

# PHY 412 Advanced Electricity and Magnetism

Spring 2025

## Course Syllabus

- Instructor:** Matt A. Wood, Regents Professor of Physics & Astronomy  
344 Sciences Bldg [Matt.Wood@tamuc.edu](mailto:Matt.Wood@tamuc.edu)  
Office hours: M-F 11:00-12:00, or by appointment, or just drop by.
- Lectures:** TR 2:00-3:15, Science 123
- 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 (4<sup>th</sup> or 5<sup>th</sup> ed.), *David J. Griffiths*, Prentice Hall, 2013.
- References:** *Physics for Scientists & Engineers*, R. D. Knight  
*Fundamentals of Physics Extended*, Halliday, Resnick, and Walker
- 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%  
Weekly Quizzes 20%  
2 midterms: 40%  
Final exam: 25%  
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.

**Quizzes:** We will have a weekly quiz (~10 min) over the material from the previous week.

**Exams:** 2 midterms and 1 final exam (the final will be comprehensive, with emphasis on the materials covered after the 2<sup>nd</sup> 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

## **TECHNOLOGY REQUIREMENTS**

### **LMS**

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

[https://documentation.brightspace.com/EN/brightspace/requirements/all/browser\\_support.htm](https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm)

Zoom Virtual Classroom Requirements:

<https://support.zoom.us/hc/en-us/articles/201362023-Zoom-system-requirements-Windows-macOS-Linux>

## **ACCESS AND NAVIGATION**

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or [helpdesk@tamuc.edu](mailto:helpdesk@tamuc.edu).

**Note:** Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

## **COMMUNICATION AND SUPPORT**

If you have any questions or are having difficulties with the course material, please contact your Instructor.

### **Technical Support**

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

<https://community.brightspace.com/support/s/contactsupport>

## ***COURSE AND UNIVERSITY PROCEDURES/POLICIES***

### **Course Specific Procedures/Policies**

#### **Syllabus Change Policy**

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

#### ***University Specific Procedures***

##### **Student Conduct**

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the [Student Guidebook](#)

<https://inside.tamuc.edu/admissions/registrar/documents/studentGuidebook.pdf>.

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: <https://www.britannica.com/topic/netiquette>

##### **TAMUC Attendance**

For more information about the attendance policy, please visit the webpages below.

[Attendance.](#)

<https://inside.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

##### **Academic Integrity**

Students at East Texas A&M University are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty, see the following procedures:

##### **Undergraduate Students Academic Integrity Policy and Form**

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

<https://inside.tamuc.edu/aboutus/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

[Undergraduate Student Academic Dishonesty Form](#)

<https://inside.tamuc.edu/aboutus/policiesProceduresStandardsStatements/rulesProcedures/documents/13.99.99.R0.03UndergraduateStudentAcademicDishonestyForm.pdf>

### **Graduate Students Academic Integrity Policy and Form**

[Graduate Student Academic Dishonesty](#)

<https://inside.tamuc.edu/aboutus/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10.pdf>

[Graduate Student Academic Dishonesty Form](#)

<http://www.tamuc.edu/academics/graduateschool/faculty/GraduateStudentAcademicDishonestyFormold.pdf>

### ***Students with Disabilities-- 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 Services  
Velma K. Waters Library- Room 162

**Phone (903) 886-5930**

Fax (903) 468-8148

Email: [StudentDisabilityServices@tamuc.edu](mailto:StudentDisabilityServices@tamuc.edu)

Website: <https://www.tamuc.edu/student-disability-services/>

### **Nondiscrimination Notice**

East Texas A&M University 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.

### ***Campus Concealed Carry Statement***

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in East Texas A&M University buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and ETAMU Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Web url:

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all ETAMU campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

### ***East Texas A&M University Supports Students' Mental Health***

#### **Counseling Center Services**

The Counseling Center at ETAMU, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit [www.tamuc.edu/counsel](http://www.tamuc.edu/counsel)