Course Overview

Our required textbook will be: *Matter & Interactions*, (Vol. 2: Electric and Magnetic Interactions, 4th Edition by R. Chabay & B. Sherwood (John Wiley & Sons 2015). A schedule of topics to be cover can be found on Canvas

An electronic version of this book is included with your WileyPlus account and covered by your lab fee. You do not need to purchase a book unless you prefer a hard-copy.

The M&I version of 2212 deals with electric and magnetic interactions, which are central to the structure of matter, to chemical and biological phenomena, and to the design and operation of most modern technology. The main goal of this course is to have you engage in a process central to science: the attempt to model a broad range of physical phenomena using a small set of powerful fundamental principles.

The specific focus is an introduction to field theory, in terms of the classical theory of electricity and magnetism. To aid in this goal you will develop computational models to visualize these fields and the interaction of charged particles. These models will be made using the Visual Python programming language (run in your browser at [www.glowscript.org](http://www.glowscript.org)). The course also emphasizes the atomic structure of matter, especially the role of electrons and protons in matter.

**Topics include:**

- Matter and the Electric & Magnetic field
  - polarization of atomic matter, an atomic model for ferromagnetism
- Electric and Magnetic fields of distributed charges and currents
  - Setting up physical integrals, numerical integration
- Electric potential and energy for fields
  - Capacitors, Inductors, Resistors, and Batteries
- Magnetic force, including Hall effect and motional emf
- Patterns of field in space (Gauss's and Ampere's laws)
- Faraday's law and non-coulomb electric field
- Electromagnetic radiation, including its production by accelerated charges and re-radiation (classical interaction of light and matter)
By the end of the course, you will be able to:

- Apply a small set of fundamental physical principles to a wide variety of situations.
- Use these principles to explain a wide variety of physical phenomena
  - Communicating scientific ideas is a big part of the laboratory.
- Use these principles to predict the behavior of a variety of physical systems.
- Model complicated physical systems by making idealizations and approximations.
- Create a 3D, animated computer model of a physical situation involving particles and fields.

Determining your Grade

Numerical ranges for final grades are as follows: 90-100 points = A, 80-89 points = B, 70-79 points = C, 60-69 points = D, 0-59 points = F. Final grades will not be curved:

- **28pts - Tests:** There are two tests, weeks listed on the course schedule
  - The tests are free response and closed book
    - A formula sheet will be provided.
  - Exams will be due by Friday with flexibility for proctor availability
  - Students are expected to arrange a proctor through professional education
    - https://pe.gatech.edu/summer-online-undergraduate-program/how-nominate-proctor
  - Please do not discuss the exam with students until a solution set has been posted to Tsquare

- **18pts - Problem Presentations:** 6 problem presentations on Fridays
  - Students will be assigned test level problems at the start of the week and asked to present a solution to their group during a one hour, online, meeting with their TA at the end of the following week.
  - TAs will grade both the solution and the quality of the presentation.
  - Presentation weeks are listed on the course schedule.

- **24pts - Final Exam:** http://www.registrar.gatech.edu/students/exams.php
• **25pts - Laboratory:** Lab begin the first week of class
  ◦ You must meet with your group and TA online each week in order to receive participation credit. Five Labs will be completed on your own and presented to the group before submitting a lab report online.
  ◦ **10pts** will be earned for successfully completing group problem solving activities
  ◦ **10pts** will be earned based on the quality of your video lab report as determined by your peers, TA, and instructors.
  ◦ **5pts** will be earned for participating in lab report presentations.
    ▪ These activities will including presenting a draft of your lab report and providing feedback to your peers on in-lab presentations.

• **5pts – Homework:** All course work is completed online at WileyPlus
  ◦ Access has already been purchased using a portion of your lab fee.
  ◦ Coursework is due every Sunday evening at 11:59pm
  ◦ You are given 10 submissions for each question part within an assignment.
    ▪ After the third submission you incur a 5% penalty for that question part
    ▪ Extension requests for an individual assignment will be handled automatically by the WileyPlus system with a 10 point (one letter grade) penalty for each extension on that assignment.
      • You are allowed two extensions on each assignment
      • You may only complete an extension within a 48 hour window of the original due date.
      • Once you request an extension, you will immediately be given 12 hours to complete the assignment.
    ◦ Correct submissions submitted more than 48 hours before the deadline earn a 40% bonus.

• **3pts - Optional Assignments** Can replace missing homework points
  ◦ These assignments can not earn you extra credit
  ◦ The can consist of additional physics problems in the form of Chapter reviews, test wrappers, reading assignments, and other assignments offered at the discretion of the instructor.
**Course Guidelines**

General guidelines for handling absences, getting help, or academic misconduct. If you are unsure about a policy please contact Dr. Greco or ask for help on Piazza.

**Excused Absences**

Students may be excused from coursework (exams or labs) if they participated in an approved Institute activity (e.g. athletics, conferences, etc...), were required to appear in court, were suffering from a serious illness that requires a doctor's visit, experienced the death of an immediate family member, or observed a religious holiday.

- Please visit Dr. Greco's office hours with documentation within one week of returning to class (or by email)
- Alternatively you can contact the Dean of Students office with documentation and they will notify all of your instructors once your absence has been excused
- If you are excused from a test, your final exam grade will replace your missing test grade at the end of the term. Experience has shown this to be more beneficial for the student than giving a makeup test. If you disagree, please speak with Dr. Greco so that we can find a resolution.

Missed homework can be handled automatically by the student. These missed assignments can be made up by completing the Optional Assignments.

**Academic Misconduct**

The policy on academic honesty as stated in the [Honor Code](#) will be fully enforced during this course for both the instructor and student. All Honor code violations will be referred to the Dean of Students office.

- Collaboration with other students in this course on: homework assignments, lab assignments, and in-class activities is permitted and encouraged.
- Collaboration is not permitted on problem presentations, tests, or the final exam
  - The work you present for your lab must be your own.
- Students are not permitted to use more than one WileyPlus account.
**How to Succeed in This Course**

The secret to succeeding in this course is to actively participate in class, one your homework, and through online discussions (i.e. Piazza). The course schedule can be found in "Files" on the left menu. There you will see the topics covered in each lecture and lab and how they align with section of your textbook. In general the course is scheduled so that an actively engaged student would:

1. Read the material that will be covered before coming to lecture
   1. Do the stop and think activities and inline exercises in the textbook
2. Watch the video lectures, taking notes and asking questions to clear up points of confusion from the reading
3. Work through the homework questions to check your understanding on your own or in a small group
4. Practice solving problems from the Optional Assignments.
   1. Work through old exams and quizzes located in our course "Files"
5. Get help early on and not just at the end of the semester
   1. Instructors and TAs are available to discuss physics related problems during office hours
   2. You can request online help from students, TAs and instructors through Piazza

Any issue related to the administration of the course should be directed Dr. Greco

**Campus Support Services and Resources**

In your time at Georgia Tech, you may find yourself in need of support. Below you will find some resources to support you both as a student and as a person.

**Academic support**

- Center for Academic Success http://success.gatech.edu
- 1-to-1 tutoring http://success.gatech.edu/1-1-tutoring
- Peer-Led Undergraduate Study (PLUS) http://success.gatech.edu/tutoring/plus
• Academic coaching  http://success.gatech.edu/coaching
• Residence Life's Learning Assistance Program  
  https://housing.gatech.edu/learning-assistance-program
• OMED: Educational Services  
  http://omed.gatech.edu/programs/academic-support
• Communication Center  http://www.communicationcenter.gatech.edu

Personal Support

• The Office of the Dean of Students  
  http://studentlife.gatech.edu/content/services  
  ○ 404-894-6367; Smithgall Student Services Building 2nd floor
• You also may request assistance at  
  https://gatech-advocate.symplicity.com/care_report
• Counseling Center:  http://counseling.gatech.edu  
  ○ 404-894-2575; Smithgall Student Services Building 2nd floor  
  ○ Services include short-term individual counseling, group counseling,  
    couples counseling, testing and assessment, referral services, and crisis 
    intervention. Their website also includes links to state and national 
    resources.  
  ○ Students in crisis may walk in during business hours or contact the 
    counselor on call after hours at 404-894-2204.
• Students’ Temporary Assistance and Resources (STAR):  
  http://studentlife.gatech.edu/content/need-help  
  ○ Can assist with interview clothing, food, and housing needs.
• Stamps Health Services:  https://health.gatech.edu  404-894-1420  
  ○ Primary care, pharmacy, women’s health, psychiatry, immunization and 
    allergy, health promotion, and nutrition
• OMED: Educational Services:  http://www.omed.gatech.edu
• Women’s Resource Center:  http://www.womenscenter.gatech.edu  
  ○ 404-385-0230
• LGBTQIA Resource Center:  http://lgbtqia.gatech.edu/  404-385-2679
• Veteran’s Resource Center:  http://veterans.gatech.edu/  404-385-2067
• Georgia Tech Police:  404-894-2500