Physics 212 Section 5

Instructor: Dr. Bin Xiao (bxiao@olemiss.edu)
TA: Ray Siedlecki (rdsiedle@go.olemiss.edu)
TA: Justin Ryan (jcryan2@go.olemiss.edu)
Class time/location: MWF 08:00 – 08:50 am Brevard 238

Office hours: MWF 09:55 – 10:55 am and by appointment
Email: bxiao@olemiss.edu
Phone: 6629153887

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 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.
- Model physical systems by making approximations and idealizations in order to be able to apply fundamental principles.
- Create a 3D, animated computer model of a physical situation involving electric and magnetic fields.

Teaching Philosophy & 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 **S**tudent-**C**entered **A**ctive **L**earning **E**nvironment with **U**pside-down **P**edagogies. 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

Matter and Interactions 4th edition, by Ruth W. Chabay and Bruce A. Sherwood. You may purchase or rent any of the following.

- Hardcopy full text (covers 2 semesters): ISBN 978-1118875865.
- Hardcopy Volume II: ISBN 978-1118914502
- Ebook+Webassign: Option to purchase the ebook when purchasing access to online homework system

Learning objectives are given at the beginning of each chapter in the textbook. You are responsible for accomplishing everything listed in the objectives. Tests and quizzes will examine whether you have achieved these objectives.

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. Webassign can be purchased with access to the ebook (see above).
- *Classroom response system: Top Hat*. Students must purchase access to Top Hat for use in class.
- *Vpython compiler: Glowscript*. This is an online Vpython compiler available for free at glowscript.org. Students can sign in with olemiss user id and password. Vpython will be used to model physical systems in this course.
- *Scientific calculator*. Any calculator with trigonometric functions, exponential functions and scientific notation.

Expectations

Class Preparation

- Students should expect to spend about 8 hours weekly, 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.
- Assigned readings can be found on the course calendar (handed out separately), and also in the instructions to most WebAssign assignments.
- When reading the assigned textbook sections, complete the "Checkpoints" and "Questions" 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 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 meeting 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 TopHat device, computer (at least one per group), calculator and textbook 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 Corequisites

- Prerequisite: Physics 212
- Corequisites: Physics 222 and Math 262

Grading Scale

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

Evaluation

Weekly quizzes (10%)

- Weekly quizzes will be given on Webassign. Quizzes are individual assignments.

Tests (36%)

- 3 tests equally weighted. Note that tests are given in a designated testing time outside of the class time.
- 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"). Calculators 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.
- 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 each extension. Extensions will be for two days past the due date.

In-class activities (15%)
- Hands-on table-top activities.
- Whiteboard activities.
- Webassign problem solving.
- Computer modeling with Vpython.

Participation (4%)
- 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

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.

University of Mississippi 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 or the use of non-captioned or non-transcribed video and audio files. Students must also contact Student Disability Services at 662-915-7128 so that office can 1) provide you with an Instructor Notification form, 2) facilitate the removal of barriers and 3) ensure you have equal access to the same opportunities for success that are available to all students.

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 academic calendar
(http://registrar.olemiss.edu/spring-2018/)

Tests and Final Exam

Test dates and topics are subject to change. The final exam date is fixed and cannot be changed.
Test 1: 02/22, 5:30 – 6:50 p.m.
Test 2: 03/29, 5:30 – 6:50 p.m.
Test 3: 04/26, 5:30 – 6:50 p.m.

Final Exam
Monday May 7, 8:00 am