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Physics 1351:
INTERMEDIATE ELECTRICITY AND MAGNETISM

- **Where:** 102 Thaw Hall
- **When:** 9:30-10:45 am Tuesday and Thursday
- **Textbook:** “Introduction to Electrodynamics”, D. J. Griffiths
- **Homework:** Several Problems assigned every week. The homework will be due approximately one week after problems are handed out. I will be specific as to due date at time of assignment. Late homework will be docked 10% per day. **ONLY** 3 random problems from each set will be graded.
- **Mid Terms:** There will be two 1¼ hour long mid-terms given during the semester. The mid terms will all be open book + personal equation sheet (but no other materials).
- **Final:** The final is cumulative and also open book + personal equation sheet (but no other materials).
- **Grade Breakdown:**
 - 2 Mid Term Exams = 50% (25% each)
 - Weekly Homework = 15%
 - Cumulative Final Exam = 35%
- **Office Hours:** Monday and Wednesday 1:30-2:30pm (or by appointment) via Zoom – please let me know if you plan to attend)
Zoom link: <https://pitt.zoom.us/j/97209680803>
- **Website:** Standard Courseweb site (<https://canvas.pitt.edu/courses/283072>): At this site you’ll find all class materials – homework assignments, exam dates, topic for lecture period, and anything else I think may be useful.

Course description:

This is an intermediate level course in classical electricity and magnetism. Electromagnetic theory, culminating in Maxwell’s Equations will be studied. The necessary mathematical background in vectors and vector calculus (some review, some new) will be reviewed. Coulomb’s Law, including Laplace’s and Poisson’s equations, associated boundary conditions, boundary value problems, and the behavior of electric fields in matter, including linear dielectrics will be presented. Magnetostatics includes the introduction of the magnetic field, electric current, and the Lorentz force law. The Biot-Savart law and Ampère’s Law will be used to calculate the magnetic field associated with a steady current and common current geometries. The connection between electricity and magnetism will be explored through electromagnetic induction (Faraday’s Law). It will be shown that Maxwell’s fix to Ampère’s Law leads to the complete Maxwell Equations. Along with Physics 1372 (Electrodynamics), completion of these courses will provide the

necessary preparation to successfully complete graduate core EM courses. A solid background in electricity and magnetism will also be useful no matter what type of career you pursue after your undergraduate study. The prerequisites for this course are a minimum grade of “C” in both Physics 0175 (or 0476) and Math 0240. Corequisite is Math 0290 or 1270 (differential equations)

Course Objectives:

After completion of this course the student will be able to:

- State Maxwell’s Equations, constitutive relations, boundary conditions, and a variety of other important concepts, results, and facts about classical electromagnetism in both mathematical form and conceptually.
- Apply important methods of mathematical physics to solve problems in classical electromagnetism and be able to interpret the results conceptually.

Approximate Class Schedule

(The midterm dates are FIXED):

| WEEK | TOPIC |
|-----------------------------|---|
| August 27,29 | Vector Analysis (Chapter 1) |
| September 3,5 | Electrostatics (Chapter 2) |
| September 10,12 | |
| September 17,19 | Special Techniques (Chapter 3) |
| September 24,26 | |
| October 1,3 | 1st Exam (Oct. 3) Electric Fields in Matter (Chapter 4) |
| October 8,10 | |
| October 15,17 | Magnetostatics (Chapter 5) |
| October 22,24 | |
| October 29, 31 | Magnetic Fields in Matter (Chapter 6) |
| November 5 (class remote),7 | |
| November 12,14 | 2nd Exam (Nov. 14) |
| November 19,21 | Electrodynamics (Chapter 7) |
| December 3,5,10 | |
| December 11-17 | Finals Week (Specific Day/Time TBA) |

Course Policies:

- Academic Integrity:

Students in this course will be expected to comply with University of Pittsburgh’s Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may

bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

Honor Code:

Students are expected to uphold the University's standard of conduct relating to academic honesty. Students assume full responsibility for the content and integrity of the academic work they submit. Students shall be guilty of violating the honor code if they:

1. Represent the work of others as their own
2. Use or obtain unauthorized assistance in any academic work
3. Give unauthorized assistance to other students
4. Modify, without instructor approval, an examination, paper, record, or report for the purpose of obtaining additional credit
5. Misrepresent the content of submitted work

Any student violating the honor code is subject to receive a failing grade for the course and will be reported to the Vice President of Academic Affairs.

• **Disabilities:**

If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both the instructor and Disability Resources and Services no later than the second week of the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. To notify Disability Resources and Services, call (412) 648-7890 to schedule an appointment. The Disability Resources and Services office is located at 140 William Pitt Union, and is open Monday-Friday from 8:30AM to 5:00PM.

• **Diversity and Inclusion:**

The University of Pittsburgh does not tolerate any form of discrimination, harassment, or retaliation based on disability, race, color, religion, national origin, ancestry, genetic information, marital status, familial status, sex, age, sexual orientation, veteran status or gender identity or other factors as stated in the University's Title IX policy. The University is committed to taking prompt action to end a hostile environment that interferes with the University's mission. For more information about policies, procedures, and practices, see: : <https://www.diversity.pitt.edu/civil-rights-title-ix-compliance/policies-procedures-and-practices>. I ask that everyone in the class strive to help ensure that other members of this class can learn in a supportive and respectful environment. If there are instances of the aforementioned issues, please contact the Title IX Coordinator, by calling 412-6487860, or e-mailing titleixcoordinator@pitt.edu. Reports can also be filed online: <https://www.diversity.pitt.edu/civil-rights-title-ix-compliance/make-report/report-form>. You may also choose to report this to a faculty/staff member; they are required to communicate this to the University's Office of Diversity and Inclusion. If you wish to maintain complete confidentiality, you may also contact the University Counseling Center (412-648-7930).

• **Statement on Classroom Recording**

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written(or electronic) permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

- No Use of Generative AI Permitted

Intellectual integrity is vital to an academic community and for my fair evaluation of your work. All work completed and/or submitted in this course must be your own, completed in accordance with the University's [Guidelines on Academic Integrity](#). You may not engage in unauthorized collaboration or make use of ChatGPT or any other generative AI applications at any time.