



PHYS 272H: Electric and Magnetic Interactions - Honors, Spring 2023

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Course Information

- Course number and title: **PHYS 272H, Electric and Magnetic Interactions, Spring 2023**
- CRN: 25787
- Meeting day(s) and time: **Mon. Wed. 12:30-1:20 PM, PHYS RM 112**
- Instructional Modality: Hybrid/Hy-Flex
- Course credit hours: 4
- Prerequisites (if any): PHYS 172 "Modern Mechanics"; Co-requisite: MA 162
- Brightspace course page: <https://purdue.brightspace.com/d2l/home/712445>
- **Recitation:** There are weekly recitation sessions. Students are required to attend the recitation section assigned to them *by the Registrar*. During recitations it is up to the instructor to allocate students in groups.
- **Laboratory:** There are weekly laboratory sessions. Students are required to attend the lab section assigned to them *by the Registrar*. Students are assigned randomly to groups during the first Lab.

Instructor(s) Contact Information

- Name of the instructor(s): **Prof. Fuqiang Wang**
- Office Location: PHYS 249
- Purdue Email Address: fqwang@purdue.edu
- Best way to reach the instructor: fqwang@purdue.edu
- Office hours: by appointment via email fqwang@purdue.edu
- Recitation TA: **Alan Jeffrey Wright** (wrigh486@purdue.edu) Wednesday 3:30-4:20, 4:30-5:20, 5:30-6:20
- Lab TAs: **Alan Jeffrey Wright** (wrigh486@purdue.edu) Friday 11:30-1:20, 1:30-3:20
Shashank Kumar (kumar414@purdue.edu) Friday 3:30-5:20

- Help center TAs: Ian Bowyer (ibowyer@purdue.edu) Tuesdays noon-2

Course Description

Physics 272H is the second course of a two-semester sequence of calculus-based physics courses for engineering and science students. It deals with electric and magnetic interactions, which are central to our understanding of the structure of matter, of chemical and biological phenomena and of most modern technology. The course emphasizes the atomic structure of matter and includes material on circuits, electromagnetic waves and optics. It builds on the fundamental principles of physics learned in the prerequisite course Physics 172. Just as in that earlier course, you will find that this course uses a relatively small number of fundamental physical principles to explain a wide variety of physical phenomena.

A key concept introduced in this course is that of a vector field. It is therefore important that you are familiar with vectors. The concept of a field is a very powerful one within physics. The electric and magnetic fields that you will encounter in this course serve as a “gateway” to the more general topic of field theory (a subject that will be left to a more advanced course!).

This is a 4-credit hour course. The rule of thumb at this University is that you should spend twice as many hours (on average) studying for this course outside of class. That is, eight hours a week spent reading, doing homework, recitation and laboratory assignments and studying for the quizzes and exams would be a typical investment of time for most students in this course.

Learning Resources, Technology & Texts

- Required texts: **Matter & Interactions II – Electric and Magnetic Interactions** (4th Edition) by Ruth Chabay and Bruce Sherwood (Wiley)
- **Brightspace** learning management system (LMS): <https://purdue.brightspace.com/d2l/home/712445>
Access the course via Purdue’s Brightspace learning management system. We will use Brightspace for course management. Course information, Syllabus, Course schedule, Lecture slides, Recitation and Lab materials, etc. will be disseminated via Brightspace. Scores and grades will also be managed by Brightspace.

It is strongly suggested that you explore and become familiar not only with the site navigation but also with content and resources available for this course. Also see the Student Services widget on the campus homepage for resources such as Technology Help, Academic Help, Campus Resources, and Protect Purdue.

- **Online homework:** Brightspace -> Table of Contents -> Homework Sets
- **Clicker:** We use the iClicker audience response system. Purchase an iClicker unit if you don’t have one already.
- **Hardware requirements:**
 - A webcam (for exam proctoring)
 - You will need a scientific calculator for lecture quizzes, homework, recitations, labs, and exams.
- **Tutoring support:** One of your most valuable resources will be your fellow students. Studying and doing homework in a group setting is an excellent way to reinforce your work habits as well as to learn fresh points of view and lines of attack on problems. Also, explaining problems and concepts to others will help you clarify what you do and do not understand about the material. However, please do keep in mind that a group session doesn't mean that you split the assigned problems and just do your part, copying answers of the remaining parts from others. Remember that all assignments in this course are assigned to individuals and not to a group. Your group is there to exchange ideas and discuss how to solve problems but not for you to obtain complete solutions or answers.

In addition, you can seek help during **Help Center** hours (see information above).

Learning Outcomes

By the end of the course, you will be able to:

1. Identify physics problems
 - Methods of Evaluation: participation in class discussions
2. Demonstrate abilities to connect problems to physics concepts
 - Methods of Evaluation: lecture quizzes, participation in class discussions
3. Outline strategies to solve physics problems
 - Methods of Evaluation: homeworks, exams
4. Execute problem solving
 - Methods of Evaluation: homeworks, exams
5. Develop overall comprehension of physics of the universe
 - Methods of Evaluation: class discussions, knowledge of principles and generalizations, questioning and probing, critiques and debates, initiative of further learning and peer instructions

Assignments

Your learning will be assessed through a combination of **lecture quizzes, homework, recitations, labs, two midterm exams and a final exam** spread throughout the academic period. Details on these assignments, including a schedule of due dates, can be found on Brightspace (Table of Contents -> Course Information).

- To get an organized overview of the material and to start thinking about the material, please read the textbook before the corresponding lecture according to the **course schedule**. (Brightspace: Content -> Course Information). Bring your questions to the lecture will help you understand the content. Make written notes of anything that you don't understand and use them to ask questions after the class or during the class.
- **Lectures:** Two 50-minute lectures are scheduled each week on **Monday and Wednesday at 12:30 PM**. Lectures are not optional. You should read assigned sections of the text before coming to class and use the lecture to clarify and to reinforce your understanding.
- We will have **clicker quizzes** during every lecture except the first week and the last week. Each lecture is worth 2 points, with 1 point for attendance and 1 point for correctly answering the quiz(zes). There will be 20 or so lectures with clicker quizzes throughout the course, but the maximum points for lecture quizzes are 30.
- **Homework:** One homework set for each chapter. Deadlines are **11 PM on Thursdays** (see course schedule on Brightspace: Table of Contents -> Course Information). The start time of each HW is usually set on the next day of the previous HW due date, so be aware that you may not be able to work on all problems right away in a HW set. **LATE POLICY:** If you do not complete a homework assignment by the due date/time, you automatically get a **3-day extension**. But, you can only earn up to a maximum of **75%** of the points on the late problems. We strongly recommend for you to complete all homework problems, even if late, to help prepare for exams. You will have 5 attempts per question for each assignment.
- **Recitation sessions:** Nearly each week you will attend a 50 minute recitation session. You must attend the recitation section assigned to you *by the Registrar*. These sections are scheduled at **3:30, 4:30 and 5:30 on Wednesdays**. All take place in-person in room **PHYS 234**. Recitations are completed in class. Recitation sessions begin the **second week** of class (see course schedule).
- **Laboratory sessions:** Weekly laboratory sessions last for 1 hour 50 minutes each. Students are required to attend the lab section assigned to them *by the Registrar*. These lab sections are scheduled on **Fridays at 11:30, 1:30, and 3:30**. All take place in-person in room **PHYS 160**. Labs begin the **second week** of class (see course schedule). Any lab assignments are completed during the lab session. Students need **not** acquire any equipment on their own for the Labs! Participation in *all* Labs throughout the semester is *mandatory*. There is *no* dedicated weekly Lab session for students to make up for any labs they might miss, while also there is *no* option for "dropping" any labs during the semester. Students may attend another lab session during the week to make up for a missed lab if permission is given from the corresponding Lab instructor of that session. Exemption from attending a weekly Lab can be granted if appropriate documentation is provided for reasons such as illness, grief, etc.

- **Midterm Exams:**
 - Exam I: Tue. Feb. 21 (online)
 - Exam II: Thurs. Apr. 6 (online)
- **Final Exam:** Date/time TBD
- All exams are closed book. Formula sheets will be provided. Notes are not allowed beyond those stated by the instructor prior to each exam. Phone use is not allowed during exams. Basic scientific calculators are allowed, but calculators with communication functionalities or with powerful functionalities similar to a mini-computer are not allowed in exams.
- If you have a conflict or are sick, you must contact me as early as possible before the exam. Generally, you should not assume that a make-up exam will be given. Unexcused absences will be scored as zero.
- If you have official university permission to obtain special arrangement for an exam (such as extended time), please contact me well before the scheduled exam date so that proper arrangements can be made.

Grading Scale

Grades will be determined from points awarded in each of the following categories:

- Two evening exams worth 100 points each.
- A final exam scheduled for 2 hours during finals week, worth 200 points.
- The weekly laboratory sessions are worth a total of 104 points (total 13 sessions of 8 points each).
- The weekly recitation sessions are worth a total of 91 points (total 13 recitations of 7 points each).
- The homework sets worth total 175 points.
- The total score possible on Clicker questions will be 30 points.

Assignments	Due	Points
Lecture Quizzes	In lectures	30
Homework	Thursdays (see course schedule)	175
Recitations	Wednesdays (see course schedule)	13 sessions × 5 = 65
Labs	Fridays (see course schedule)	13 labs × 10 = 130
Midterm Exams	See course schedule	200
Final Exam	See course schedule	200
		Total: 800

A running tally of your scores will be posted on Brightspace. You should check this on a regular basis and report any questions you have about scores to your Lab and Recitation TA instructors. Any unresolved issues should be directed to the faculty instructor.

At the end of the semester, final grades will be calculated by adding the total points earned and translating those numbers (out of 800) into a letter grade. The table below lists the percentage (lower bound) corresponding to each letter grade as a general guideline. Within each letter grade range “+” and “-” designations may be assigned to approximately 1/3 of the students.

Grade	Lower Bound
A	680 (85%)
B	600 (75%)
C	520 (65%)
D	400 (50%)

You are guaranteed the above grades if you achieve the listed points, but I may lower the cut-off points based on circumstances.

Please note that if a student has an unusually skewed distribution of points from the different elements of the course, this fact may affect his/her grade. Also no constituent part of the grade can be substituted for by another part (except possibly under very special and explicit prior arrangement with the lecturer due to emergencies and extraordinary circumstances).

Drop course: I will sign any drop slip as *W* until a deadline specified by the university. Past this date, we are required to add *F* to *W* if your grade is failing at that point in the course.

Your fellow students are a valuable learning resource and studying in groups is encouraged. However, all *grades* are attributed to the *individuals*. While it is an excellent idea to study together and discuss how to attack homework problems with other students in the course, no one should be *copying* someone else's solution and/or answer. Just blindly plugging in your set of randomly generated numbers in homework into a formula someone gave you would not only be cheating but also disrupt your learning process. If a student is found to have engaged in an academically dishonest activity, he/she will be immediately reported to the Dean of Students office for disciplinary action. The student will receive a zero for that part of the course and quite possibly a grade of F for the whole course. In addition, depending on the severity of the offense, the Dean of Students may impose much harsher penalties.

Attendance Policy

This course follows the Academic Regulations: Attendance and Office of the Dean of Students: Class Absences posted in Brightspace under "University Policies and Statements." The policies state that students are expected to be present for every meeting of the classes in which they are enrolled. Attendance will be taken at the beginning of each class and lateness will be noted. When conflicts or absences can be anticipated, such as for many University-sponsored activities and religious observations, you should inform me of the situation as far in advance as possible. For unanticipated or emergency absences when advance notification is not possible, contact me as soon as possible by email or phone. For cases that fall under excused absence regulations, you or your representative should contact or go to the [Office of the Dean of Students \(ODOS\) website](#) to complete appropriate forms for instructor notification. Under academic regulations, excused absences may be granted by ODOS for cases of grief/bereavement, military service, jury duty, parenting leave, or emergent medical care. In cases related to COVID-19, please follow the [Protect Purdue Updates for the Spring 2023 Semester](#).

Course Schedule

The **Course schedule** can be found on Brightspace: Content -> Course Information -> Schedule.

The course schedule may be subject to changes during the semester. Any major changes will be announced. The course schedule linked from Brightspace is always kept up-to-date. Please check the schedule often.

Academic Integrity

Academic integrity is one of the highest values that Purdue University holds. Details are available in our course Brightspace under University Policies and Statements.

Nondiscrimination Statement

A hyperlink to Purdue's full Nondiscrimination Policy Statement is included in our course Brightspace under University Policies and Statements.

Accessibility

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.

Mental Health/Wellness Statement

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try [WellTrack](#). Sign in and find information and tools at your fingertips, available to you at any time.

If you need support and information about options and resources, please contact or see the [Office of the Dean of Students](#). Call 765-494-1747. Hours of operation are M-F, 8 am- 5 pm.

If you find yourself struggling to find a healthy balance between academics, social life, stress, etc., sign up for free one-on-one virtual or in-person sessions with a [Purdue Wellness Coach at RecWell](#). Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is free and can be done on BoilerConnect.

If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact [Counseling and Psychological Services \(CAPS\)](#) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office on the second floor of the Purdue University Student Health Center (PUSH) during business hours. The [CAPS website](#) also offers resources specific to situations such as COVID-19.

Basic Needs Security

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday.

Emergency Preparation

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.