

PHY 4324—Electromagnetism 2—Fall 2021
Course Syllabus

This course is the second semester of electricity and magnetism at the undergraduate physics level. Time enters the theory of electromagnetic fields and we arrive at Maxwell's equations—the complete classical theory of electromagnetism. The arrival happens pretty early in the term, and the bulk of our work will be to study electromagnetic waves and radiation.

Details

Course number:	PHY 4324
Class number:	18513
Credits:	3
Time & Place:	MWF 5 th period (11:45–12:35) in NPB 1002
Final exam time:	At 3:00–5:00, Wednesday, December 15 in NPB 1002
Instructor:	David Tanner
Office & phone	2372 NPB — 392-4718
Email:	tanner@phys.ufl.edu
Office hours:	Tuesdays 4:00 PM and Wednesdays 12:50 PM
Grader:	
Class web site:	http://www.phys.ufl.edu/~tanner/Phy4324.html

Course Learning Goals

At the end of the semester, you will know that electromagnetism is governed by the four Maxwell equations plus the Lorentz force law. You will be familiar with energy and momentum of the electromagnetic fields. You will understand electromagnetic waves in the vacuum and in matter and how these derive from Maxwell's equations. You will be familiar with the physics that governs optical effects in matter. You will learn about the potential and fields from time-dependent currents and from charges in motion. You will understand how electromagnetic waves are generated by antennas and by accelerating charges.

Textbook and other reading

The text is the book by Griffiths: *Introduction to Electrodynamics*, (Fourth Edition). We will attempt to cover Chapters 7–11. See the web page for a detailed schedule.

Another useful text is *Classical Electromagnetic Radiation*, Jerry B. Marion (1965) There is a revised 3rd edition by Mark A. Heald and Jerry B. Marion. This book is at the same level (more or less) as Griffiths. I'll use it occasionally for lecture material. It appears that can be downloaded as a pdf. Cheap used copies are available.

For a book about electromagnetic waves and optics, you cannot do better than the book *Optics* by Miles Klein, updated as a second edition by Klein and Thomas Furtak. Finally, reading Feynman's lectures is always valuable.

If you want to look at graduate-level texts, try *Classical Electrodynamics*, John D. Jackson (3rd edition 1999). This is the standard graduate text. Also *The Classical Theory of Fields*, Lev Landau and Evgeny Lifshitz (1951 and later; the 4th edition is revised substantially) and *Electrodynamics of Continuous Media*, Lev Landau, Evgeny Lifshitz, and L.P.

Pitaevskii (1960 and later). These books are at the high graduate level but are very readable. You need both to cover all of E&M.

Methods by which students will be evaluated and their grade determined

There will be three in-class exams (100 points each). The lowest grade on the three will be dropped and the other two will *each* make up 20% of your grade. The exam dates are 9/24, 10/27, and 11/17.

The final (3:00 to 5:00 pm Wednesday, December 15) will be worth 200 points and makes up 25%.

If all three exam scores are good, one of them can replace half of the final score.

There will be homework (35%). The lowest-scored homework set will be dropped. The homework due dates are 9/3, 9/20, 10/1, 10/18, 11/1, 11/12, 11/29, and 12/8.

Current UF grading policies may be found at: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/#gradestext>.

The Guaranteed Point Range for this Class is in the following table (The breaks may be lower but will not be higher.)

Letter Grade	Range:
A	100 % to 94 %
A-	< 94 % to 90 %
B+	< 90 % to 87 %
B	< 87 % to 84 %
B-	< 84 % to 80 %
C+	< 80 % to 77 %
C	< 77 % to 74 %
C-	< 74 % to 70 %
D+	< 70 % to 67 %
D	< 67 % to 64 %
D-	< 64 % to 61 %
F	< 61 % to 0 %

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/UGRD/academic-regulations/attendance-policies/>. Attendance will not be monitored; however, exam questions will mostly come from topics discussed in class.

Policy on Late and Make-up Work: For anyone missing *one* of the midterms due to an excused absence (illness with doctors note, organized U of F activity requiring your presence elsewhere), there will be a single makeup scheduled after classes end. Late homework is not allowed, as solutions will be posted very shortly after the homework is turned in.

Class delivery

The class will be delivered in person in room 1002 of the physics building. I'll write equations and draw diagrams on the blackboard.

Recordings of the streaming video from the fall of 2020 are available. See <https://mediasite.video.ufl.edu/Mediasite/Catalog/catalogs/phy4324-electricity-and-magnetism-ii>

for the videos and

<http://www.phys.ufl.edu/~tanner/2020skd-em.pdf>

for the schedule from fall 2020. The schedule is about the same as this fall, but it will help with synchronization. Zoom sessions from spring 2021 are at

<http://www.phys.ufl.edu/~tanner/lectures/lectures.html>

There are MP4s of the lectures and pdfs of what I wrote on the tablet.

Other information

Physics is practiced and advanced by a scientific community of individuals with diverse backgrounds and identities and is open and welcoming to everyone. The instructional team recognizes the value in diversity, equity, and inclusion in all aspects of this course. This includes, but is not limited to differences in race, ethnicity, gender identity, gender expression, sexual orientation, age, socioeconomic status, religion, and disability. Students may have opportunities to work together in this course. We expect respectful student collaborations such as attentive listening and responding to the contributions of all teammates.

Physics, like all human endeavors, is something that is learned. Our aim is to foster an atmosphere of learning that is based on inclusion, transparency and respect for all participants. We acknowledge the different needs and perspectives we bring to our common learning space and strive to provide everyone with equal access. All students meeting the course prerequisites belong here and are well positioned for success.

A wise colleague once told me “The system here at Florida is very flexible and forgiving. There are many paths to succeeding.” Please explore any and all of these paths and do not hesitate to communicate with faculty and fellow students.

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. This class supports the needs of different learners; it is important for students to share their accommodation letter with their instructor and discuss their access needs as early as possible in the semester.

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-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://sccr.dso.ufl.edu/process/student-conduct-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.

Contact information for the Counseling and Wellness Center: <https://counseling.ufl.edu/>, 392-1575. This center provides counseling and support as well as crisis and wellness services including a variety of workshops throughout the semester (e.g., Yappy Hour, Relaxation and Resilience).

The Dean of Students Office <https://dso.ufl.edu/>, 392-1261, provides a variety of services to students and families, including Field and Fork (UF’s food pantry) and New Student and Family programs.

ONE.UF (<https://one.uf.edu/>) is the home of all the student self-service applications, including access to Advising, the Bursar, 392-0181, Financial Aid, 392-1275, and the Registrar, 392-1374.