

# Physics 212: Physics for Science and Engineering II

## Hybrid 6, Spring 2021

Instructor: **Dr. Gavin S. Davies** ([gsdavies@olemiss.edu](mailto:gsdavies@olemiss.edu), Phone: (662) 915-7642)

**Class hours/location:** MWF 01:00 - 01:50 pm, Brevard 238

**Office hours/location:** MWF 02:00 - 02:50 pm and by appointment, Lewis 222

**Recitation hours/location:** Th 5:30 - 6:50 pm Lewis 101

Co-instructor: Dr. Bin Xiao ([bxiao@olemiss.edu](mailto:bxiao@olemiss.edu))

TA: John Waite ([jvwaite@go.olemiss.edu](mailto:jvwaite@go.olemiss.edu))

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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.

*While the structure of the course will be as consistent as feasible, some modifications may be instituted based on the changing conditions of the global pandemic, University regulations.*

## 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. On completion of this course, students should be able to do the following:

- Apply a small set of fundamental physical principles to a wide variety of physical situations.
- Use these principles to explain a wide variety of physical phenomena.
- Use these principles to predict the behavior of a variety of physical systems.

## Teaching Philosophy and Approach

Qualitative reasoning and quantitative evaluation are emphasized in this course. This is done through using the SCALE-UP approach; problem-solving in physics using interactive instruction, collaborative learning and computer applications. Students are required to perform hands-on 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. There is very little lecturing 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. (Simple printouts sold by third parties on Amazon are not verifiable and not as high quality.) Selected chapters from the Volume 3 textbook will be used towards the end of the semester.

## Other Required Items

- *Online homework and classroom activity: WebAssign.*  
The system can be accessed through Blackboard ([blackboard.olemiss.edu](https://blackboard.olemiss.edu)). Students must purchase access to WebAssign for this class. If you're undecided about this course, you are welcome to hold off on paying and to take advantage of WebAssign's 14-day free trial.
- *Classroom response system: Top Hat*  
Students must purchase access to Top Hat 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

- In-class participation, with synchronous interactions between students, is essential to mastering the outcomes of this course. During class students are encouraged to think aloud, ask questions of each other, and respond to one another's work. These interactions cannot be successfully duplicated if you are not present in class.
- Collaborative Work
  - You will be assigned to a group. Class activities are to be performed collaboratively by the group.

- 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 will 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.
- Students must bring their computer (at least one per group), notebook, scientific calculator to every class meeting.
- If you miss class, it is your responsibility to find out what you missed from members of your group before the next class.

## Course Prerequisite and Co-requisites

- Prerequisite: Physics 211
- Co-requisite: Physics 222 and Math 262

## Grading Scale

- $92\% \leq A \leq 100\%$
- $88\% \leq A- < 92\%$
- $84\% \leq B+ < 88\%$
- $80\% \leq B < 84\%$
- $76\% \leq B- < 80\%$
- $72\% \leq C+ < 76\%$
- $68\% \leq C < 72\%$
- $64\% \leq C- < 68\%$
- $50\% \leq D < 64\%$
- $F < 50\%$

## Course Evaluation

### In-class quizzes (10%)

- In-class quizzes will be given on WebAssign. Quizzes are individual assignments.

### Tests (10% + 10% + 5%)

- Three tests weighted as indicated. The lowest scoring test will be assigned 5%. Note that tests are given in a designated testing time outside of the class time; during the Thursday evening recitation time slot.
- Tests and exams are individual, not collaborative and must be done without help from others.
- Tests are closed book (no books, notes or "cheat-sheets"). Scientific calculators (not graphical) are allowed. A sheet of formulas and constants will be provided for the tests.

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. Recall that tests and quizzes are individual assignments.
- Students may be requested to turn in written homework solutions for grading. 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%)

Reading the textbook, watching mini-lecture videos, and completing TopHat pre-class problems.

In-class activities (15%)

- Hands-on table-top activities
- Whiteboard activities
- WebAssign problem solving
- In-class games

Participation (5%)

- Students are expected to attend all classes
- Students are expected to participate in all in-class activities
- Participation points will be determined from Top Hat
- Class attendance will be verified for university purposes during the first two weeks of class
- **Every three un-excused absences will lower one letter grade in the Grading Scale**

Final exam (20%)

- The final exam is comprehensive. The format will be similar to the tests.

## Policies

Classroom Health Requirements

- Properly worn face coverings or face masks are required inside all University buildings. Face-to-face sessions will not proceed unless all present have properly worn face coverings or face masks. (Students who have a diagnosed health concern which interferes with the wearing of face coverings or face masks may contact the Student Disability Services (SDS) Office to seek a University-approved accommodation. Please contact SDS at <https://sds.olemiss.edu/> for more information.)
- Students and faculty must complete the daily symptom checker before any face-to-face class meeting.

- Quarantines are an important tool for controlling the spread of the virus. If you need to quarantine at any point this semester, you should do so, and email me as soon as possible. Additionally, if you are identified as a close contact by the University of Mississippi Contact Tracing team, you will receive a Quarantine form. In order to arrange for any class or assignment dispensation, you must provide this form to me in an appropriately timely manner. Although I will not be able to provide recordings of class sessions, we can work together to establish a plan for completing the necessary work. You will have access to your texts, our lecture videos, and our Blackboard course site. More information on quarantine protocols can be found at <https://coronavirus.olemiss.edu/>
- Students with COVID-19 should seek medical attention at the Student Health Center and contact their instructor to let them know that they are sick, quarantined, or have some other health-related absence.
- If students test positive for COVID-19 at any health care facility, they must contact the Student Health Center at 662-915-7274. (Faculty and staff should contact the Employees Health Service at 662-915-6550.) University Health Services will coordinate contact tracing to lessen the likelihood of spread.
- Upon entering the classroom, students and instructors should use provided cleaning supplies to wipe down the surfaces that they will touch during the class.

### Student Support Resources

Students are encouraged to visit the University's Keep Learning site (<https://olemiss.edu/keeplearning/>) to access information and resources related to COVID-19 support. The site provides links to University student services to facilitate and support learning.

Students with diagnosed health concerns that may affect their compliance with COVID-19 health requirements should contact UM's Student Disability Services (SDS) Office (<https://sds.olemiss.edu>) to see if they are eligible for an SDS accommodation as soon as possible.

The University Counseling Center is a professional facility offered by the University of Mississippi to assist students, faculty, and staff with many types of life stressors which interrupt day-to-day functioning, including the stressors associated with the COVID-19 pandemic. They offer individual counseling, couple's counseling, group counseling, stress management, crisis intervention, assessments and referrals, outreach programs, consultations, and substance abuse services. There is no fee for currently enrolled University students and everything you say to your counselor is confidential. You can contact the Counseling Center for information about mental health issues at <https://counseling.olemiss.edu>, [counselg@olemiss.edu](mailto:counselg@olemiss.edu), 662-915-3784, 320 Lester Hall, and <https://www.facebook.com/universitycounselingcenterolemiss/>. You can schedule an appointment or get information about appointments by calling the UCC at 662-915-3784.

### 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:

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-2021>)

**Final Exam:** The final exam date is fixed and cannot be changed.

Wednesday, April 28, Noon - 3:00 pm