## **PHYS 1520.002 – General Physics with Calculus, Fall 2025**

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| Professor:  Dr. Jingbiao Cui (he/him) email:  Jingbiao.Cui@unt.edu phone: 940.565.3275 office:  Physics Bldg. Room 325  office hours:  Tuesdays 12:30 -1:30 pm, or by appt. | Bproton3_small.jpg |
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### **Course Description:**

This course covers: Electricity and Magnetism, Optics, and the structure of atoms.  The goal of the course is to involve you in the contemporary physics enterprise, by emphasizing reasoning directly from a small number of fundamental principles, integrating contemporary insights such as atomic models of matter, engaging in the full process of creating and refining physical models, and reasoning iteratively about system behavior, both on paper and through the construction and exploration of computational models.  You should have completed at least the first five Trinket assignments from PHYS 1510/1530 to prepare for this.

Pre-requisite:  PHYS 1510

Co-requisite: PHYS 1540 (lab)

### **Course Structure:**

* + Lectures are face-to-face TuTh 11: 00 AM – 12:20 PM, Physics Building Room 311
  + Recitations: Recitations meet twice a week, TuTh 2:00 - 2:50 PM, in Chil Room 245, and are a required part of the course. In recitation you will practice solving problems similar to those on homework and tests.
  + Lab (PHYS 1540) is face-to-face, and meets in Physics Room 204. It is tightly integrated with the lecture, and is required to be taken concurrently with PHYS 1520. It will focus on collecting and making sense of data in experiments based on the theory you learn in lecture, and on constructing and exploring computational models of physical systems.  You must take PHYS 1540 concurrently with PHYS 1520.  You are encouraged to bring your personal laptop or tablet to lab.
  + Homework will be found in WileyPlus, which can be accessed through Canvas. Homework will usually be due every week at 11:59 PM on Monday evening, but pay attention to the posted due dates as they may vary occasionally. Late homework will receive 70% credit.

### **Course Materials:**

You are required to obtain access to the WileyPLUS homework system.  Access includes a complete electronic version of the textbook Matter & Interactions, 5thEdition (Chabay & Sherwood, Wiley, 2025), which is required for this course.

You will need a computer with a webcam, and good internet access. You are also required to install Lockdown Browser, and use it, along with a webcam, during quizzes.

### **Physics 1520 Core Objectives:**

This course satisfies the core course requirement by fostering skills associated with four core 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 – the ability to compute and manipulate quantitative data and to reach meaningful conclusions
4. Teamwork – the ability to consider different points of view and to work effectively as a team

### **Grading:**

Your final grade will be calculated as follows:

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| Tests (all 3 test grades will be averaged) | 50% |
| Final  Exam | 25% |
| Homework | 15% |
| Class participation (class, recitation) | 5% |
| Weekly quizzes (lowest dropped) | 5% |

Final gradelines are:

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| --- | --- |
| 0-59 | F |
| 60-69 | D |
| 70-79 | C |
| 80-89 | B |
| 90 and above | A |

## **Attendance**

Attendance is required for lectures and recitations, and will count toward your final grade.   See the section on Attendance and Illness below.

## **Tests**

Test dates are noted in the Course Schedule in this document.  Tests will be given during class time, in the Testing Center in Sage Hall unless you are otherwise informed.

Please record these test dates in your calendar immediately.  There will not be makeup tests.  If you miss a test due to documented illness or to a documented university-sponsored activity, your other test scores will be averaged.

## **Quizzes**

Short weekly quizzes will be given through Canvas.  Quizzes will be available all day, usually on Fridays.  You will be required to use Lockdown Browser with a webcam.  You will be permitted two attempts at each quiz.

## **How to Succeed in this course**

1. Come to class, and pay attention. Answer the questions posed during class. Class attendance is strongly correlated with final grade in this course.
2. Don’t get behind. Every topic in this course builds on previous topics.  Don’t treat the course as a series of sprints, where you cram to pass a test.  Treat it as a marathon, where working steadily and learning material thoroughly is essential to success.
3. Do the homework. Approach it as an opportunity to learn. Homework is where you really consolidate your knowledge of physics.  Homework score is strongly correlated with final grade in this course. It is very important to keep up with homework.  When you do homework, ask yourself what you are supposed to be learning.  Use homework as a self-test:  if you can’t do the homework, re-read the assigned sections and try to identify what you don’t understand.
4. Use the quizzes to assess your understanding. If you can’t do a question on a quiz, you won’t be able to do a similar question on a test.
5. Get help right away when you need it. Physics tutoring are free help sessions in Hickory Hall 266, which is available daily. Just come and get help.

## **Tentative Course Schedule**

The following schedule is tentative and may be adjusted as appropriate or necessary based on the progress.

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| Week | Date | Topics to be covered | Reading materials (Chapter/section) |
| 1 | 08/19, 8/21 | Electric field: Intro; 3D vectors, Electric force,  Electric Field, point charge, superposition | 1.4-1.5, 3.7  13.1-13.5 |
| 2 | 08/26, 8/28 | Superposition, Dipoles, Polarization,   Charged and neutral matter, Conductors and insulators | 13.6, 14.1-14.5 |
| 3 | 09/02, 09/04 | Charging/discharging,  E of distributed charges:  thin rod, ring, disk, capacitor | 14.6-14.8,  15.1-15.5 |
| 4 | 09/09, 09/11 | E of distributed charges:  Hollow and solid spheres  Electric potential energy; Electric potential difference | 15.6-15.8  16.1-16.5 |
| 5 | **Tu 09/16**  Th 09/18 | Test 1 Ch 13-15 (Sage Hall 3rd Floor Testing Center)   Electric potential, Energy density | 16.6-16.10 |
| 6 | 09/23, 9/25 | Charge and magnetic field, current distribution | 17.1-17.7 |
| 7 | 09/30, 10/02 | Magnetic field, Magnets, electric field   and charge flow in circuits | 17.8-17.10  18.1-18.3 |
| 8 | 10/07, 10/09 | Surface charge, Resistors, Energy in circuit  Capacitance, Resistance | 18.4-18.10,  19.1-19.2 |
| 9 | Tu 10/14  **Th 10/16** | Work, power, Batteries  Test 2 Ch 16-18 (Sage Hall 3rd Floor Testing Center) | 19.3-19.5 |
| 10 | 10/21, 10/23 | RC circuit, AC circuits, complicated resistive circuits  Magnetic force | 19.6-19.11  20.1-20.3 |
| 11 | 10/28, 10/30 | Magnetic torque, Magnetic potential energy  Motors and generators, electric flux | 20.4-20.9  21.1-21.2 |
| 12 | 11/04, 11/06 | Gauss’s law and application, Ampere’s law | 21.3-21.7 |
| 13 | 11/11, 11/13 | Faraday’s law, Inductance, Lenz’s law | 22.1-22.10 |
| 14 | **Tu 11/18**  Th 11/20 | Test 3, Ch 18-20 (Sage Hall 3rd floor testing center)  Maxwell’s equations, Fields traveling, Radiation | 23.1-23.5 |
| 15 | 11/25, 11/27 | Thanksgiving Break (no classes) |  |
| 16 | Tu 12/02  Th 12/04 | 23.6-10 Reflection and refraction, Lenses and image formation  Last class: Review | 23.6-23.10 |

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## **Comprehensive Final exam:  Tuesday December 9, 10:30 AM – 12:30 PM**

(Sage Hall 3rd floor Testing Center)

### **University Policies:**

### **Attendance and Illness**

While attendance is expected as outlined above, it is important for all of us to be mindful of the health and safety of everyone in our community. Please contact me if you are unable to attend class because you are ill and other unexpected emergence. It is important that you communicate with me prior to being absent so I may make a decision about accommodating your request to be excused from class.

### **Academic Integrity Policy**

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.

### **ADA Policy**

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 websiteLinks to an external site.](https://disability.unt.edu/) (https://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 Canvas for contingency plans for covering course materials.