

# Syllabus: PHYS 431, *Electricity and Magnetism*

University of Tennessee, Knoxville - Fall 2021

**Lecture Time:** T-R 8:10 – 9:25 PM

**Lecture Modality:** Face-to-Face

**Lecture Location:** 304 Nielsen Physics Building

**Credit Hours:** 3

**Instructor:** Joon Sue Lee (Physics & Astronomy)

**Office:** 515 Nielsen Physics Building

**Office hour:** Immediately after every lecture or by appointment

**E-mail:** jslee@utk.edu

**Web page:** www.phys.utk.edu/jslee

**Course GTA:** TBD

## **Target Audience:**

The course is designed for senior level physics majors; however other engineering and science majors with the correct preparation are welcome.

**Prerequisites:** PHYS 136, 138, or 232

## **Expected previous knowledge**

A basic knowledge of electricity and magnetism at the level of physics freshman courses (PHY 232 or PHY 136-138) is expected. Familiarity with calculus and calculus concepts (vectors, vector, differential and integral calculus), linear algebra (matrices, determinants etc.), differential equations (ODE, PDE), and vector analysis.

## **Course Objectives:**

Gain deeper understanding of Electricity and Magnetism: Consolidate the understanding of fundamental concepts in Electricity and Magnetism more rigorously as needed for further studies in physics, engineering, and technology.

Advance skills and capability for formulating and solving problems: Expand and exercise the students' physical intuition and thinking process through the understanding of the theory and application of this knowledge to the solution of practical problems.

Increase mathematical and computational sophistication: Learn and apply advanced mathematical techniques and methods of use to physicists in solving problems. Develop some capabilities for numerical/computational methods, in order to obtain solutions to problems too difficult or impossible to solve analytically.

**Main Textbook:** Introduction to Electrodynamics by David J. Griffiths, published by Cambridge University Press, 4<sup>th</sup> edition.

### Topics Covered

Chapter 1. Vector Analysis	in week 1 & 2
Chapter 2. Electrostatics	in week 3 & 4
Chapter 3. Potentials	in week 5 & 6
----- <b>Midterm Exam 1</b> covering chapters 1-3	
Chapter 5. Magnetostatics	in week 7 & 8
Chapter 7. Electrodynamics	in week 9, 10, & 11
----- <b>Midterm Exam 2</b> covering chapters 5, 7	
Chapter 4. Electric Fields in Matter (4.1)	in week 12
Chapter 6. Magnetic Field in Matter (6.1-2)	in week 13 & 14
----- <b>Final Exam</b> covering chapters 1-7	

### Grades

Learning outcomes will be evaluated through students' performance on homework assignments, quizzes, and exams. Students are responsible for reading the material before lectures, doing homework assignments, and keeping up as we go along.

#### Grading distribution

Homework	30%
Attendance/Quiz	20%
Midterm Exam 1	15%
Midterm Exam 2	15%
Final Exam	20%

#### Grading scale

≥ 90%	A	80 – 84%	B+	65 – 69%	C+	50 – 54%	D+
85 – 89%	A-	75 – 79%	B	60 – 64%	C	45 – 49%	D
		70 – 74%	B-	55 – 59%	C-	40 – 44%	D-

\*Scaling may be applied to homework, quiz, and exam.

### Homework Assignments

Homework assignments are based on the material covered in the class. Students will learn a lot during the completion of homework assignments. Discussions with students in the course are encouraged. Please take time to demonstrate your own thoughts. Copying solutions of peer students or other available solutions and handing them in as your own is cheating, which results in "F" on the assignment. Homework assignments are due on every other Friday at 11:59 PM. Electronic copies must be submitted via Canvas. Late homework may be submitted with 20% penalty within a week after the due date. Additional 20% penalty will be cumulatively applied every week.

### Attendance/In-class Quizzes

Regularly attending class is important to be successful in this course. If you have to miss a lecture, please contact the instructor for information about what was covered and what was announced. During class, there will be in-class quizzes (polls using *Turning Point ResponseWare*) on the class materials. Every unexcused absence will lead to missing points from the in-class quizzes.

### **Canvas Quizzes**

There will be quizzes between homework assignments, given via Canvas. Access will be open from Wednesday evening to the start of Thursday class. Questions will be mostly on physical concepts discussed in classes.

### **Exams**

There will be three synchronous exams. A one-page (single-side), hand-written formula sheet will be allowed for the exams. Contact the instructor if makeup is needed.

#### Exam Dates

Midterm exams 1 & 2 – during class time

Final exam – TBD

### **Announcements**

For announcements, check the “Announcements” on Canvas regularly.

### **Policies for Students Who Are Ill or Self-Isolating**

#### COVID-19 Guidelines

With the spread of the Delta variant of COVID-19, students, faculty, and staff will be required to wear masks in classrooms, labs, and for indoor academic events required for students such as orientation. This requirement will remain in place until conditions improve and the university communicates new instructions.

The university strongly recommends that all members of the campus community be vaccinated for their own protection, to prevent disruption to the semester, and to prevent the spread of COVID-19.

Vaccination information and appointment signups are available at [tiny.utk.edu/vaccine](http://tiny.utk.edu/vaccine). The Student Health Center medical staff is available to students to answer questions or discuss concerns about vaccines, and the center provides vaccines free of charge for anyone 18 years or older who would like one.

If you think you are sick or have been exposed to COVID-19, you should contact the Student Health Center or your preferred health care provider. You can also contact the university’s COVID-19 support team for guidance by filling out the COVID-19 self-isolation form at [covidform.utk.edu](http://covidform.utk.edu).

#### Classroom Attendance Policy

You must not attend class if you have tested positive for COVID-19 and are in the isolation period, if you have COVID-19 symptoms and have not been cleared by a medical provider, or if you are an unvaccinated close contact in the quarantine period. If you need to miss class for illness, contact the instructor for your absence to be excused. You do not need to provide any personal medical information. You should begin attending class again as soon as you are cleared from the illness.

#### Make Up/Late Work

If you are feeling well enough, you should continue to attend class and turn in assignments on time. If you are too ill to complete daily tasks, we will discuss accommodations individually. It is your responsibility to reach out to the instructor once you return to class to set up a time to discuss any necessary accommodations.

**Additional information**

Please see the Campus Syllabus, which contains information that is common to all courses at UTK, such as academic integrity and addressing disability needs.

<https://teaching.utk.edu/the-syllabus/>