instruction or design of this course that result in barriers to your full inclusion and participation, or to accurate assessment of your achievement, please contact the course instructor as soon as possible. Barriers may include, but are not necessarily

limited to, timed exams and in-class assignments, difficulty with the acquisition of lecture content, inaccessible web content, and the use of non-captioned or non-transcribed video and audio files. If you are registered with SDS, you must log in to your Rebel Access portal at <https://sds.olemiss.edu/rebel-access-portal> to request approved accommodations. If you are NOT registered with SDS, you must complete the process to become registered. To begin that process, please visit our website at <https://sds.olemiss.edu/apply-for-services>. SDS will: 1. Complete a comprehensive review to determine your eligibility for accommodations, 2. If approved, disseminate to your instructors a Faculty Notification Letter, 3. Facilitate the removal of barriers, and, 4. Ensure you have equal access to the same opportunities for success that are available to all students. If you have questions, contact SDS at 662-915-7128 or [sds@olemiss.edu](mailto:sds@olemiss.edu).

#### Audio and video recording

Audio and/or video recording of class lectures is not allowed unless explicit permission is given by the instructor. Permission will only be given if the student has a Student Disability Services request. In such cases, recordings may only be used by the student to whom permission is given and all recordings must be deleted at the end of the semester. Recordings may not be distributed online or elsewhere.

## Important Dates

See the academic calendar (<http://registrar.olemiss.edu/Spring-2025>)

Test dates and topics are tentative and subject to change. The final exam date is fixed and cannot be changed.

#### **Summative Quizzes**

Summative Quiz 1: Thursday, February 20th, 5:30 - 7:00 pm

Summative Quiz 2: Thursday, March 27th, 5:30 - 7:00 pm

Summative Quiz 3: Thursday, April 24th, 5:30 - 7:00 pm

#### **Final Exam**

**Monday, May 5th, 4:00 - 7:00 pm**