

Electricity and Magnetism
Physics 2220
Spring 2023

Lecture Section 004, Physics Room 104, TuTh 12:30–1:50 p.m.
Recitation Section 216, Hickory Room 252, TuTh 3:00–3:50 p.m.

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Welcome to UNT and to the Physics department! As members of the UNT community, we have all made a commitment to be part of an institution that respects and values the identities of the students and employees with whom we interact. UNT does not tolerate identity-based discrimination, harassment, and retaliation. UNT’s full Non-Discrimination Policy can be found in the UNT Policies section of the syllabus.

Communication Expectations: This face-to-face lecture will be in Physics 104 for the Spring 2023 semester. All course-related material and announcements will be provided via Canvas. The best way to reach me with questions or concerns is via email at clittler@unt.edu. In most cases, you can expect to receive a response to emails within 24 hours.

Course Objectives: This course will cover electric fields, direct-current and alternating-current circuits, magnetic fields and magnetic induction, electric and magnetic properties of matter, and electromagnetic waves.

PHYS 2220 contributes to the following core course learning objectives.

- 1) **Critical thinking:** Analysis, evaluation and synthesis of information.
- 2) **Effective communication:** Development, interpretation, and expression of ideas through written, oral, and graphical means.
- 3) **Quantitative skills:** Ability to compute and manipulate quantitative data and to reach meaningful conclusions.
- 4) **Teamwork.** Able to consider different points of view and to work effectively as a team.

Textbook and online homework system: The recommended text is *University Physics*, 15th Edition, by Young and Freedman (Pearson). Other calculus-based introductory physics texts are acceptable; the successful student will have a text. You are required to obtain access to the Mastering Physics online homework system.

Options with Young/Freedman textbook that include Mastering access:

- Hardcover text with MasteringPhysics access
- 3-hole punched edition with MasteringPhysics access
- MasteringPhysics access including e-book for Young/Freedman.

Class Policies

- 1) Students are required to attend all lectures and recitations for the section in which you are enrolled.
- 2) Students are to be prepared for class (read/review assigned chapters prior to lecture).
- 3) This is a professional environment. Students are to be respectful of the instructor and other students. Please refrain from use of vulgar language or rude behavior.
- 4) Pertinent questions should be directed to the instructor.
- 5) Classes will start at the assigned time. Tardy students will not be given any additional time on exams. Silence mobile phones prior to attending class.
- 6) Students are expected to participate by answering in-class questions, and taking weekly written recitation quizzes.

Exams

- 1) There will be three 80-minute exams during the semester. The dates are indicated in the tentative lecture schedule. There will be a comprehensive final exam, to be given at 10:30 a.m. - 12:30 p.m. on Thursday, May 11th, 2023. Exam questions will be based on lecture material, material contained in the text and in the homework assignments.
- 2) There will be no makeup exams, except for medical reasons or other serious extenuating circumstances.
- 3) Questions pertaining to the grading of exam questions and problems must be directed to the instructor in writing within two days after the graded exams are returned.
- 4) If you have a scheduled course conflict with the exam times, contact your instructor at the earliest possible date.

Homework:

- 1) All homework will be posted, completed, and graded via the internet.
- 2) You must access your assignment online through Canvas, work the problems, and submit your solutions to the server by the due date indicated online.
- 3) If you have not registered yet, go to Canvas, click MyLab and Mastering, then open MyLab and Mastering. If you have already paid for an access, use the **same username and password** for the access to MyLab and Mastering through Canvas.
- 4) Homework grading policy: Your homework grade is determined from your Mastering Physics web-based homework score.

Grades: The course grades will be calculated as follows: (includes an extra credit point)

Exam 1	15%
Exam 2	15%
Exam 3	15%
Final Exam	30%
Home Work	15%
Recitation Quiz	10%

Lab Credit: You must enroll separately in Physics 2240 for laboratory science credit.

Tentative Lecture Schedule – *subject to amendment by the instructor*

Session	Date	Day	Chapter: Lecture Topic
1	17 Jan.	Tu	Ch. 21: Electric charges, fields and forces, Coulomb's Law
2	19 Jan.	Th	Ch. 21: Electric field
3	24 Jan.	Tu	Ch. 21: Electric field lines, electric dipole; Ch. 22: Electric flux
4	26 Jan.	Th	Ch. 22: Gauss's law and applications
5	31 Jan.	Tu	Ch. 22: Gauss's law and applications
6	2 Feb.	Th	Ch. 23: Electric potential energy
7	7 Feb.	Tu	Ch. 23: Electric potential, calculating electric field from potential
8	9 Feb.	Th	Ch. 23: Applications of electric potential; Ch. 24: Capacitance
9	14 Feb.	Tu	Ch. 24: Calculating capacitance, capacitor networks
10	16 Feb.	Th	Ch. 24: Energy in capacitors, capacitors with dielectrics
11	21 Feb.	Tu	Exam 1—Chs. 21-23
12	23 Feb.	Th	Ch. 25: Current, resistance, Ohm's law
13	28 Feb.	Tu	Ch. 25: Electrical power in resistors, emf
14	2 Mar.	Th	Ch. 26: Resistor networks
15	7 Mar.	Tu	Ch. 26: Kirchhoff's rules, RC circuits
16	9 Mar.	Th	Ch. 27: Magnetic fields, force, and flux
—	14 Mar.	Tu	<i>No class – Spring Break</i>
—	16 Mar.	Th	<i>No class – Spring Break</i>
17	21 Mar.	Tu	Ch. 27: Magnetic field applications, magnetic force on current, torque on a current loop
18	23 Mar.	Th	Ch. 28: Biot-Savart law, Force between current-carrying conductors,
19	28 Mar.	Tu	Exam 2—Chs. 24-26
21	30 Mar.	Th	Ch. 28: Ampere's law and applications
22	4 Apr.	Tu	Ch. 29: Faraday's law of induction
23	6 Apr.	Th	Ch. 29: Motional emf, Lenz's law, applications of Faraday's law
24	11 Apr.	Tu	Ch. 30: Inductance, RL circuits
25	13 Apr.	Th	Ch. 30: Energy in magnetic field, LC and RLC circuits
26	18 Apr.	Tu	Ch. 31: Inductors and capacitors in AC circuits, LRC series circuits
27	20 Apr.	Th	Ch. 31: Power in AC circuits, transformers
28	25 Apr.	Tu	Exam 3—Chs. 27-29
29	27 Apr.	Th	Ch. 32: Electromagnetic Waves
30	2 May	Tu	Ch. 32: Electromagnetic Waves
Final	11 May	Final Exam—Comprehensive—Thursday, 10:30 am – 12:30 pm Physics Building Room 104	

Physics 2220 Goals and Learning Strategies

The goals of instruction in Physics 2220 are to lead and to guide you to understand and master the fundamentals of elementary electromagnetism, and to develop your skills of analysis using the mathematical tools of algebra and calculus. To help in achieving these goals you are requested to pursue the following strategies:

- (1) Read the text chapter within the forty-eight hours prior to the class. You should bring your questions to class or e-mail to the instructor prior to the morning of the class.
- (2) During class, listen, observe, take notes, analyze, discuss with peers, answer questions, solve in-class problems and respond to questions asked by your instructor.
- (3) Review your textbook chapter summary and your notes within twenty-four hours after class.
- (4) Work the assigned problems only after you have read and reviewed the material of the chapter.
- (5) Respond via e-mail or during office hours at clittler@unt.edu whenever you have an observation or question.
- (6) Come to class prepared: bring a calculator, your text book, participate and take full advantage of the lecture hall learning experience.
- (7) Work extra practice problems, such as from the end-of-chapter problems in the text.

Canvas will be used to post some useful course materials and your grades. To get to this resource, go to <https://unt.instructure.com/login/ldap> and follow the UNT link to log on. (You will log on using your UNT EUID and password.) Once logged on, select this course. You will find an electronic copy of this syllabus, copies of the PowerPoint presentations from lecture, and exam expectations. **The gradebook in Canvas will not be used to determine your final course grade; it will only provide a rough estimate of your progress.**

Course Evaluation

The Student Perceptions of Teaching (SPOT) is a requirement for all organized classes at UNT. This short survey will be made available to you on-line at the end of the semester and will provide you with an opportunity to provide feedback to your course instructor. SPOT is considered to be an important part of your participation in this class. For the Fall 2022 semester you will receive an email from "UNT SPOT Course Evaluations via *IASystem* Notification" (no-reply@iasystem.org) with the survey link. Please look for the email in your UNT email inbox. Simply click on the link and complete your survey. During the long terms, the SPOT is open for students to complete two weeks prior to final exams.

Course Policies

Attendance

Students are expected to attend class meetings regularly and to abide by the attendance policy established for the course. It is important that you communicate with the professor and the instructional team prior to being absent, so you, the professor, and the instructional team can discuss and mitigate the impact of the absence on your attainment of course learning goals. Please inform the professor and instructional team if you are unable to attend class meetings because you are ill, in mindfulness of the health and safety of everyone in our community. If you are

experiencing any [symptoms of COVID-19](https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html) (<https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>) please seek medical attention from the Student Health and Wellness Center (940-565-2333 or askSHWC@unt.edu) or your health care provider PRIOR to coming to campus. UNT also requires you to contact the UNT COVID Team at COVID@unt.edu for guidance on actions to take due to symptoms, pending or positive test results, or potential exposure.

UNT Policy Statements

Academic Integrity Standards and Consequences: According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University. [Insert specific sanction or academic penalty for specific academic integrity violation].

ADA Accommodation Statement: UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specific course needs. Students may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website at disability.unt.edu.

Emergency Notification & Procedures: UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.

Sexual Assault Prevention: UNT is committed to providing a safe learning environment free of all forms of sexual misconduct, including sexual harassment sexual assault, domestic violence, dating violence, and stalking. Federal laws (Title IX and the Violence Against Women Act) and UNT policies prohibit discrimination on the basis of sex, and therefore prohibit sexual misconduct. If you or someone you know is experiencing sexual harassment, relationship violence, stalking, and/or sexual assault, there are campus resources available to provide support and assistance. UNT's Survivor Advocates can assist a student who has been impacted by violence by filing protective orders, completing crime victim's compensation applications, contacting professors for absences related to an assault, working with housing to facilitate a room change where appropriate, and connecting students to other resources available both on and off campus. The Survivor Advocates can be reached at SurvivorAdvocate@unt.edu or by calling the Dean of Students Office at 940-565- 2648. Additionally, alleged sexual misconduct can be non-confidentially reported to the Title IX Coordinator at oeo@unt.edu or at (940) 565 2759.