PHYS 5320 – Electromagnetism I

Spring 2026, MW 2:30-3:45pm, PHY 1.202

INSTRUCTOR:

- Dr. Lunjin Chen - 972-883-2891
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- office: WSTC 2.716

TEACHING ASSISTANT:

- Ali Sadain
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OFFICE HOURS:

- Dr. Chen: By appointment
- TA Ali Sadain, **4-5pm Tues, 4-5pm Thurs, SCI 2.159**

TEXT:

- "Classical Electrodynamics" third edition, by Jackson
- Other books that cover this material are:
  - "Fundamentals of Electromagnetic Phenomena", by Lorrain, Corson, and Lorrain
  - "Classical Theory of Electromagnetism", by Di Bartolo
  - "Foundations of Electromagnetic Theory", by Reitz, Milford, and Christy
  - "Introduction to Electrodynamics", by Griffiths – this is an advanced undergraduate text

GRADING:

- Exams (2) - administered at the testing center, currently scheduled as

  Exam 1 (duration of 3 hr) on March 25th 5-9pm
  Exam 2 (duration of 3 hr) on May 14th noon-4pm

Instructor	Course Information	Exam Name	Exam Start Date	Exam End Date	Exam Start/End Time	Exam Duration (Min)	Total Students	Exam Type
Lunjin Chen	PHYS 5320.001	Exam 1	3/25/2026	3/25/2026	5pm-9pm	180	16	100% PAPER
		Exam 2	5/14/2026	5/14/2026	12pm-4pm	180	16	100% PAPER

- 35% each exam; 70% two exams
  - You will be allowed **one "cheat" sheet** of 8 ½ X 11 paper with writing allowed on both sides (**equations only, NOT solutions to Lecture note/HW problems**)

— Homework = 30%

Homework will be due a week after assigned, unless otherwise noted. Penalties will ensue for late homework up to 100% after a week. You will submit your homework as a **pdf** through **Elearning**.

— Grades will be assigned a letter grade of A, B, C, D, or F

Homework Guidelines:

1. Explain all steps (This will help you to check that what you are doing is correct as much as it helps the TA figure out and explain what to you what went wrong if you have made an error.)
2. In many cases a diagram will help you to see how to do the problem and well as showing the TA what your reasoning was.
3. Use neat illustrations, diagrams, etc… and make sure they are adequately labeled and all symbols defined.
4. Put each question on a separate page.
5. Don't turn in scratch work; turn in a revised version without excessive erasing.
6. BE NEAT AND WRITE LEGIBALLY!

LECTURES:

I will place a pdf of the notes on eLearning. You can download them and print them out if you want so you can follow along with me without having to write everything down. It obviously makes it easier for you to follow.

But I will also be discussing the subject matter with additional information. If we finish the subject matter earlier, we will spend the rest of the class answering questions, having discussions, or working on homework problems.

COURSE APPROACH

Electromagnetism is a topic in physics that is mature, i.e., we are not confronting uncertainties that are current topics of research. We do not expect significant changes in important concepts (as is research in atmospheric and space sciences, climate change, astronomy, cosmology, etc…). Since the necessary and sufficient basic postulates have been established, the subject of electromagnetism can be dealt with in a deductive manner, and this is how we will approach it.

Topics to be covered (tentative):

Vector theory (notation, vector theorems, delta functions)
Vacuum electrostatic fields – spherically symmetric distributions
The field line and field tube convention – equipotential surfaces
Theory of conductors, capacitors
Vacuum potential problems; method of images
Axisymmetric potential problems
Theory of multipoles; dipole and quadrupole potentials and fields
Energy of clusters of point charges in an external field
Force between dipoles; torques on dipoles
Energy of an electrostatic field
Theory of dielectrics
Potential problems with dielectrics
Magnetic flux density B and Biot-Savart Law
Ampere's Law, magnetic dipoles, vector potential A
Magnetic materials: flux density B and magnetic field strength H

COVID-19 Guidelines and Resources

The information contained in the following link lists the University's COVID-19 resources for students and instructors of record.

Please see http://go.utdallas.edu/syllabus-policies.

Classroom Conduct Requirements Related to COVID-19

UT Dallas requires that all students must wear a face covering that covers the nose and mouth in all university buildings and classrooms. To help protect the health and safety of students, instructors, and the University community, students who choose not to wear a face covering may not attend class in person but may attend a course remotely. Anyone attending class in person without a face covering will be asked to put one on or leave. Instructors may end the class if anyone present refuses to appropriately wear a face covering for the duration of class. Students should also be sure they are at least six feet away from their fellow students and faculty, and seated in a seat that is designated to ensure that distance. Students who either refuse to wear face coverings appropriately or to adhere to other social distancing protocols may face disciplinary action for Student Code of Conduct violations. Students who are unable to comply with the university policies including wearing a face covering should consult the Comets United - Student Safety webpage for further instructions.

Students who have tested positive for COVID-19 or may have been exposed should not attend class in person and should instead follow required disclosure notifications as posted on the university's website (see "What should I do if I become sick?" webpage)

Class Attendance

The University's attendance policy requirement is that individual faculty set their course attendance requirements. Regular and punctual class attendance is expected regardless of modality. Students who fail to attend class regularly are inviting scholastic difficulty. In some courses, instructors may have special attendance requirements; these should be made known to students during the first week of classes. These attendance requirements will not be used as part of grading (see Class Participation below for grading information).

In-person participation records may be used to assist the University or local public health authorities in performing COVID-19 occurrence monitoring. Please note – in-person attendance requires consistently adhering to University requirements, including wearing a face covering and other public safety requirements related to COVID-19, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Participation

Regular class participation is expected regardless of course modality. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

NOTE: if the instructor records any part of the course, then the instructor will need to use the following syllabus statement:

The instructor may record meetings of this course. Any recordings will be available to all students registered for this class as they are intended to supplement the classroom experience. Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Materials

The instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement

an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Comet Creed
This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

Academic Support Resources

The information contained in the following link lists the University's academic support resources for all students.

Please see http://go.utdallas.edu/academic-support-resources.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.