

**PHY 4324 Electromagnetism 2**  
Spring 2019 course syllabus

Time and place:	M W F Period 7 (1:55 PM – 2:45 PM), NPB 1220
Prerequisites:	PHY 2049 or equivalent, and PHY 3323 or an equivalent
Instructor:	Yasu Takano, NPB 2356, 392-9326, takano AT phy.ufl.edu
Office hours:	M W Period 8 (3:00 PM – 3:55 PM)
Textbook:	David J. Griffiths, <i>Introduction to Electrodynamics</i> , 4th edition (Cambridge Univ. Press, 2017). To save money, you may use the 3rd edition.

### **Synopsis**

The second part of the two-semester sequence on standard undergraduate-level electromagnetism, this course covers time-dependent aspects, with a main focus on Maxwell's equations in differential form and their applications. These are subjects of Chapters 7 – 11 of Griffiths. If time allows, we will try to cover part of Chapter 12, on special relativity.

Some students find this course difficult. The difficulty does not come from the logical structure of the theory, like in thermodynamics, but from the mathematics. It is essential in this course to become fluent in vector calculus. However, mathematics should not obscure the physical reality represented by equations.

### **How to Study**

In physics, it is absolutely necessary to do problems, as you already know. The purpose of doing problems is to acquire conceptual understanding of the subject and to develop intuitive understanding of the behavior of physical systems. Accordingly, there is a correct way and wrong way of doing problems. The correct way of doing problems entails five things: (1) to expect the result before embarking on calculation, (2) to keep track of information content as you manipulate equations, (3) to examine the result for correct dimensions and symmetry, and to check whether it agrees with known results for special cases (e.g. in the limits of something going to infinity or zero), and (5) to compare the result with what you have expected and, if your expectation has turned out to be wrong, to correct a wrong intuition that has led to the wrong expectation. The incorrect way is what I call "black-box shaking"—putting equations in a box and keeping shaking it until a solution comes out.

You are expected to do all Examples in the book and all recommended problems, lists of which will be posted in e-Learning. Homework assignments and exams will assume that you have done them. Homework problems are intended to supplement recommended problems, not to replace them. Without doing recommended problems, your understanding of electromagnetism will be weak and you may not do well in the exams.

### **Grading**

Grades will be based 31% on homework and 69% on exams. There will be six homework assignments, each worth 50 points, typically containing four or five problems. The lowest of the six homework scores will be dropped. There will be three exams, two midterms and a comprehensive final, each worth 23% of the grade. The grading scheme is as follows, with the lower threshold of each letter grade given.

A	85%
A-	80%
B+	75%
B	70%

B-	65%
C+	60%
C	55%
C-	50%
D+	45%
D	40%
D-	35%
E	less than 35%

For physics majors, the lowest passing grade is C.

### **Homework**

Homework must represent your own work. Collaboration with other students who are taking this course are strongly encouraged, but the homework you turn in must not be a copy of solutions by your collaborators. Homework must be written neatly, with words and sentences provided to make your solutions understandable and the final results clearly marked as such. Points may be deducted if your solutions are hard to read or hard to understand. Points may be also taken away if your homework shows a sign of “black-box shaking”—such as circular arguments and undirected manipulation of equations—or your result lacks necessary symmetry or is dimensionally incorrect.

Homework will be collected at the beginning of class on the due date. If you are to miss the class on a due date for university sanctioned activities, documented illness under care of a doctor, or verifiable family emergency, you may scan or print your homework to a pdf file and email it to the instructor before the class begins—with a document such as a letter from a faculty advisor of your student organization, a physician, or an attorney. No other way of submitting homework is allowed, since it may get lost or misplaced. No late work is accepted, since solutions will be posted in e-Learning immediately after the class on the due date. No make-up assignment will be given for a missed homework.

### **Exams**

Exams will be closed book, with math formulae provided. You will not be allowed to bring your own formula sheets, nor a calculator (there will be no numerical questions). Exam 1 will cover Chapters 7 and 8, and Exam 2 Chapters 9 and 10. Exam 3 will be comprehensive, but roughly a half of the problems will come from Chapter 11 and possibly part of Chapter 12. The date and time of the final exam has been set by the registrar: Tuesday, April 30, 3:00 pm–5:00 pm. Midterm exams will be 8:20 pm–10:10 pm, but the dates given in the course schedule, linked to the course webpage <https://www.phys.ufl.edu/courses/4324/spring19/>, are only tentative and subject to change. For an exam missed for an excusable reason with a verifiable supporting document (see the section above on Homework), a makeup exam will be provided.

### **Course Webpage vs e-Learning**

Announcements, which will also be made in class, this syllabus and the course schedule will be posted on the course homepage, <https://www.phys.ufl.edu/courses/4324/spring19/>. Lists of recommended problems, homework problem sets, solutions, exam answer keys, and homework and exam grades will be posted in e-Learning, <https://elearning.ufl.edu/>.

To contact the instructor, please send email to takano AT phys.ufl.edu. Do not use e-Learning’s Help > Ask Your Instructor a Question. That will send a notifying email to me, then I will have to open a web browser, allow it to accept cookies, and log into e-Learning to respond—extra work which will be totally unnecessary if you just send me an email directly.

### **Additional Information**

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc/>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Contact information for the Counseling and Wellness Center: <https://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575.

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code." On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/studentconduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor.