

ELECTRICITY AND MAGNETISM II**MWF 10:00-10:50 am in WIL-1116**

- Instructor:** Jiong Qiu
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Office hours: 9:00-10:00 (MF), 11-12 (W), EPS 221
- Texts:** Introduction to Electrodynamics, 3rd edition, by Griffiths D. J.
- Web:** <http://solar.physics.montana.edu/qiuj/phsx425/>
Frequently check this page for detailed course schedules, reading assignments, homework problems and other notes.
- Description:** This course will use Maxwell's equations to study time-varying electromagnetic fields, electromagnetic waves, radiations, and special relativity.
- Prerequisite:** PHSX-423 or equivalent (E&M I)
- Homework:** 1-2 problems will be given for each class, due at the next class. Solutions will be distributed after the due. Group discussions are encouraged, but you must turn in your own work.
- Exams:** There will be 6 in-class quizzes. The final exam is comprehensive and will be given at **8:00-9:50am on Monday, April 30, in WIL-1116.**
- Grading:**
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|-------------|-------------------------------|
| Quizzes: | 50% (= 10% x best 5 out of 6) |
| Final exam: | 30% (comprehensive) |
| Homework: | 20% |

Outline:

PART I: review of Maxwell's equations (Chap 2-7)

- Maxwell's equations and Ohm's law
- Boundary Conditions
- Time varying electromagnetic fields in a few configurations

PART II: electromagnetic waves (Chap 8-9)

- Wave Equations and properties of waves
- Monochromatic plane EM waves in uniform media
- Reflection and transmission in linear media
- Absorption and dispersion in conductors
- Wave guides

PART III: radiation (Chap 10-11)

- Review of electric and magnetic dipole fields
- Scalar and vector potentials
- Radiation by dipoles
- Radiation by point charges
- Radiation by continuous source

PART IV: special relativity (Chap 12)

- Lorentz transformations
- Relativistic mechanics
- Relativistic electrodynamics

Mathematical Preparation:

- Vector calculus
- Multipole expansion