

**Physics 212L §1–3 (Fall) and §1–6 (Spring)**  
**College Physics II Lab**  
North Dakota State University  
Fall & Spring Semesters, 1 Credit  
Tuesdays (Spring only) and Wednesdays, in SE316

**Instructor:** \_\_\_\_\_

**E-mail:** \_\_\_\_\_@ndsu.edu

**Office Hours:** \_\_\_\_\_

**Covid-19 Information**

We request that masks be worn in this lab.

Students with medical conditions or disabilities should seek an accommodation through Disability Services: 701-231-8463.

Common sense is also required. Do not come to lab if you are sick or have been exposed to individuals who have tested positive. To protect your health and the health of your fellow students, we are continuing to provide online lab materials for remote learning.

Vaccine availability, testing, and other information can be found at NDSU's Covid Info Website.

**Primary Text:** Laboratory instructions provided through LON-CAPA system.

**Secondary Text:** Giordano. *College Physics: Reasoning and Relationships*, 2<sup>nd</sup> Edition. Brooks Cole, 2013.

**Materials:** Notebook, pen.

**Laboratory Coordinator:** Paul Omernik, South Engineering 110

**E-mail:** paul.omernik@ndsu.edu

**Phone:** 231-7047

**Bulletin Description:** Second course for students without a calculus background. Includes electricity, magnetism, optics and modern physics.

**General Education Approved Course for the Science & Technology (S) Category:** This course has been approved by the NDSU Faculty Senate to meet the requirements for the Natural and Physical Sciences Learning Outcome. Students will:

- i. analyze components and dynamics of natural and physical worlds
- ii. develop models to explain phenomena within the natural and physical worlds
- iii. apply methods of scientific inquiry to enhance their understanding of the natural and physical world

**Course Objective:** This laboratory course is designed to complement Physics 212 by using hands-on experimentation to reinforce the theory and ideas developed during the lecture. By the end of the semester, students should have a good working knowledge of the concepts that were presented, be able to communicate these ideas effectively, and understand the importance of working in collaboration with their peers.

**Prerequisite:** Physics 211 & 211L.

**Class Expectations:** Students are expected to attend *all* laboratory exercises and to have read the relevant material prior to each meeting. Students are expected to treat the instructor and fellow students with respect; this includes arriving to the lab in a timely fashion to avoid disturbing the class.

Students should pair off and sit *no more than two* to a table. Obvious caveats are if there are more than 24 students in the lab, or if a piece of equipment is broken and irreplaceable on short order. If you feel the desire to sit near friends, sit at adjoining tables, but the two-student-per-table requirement still exists, and each pair of students are expected to turn in their own lab.

Students are also expected to treat all lab equipment properly. This includes, but is not limited to, experiment-specific equipment, lab computers, desks, and stools. Damaging or defacing department property in any way is *not* acceptable. Students caught being malicious to equipment will be expelled from the class.

The only personal effects students are expected to provide are a pen or pencil, and a notebook. Other personal items should be kept stowed away from the lab tables. Lab rooms are active environments: people are moving around, equipment is constantly in flux, and some labs deal with liquids.

Specifically, it is department policy that phones should be silenced and put away during your time in the lab. If your phone is damaged because it was not put away, *you* are responsible for anything that happens to it.

**Class Procedure:** Each lab period will begin with a brief discussion of theory and ideas which are relevant to the lab, as well as an overview of the lab procedure. In order for me to keep this brief, it is necessary for you to have read the lab material before class begins.

After work on the lab has begun, I will check with each group to make sure the experiment is proceeding satisfactorily. If you have any questions during the lab or are in need of clarification, please do not hesitate to ask me immediately.

**Assignments and Grading:** I will grade your assignments based on several criteria. Taken into account will be demonstration of your knowledge of the material, your ability to use the scientific method to arrive at a conclusion, and your ability to effectively communicate that conclusion. Error in your results will not affect the grade you receive, so long as you provide a reasonable explanation for the error. If you notice errors in your results during class time, please let me know and we may be able to correct the problem.

Each lab will be accompanied by a lab worksheet. These worksheets must be completed and returned one week after the associated lab period. Extenuating circumstances may allow for late homework to receive partial credit, but in general, late homework will *not* be accepted.

Your grade is calculated from the sum of your weekly worksheet scores. Each worksheet will be worth ten (10) points. The fully-completed assignment with the lowest non-zero score during the semester will be dropped. Failing to follow the lab procedure to completion is a zero, and will not count toward the dropped lab.

Your final grade in Physics 110L will be based on the following scale:

- A -  $\geq 90\%$
- B -  $\geq 80\%$
- C -  $\geq 70\%$
- D -  $\geq 60\%$
- F -  $< 60\%$ .

Failure to turn in one lab assignment will reduce your final grade by one letter. Failure to turn in two or more lab assignments will result in automatic failure of the course.

**General Education Outcomes & Student Learning Assessment:** Weekly worksheets will assess the degree of having reached our General Education Approved learning outcomes in the three categories outlined above, and reiterated here.

In reading each lab and completing each experiment, students will build on their knowledge of electrostatics, simple circuits and their components and optics. In performing these experiments and taking measurements, students will

- i. analyze components and dynamics of natural and physical worlds.

Students will perform experiments, take measurements, make calculations and generate and interpret graphical representations of data to

- ii. develop models to explain phenomena within the natural and physical worlds.

Additionally, students will build on hypotheses and collect, analyze, and interpret data relating to electrostatic charge, circuits and their components, and optics. Students will develop the tools to make further observations of the physical world and form their own questions about new phenomena, and be able to

- iii. apply methods of scientific inquiry to enhance their understanding of the natural and physical world.

**Attendance:** Attending all lab exercises is mandatory. Make-up labs will be considered only in the case of emergencies and at the discretion of the lab instructor. Unless explicitly noted, assume class is occurring as scheduled.

Lab make-ups must be attended by your teaching assistant or arranged with another teaching assistant. Make-ups cannot be done without a TA present.

Veterans and student service members with special circumstances or who are activated are encouraged to notify the instructor as soon as possible and are encouraged to provide Activation Orders.

**Feedback:** Students are invited to share any concerns they have about the course or their performance with the instructor at any time.

**Labs:** An approximate list of labs are as follows:

|        |   |
|--------|---|
| Lab 1  | Electrostatics                                      |
| Lab 2  | Gauss' Law  |
| Lab 3  | Electrical Measurement I                            |
| Lab 4  | Electrical Measurement II                           |
| Lab 5  | The Oscilloscope                                    |
| Lab 6  | RC Circuits   |
| Lab 7  | Transformers  |
| Lab 8  | RL Circuits   |
| Lab 9  | RLC Circuits  |
| Lab 10 | Reflection, Refraction, & Total Internal Reflection |
| Lab 11 | Geometrical Optics                                  |
| Lab 12 | Optical Instruments                                 |
| Lab 13 | Interference & Diffraction                          |

*Any students with disabilities or other special needs, who need special accommodations in this course, are invited to share these concerns or requests with the instructor and contact the Disability Services Office ([www.ndsu.edu/disabilityservices](http://www.ndsu.edu/disabilityservices)) as soon as possible.*

*The academic community is operated on the basis of honesty, integrity, and fair play. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at [www.ndsu.edu/academichonesty](http://www.ndsu.edu/academichonesty).*