## **PHYS 1540 – General Physics with Calculus II Lab Fall 2025**

|  |  |
| --- | --- |
| Lecture Instructor: Dr. Jingbiao Cui (he/him) Jingbiao.Cui@unt.edu    T.A.: Andrew Aoueille (he/him), AndrewAoueille@my.unt.edu  Office hours: ??????  Link to Trinket: [https://trinket.io/courses/join/wATWGYLinks to an external site.](https://trinket.io/courses/join/wATWGY)  Sec. 501: Fri 3:00 – 4:50 PM  Sec. 502: Fri 1:00 - 2:50 PM | A diagram of a circular object with a red arrow  AI-generated content may be incorrect. |

### **Course Description**

Physics 1540 is the companion laboratory to PHYS 1520, the second semester of General Physics with Calculus.  The lab is a separate course and is separately graded, but it is tightly tied to the sequence and content of PHYS 1520.

The purpose of the laboratory is to give you experience in two areas:

* Experimental data analysis. Experiments will be related to principles discussed in lecture.  Experimental labs will focus on deciding what to measure in an experiment, and how to analyze data in order to be able to apply physical principles to determine an unknown quantity.
* Computational modeling: Computational labs focus on building computational models based on physics principles discussed in lecture, on exploring these models to observe the range of behaviors predicted by the models, and on using models to answer questions.  No previous computing experience is necessary.

### **Course Structure**

***Labs start the first week of the semester.***  Labs meet face-to-face in Physics Room 204, and attendance is required at every lab. You will work in groups so you can discuss your work and measurements with other students.  You are encouraged to bring your laptop or tablet to the labs that are done in a browser.

### **Course Materials**

You do not need a lab manual for this class.  Lab instructions will be made available through Canvas.

You are encouraged to bring your own laptop or tablet to the lab.

### **Learning Objectives**

In this lab you’ll apply what you learn in lecture in two areas:  Experimental data collection and analysis, and computational modeling.   By the end of the course you should be able to:

#### **Computational modeling: Prediction and explanation**

* Plan the organization of a computational model.
* Numerically calculate and visualize electric and magnetic fields due to multiple sources.
* Model the motion of charged particles under the influence of electric and magnetic fields.

#### **Experimental data collection and analysis: Measurement and explanation**

* Decide what must be measured in an experiment.
* Either make the measurements yourself, or direct an instructor to make the correct measurements.
* Record data in tables
* Create plots of the data, and of quantities calculated from the data (for example, position and velocity)
* Interpret the slope of a graph of experimental data or derived quantities
* Use your data to determine unknown quantities by applying fundamental physics principles

The Lab Practical Exam at the end of the semester will cover these objectives.

### **Grading**

Your final lab grade will be calculated as follows:

|  |  |  |
| --- | --- | --- |
| 65% | Work done in lab plus PreLab and Lab follow-up assignments | Complete pre-lab assignments prior to the start of lab. Participate actively and thoughtfully in lab activities, and complete in-class assignments.  Be prepared to answer questions about what you are doing and how it relates to the physics concepts discussed in lecture. |
| 15% | Lab Reports | Two lab reports are required.  In these reports you will discuss the point of the experiment, the data collected and how they were analyzed, and what conclusions you drew.  A more detailed description of requirements is published separately. |
| 20% | Lab Final Exam | The lab final is a practical test.  You will be asked to collect, analyze, and interpret data; and to read, interpret, and modify a computational model. |

### **Lab Calendar**

This lab calendar may be revised.  Most recent revision: 2025-8-16

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Dates | Prelab | Lab Activity |
| 1 | 8/18 - 8/22 | - | Electric Field Hockey: A computer game |
| 2 | 8/25 - 8/29 | Electric field | Comp: Electric field of a dipole |
| 3 | 9/1 - 9/5 | - | Expt: Charged tapes |
| 4 | 9/8 - 9/12 | Modeling extended objects | Comp: Electric field of a charged rod |
| 5 | 9/15 - 9/19 | Nested loops | Comp: Testing a hypothesis: is a video faked? (Lab Report) |
| 6 | 9/22 - 9/26 | - | Expt: Potential and Electric Field in Circuits |
| 7 | 9/29 - 10/4 | - | Expt: Magnetic field of current-carrying wires |
| 8 | 10/6 - 10/10 |  | Comp: Magnetic field of a moving charge |
| 9 | 10/13 - 10/17 | - | Expt: Energy Conservation in Circuits |
| 10 | 10/20 - 10/24 | - | Expt: Capacitors in circuits (Lab report) |
| 11 | 10/27 - 10/31 | - | Comp: Magnetic force |
| 12 | 11/3 - 11/7 | - | Comp: Cyclotron |
| 13 | 11/10 - 11/14 |  | Expt: TBD |
| 14 | 11/17 - 11/21 |  | Lab Practical Test |
|  | 11/24 - 11/28 |  | No lab - Thanksgiving Break |
| 15 | 12/1 - 12/5 |  | No lab - Pre-finals week |

## **University Policies:**

### **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. [Insert specific sanction or academic penalty for specific academic integrity violation.]

### **ADA Policy**

UNT makes reasonable academic accommodations 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.