

PHY 412 Advanced Electricity and Magnetism

Spring 2015

Course Syllabus

- Instructor:** Prof. Matt A. Wood, Professor and Head of Physics & Astronomy
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www.astro.tamuc.edu/wood
Office hours: MWF 1:00-2:00, or by appointment
- Lectures:** MWF Noon-12:50 PM, Science 114
- Description:** The course covers the fundamental theory of electricity and magnetism. The subjects under study include vector analysis, static electric and magnetic fields, electric scalar potential, magnetic vector potential, Maxwell's equations, electric and magnetic properties of materials, boundary value problems in electromagnetics, etc.
- Textbook:** Introduction to Electrodynamics (4th ed.), *David J. Griffiths*, Prentice Hall, 2013.
- References:** Fundamentals of Physics Extended, Halliday, Resnick, and Walker
Classical Electrodynamics (3rd ed.), *John David Jackson*, Wiley, 1998.
- Topics:**
- Chapter 1: Vector Analysis – 1 week
 - Chapter 2: Electrostatics – 3 weeks
 - Chapter 3: Special Techniques – 2 weeks
 - Chapter 4: Electric Fields in Matter – 2 weeks
 - Chapter 5: Magnetostatics – 2 weeks
 - Chapter 6: Magnetic Fields in Matter – 2 weeks
 - Chapter 7: Electrodynamics – 3 weeks
- Prerequisites:** PHYS2426 (University Physics II) & MATH 314 (Calculus III)
- Grading:** Homework: 15%; 2 midterms: 50%; final exam: 35%; class participation: up to 5%*

Percentage Range	Letter Grade
100-90	A
89-80	B
79-70	C
69-60	D
59-0	F

* Bonus points for participating in class activities.

- Homework:** Homework problems will be assigned approximately every week and will be collected a week later.

- Exams:** 2 midterms and 1 final exam (the final will be comprehensive, with emphasis on the materials covered after the 2nd midterm).
- Course Policies:**
- Attending the class is strongly recommended. Inform me if you will miss a class due to personal matters, etc. If you miss a class, try to obtain the lecture notes from other students or come to see me during the office hours for the materials being covered.
 - Class participation is an important part of this course. Active participation of class activities is highly recommended including answering questions, asking questions, participating in class discussion, etc. This is an effective means for me to know how well you understand the lecture materials.
 - Use of laptops, mobile phones, and other electronic devices except calculators is not allowed in the classroom.
- Expectation**
- This will be a challenging course requiring considerable time and effort, but in return you will learn a fundamental and exciting branch of physics – electromagnetism. You are strongly advised to keep up with the work and not to fall behind, because the new material builds on the covered material. Reading assignments will be given regularly, and you should complete reading before coming to class.
 - Learning electromagnetics involves math-intensive work. You should be familiar with different coordinate systems, vector algebra, vector integral calculus, multiple integral, etc. You are strongly encouraged to frequently consult with your calculus textbook during the semester.
- Student Learning Outcomes**
- Students completing this course will demonstrate mastery of
1. Concepts and applications of vector analysis
 2. Concepts and applications of electrostatics
 3. Concepts and applications of special mathematical techniques
 4. Concepts and applications of electric fields in matter
 5. Concepts and applications of magnetostatics
 6. Concepts and applications of electrodynamics

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures:

Classroom behavior: I require you to follow some simple good manners that will make class time much more productive for you and your fellow students.

During lecture and labs,

- Do not be disruptive or disrespectful.
- Turn off your cell phone ringer.
- Do not answer your phone in the classroom.
- Do not send or view texts, tweets, emails, photos, or any other communication.
- Do not use computers during lecture for any purpose (laptops are lousy for taking notes in physics).
- Do not use iPods, MP3 players, Pandora, or any other type of noise-making device.

Academic integrity: A major goal of this and most every university course is for you to learn and appreciate subject material. Academic dishonesty (“cheating”) actively prevents you from achieving this goal. Academic dishonesty is taken seriously by the University and by me, and will not be tolerated. (See the TAMU-C Code of Student Conduct and the TAMU-C Procedures A 13.04, 13.12, 13.31, and 13.32.)

This conduct is not only considered wrong in this course and at this University, but also in the real world. Engaging in these activities will get you fired from a job and prevent you from getting another job.

Unethical student conduct includes:

- **Plagiarism**, or copying the words of others with the intent of making it look like your own. Whether you use someone else’s phrase word for word, or whether you try and change a few words, or even if you just borrow someone else’s original idea and don’t give them credit, that’s unethical. Use your own words whenever possible, give credit to wherever you got an idea, and put direct quotes inside quotation marks.
- **Cheating** involves trying to trick me or others into thinking you did work that you really didn’t do, or into thinking you know what you really don’t know. This can include stealing exams, changing your answers on a graded exam or assignment and claiming it was graded wrongly, putting your name on someone else’s homework, and so on. Searching the Internet for homework or exam solutions is considered cheating. Borrowing a previous student’s homework, exams, or solution sets is considered cheating.
- **Collusion** is working with another person to cheat. This can include copying someone else’s answers to an exam or assignment, doing work for another student, buying or otherwise obtaining homework/exam solutions from any source online or off-line, or any other instance of multiple people engaging in some form of cheating or dishonesty. Working with other students on an assignment is fine and encouraged as long as everyone

contributes and each student does their own work.

- **Any other activity that, to a reasonable person, looks wrong.** If you have any doubt whatsoever whether a certain action is considered dishonest, please ask me *before* engaging in the activity. There is no need to be embarrassed about asking, and I won't penalize you for asking! In this class, if you follow the maxim "it's easier to beg forgiveness than to ask permission", don't expect forgiveness to be forthcoming.

If you engage in academic dishonesty during any graded activity, you will receive no credit for that activity. More than one instance of dishonesty by a student will result in automatic failure of the course and referral of the student for disciplinary action.

For further information, search the Texas A&M-Commerce website for "academic integrity policy".

University Specific Procedures:

ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

Texas A&M University-Commerce

Gee Library 132

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

StudentDisabilityServices@tamuc.edu

Student Disability Resources & Services

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See *Code of Student Conduct from Student Guide Handbook*).

Nondiscrimination Statement

A&M-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status.

Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.