

Electromagnetic Universe

Physics 215

Gustavus Adolphus College

Fall 2022

Instructor: Dr. Charles F. Niederriter

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Textbooks: *Physics For Scientists and Engineers*, Serway and Jewett, Tenth Edition

Required: Everything that we do in this class will be posted on Moodle. This includes: lecture notes, reading notes, homework assignments and solutions, group work assignments and solutions, exams and solutions, and your grades (usually on a 1-2 week delay). It is your responsibility to periodically check your grades on Moodle and inform me of any discrepancies.

Course Policy and Evaluation

- Objectives:** As the third class in the sequence for science and engineering students at Gustavus, this course shares several objectives with the rest of the physics program. It is hoped that when students have completed the “Universe” sequence they will have learned basic problem solving skills, computer and calculation skills, quantitative and empirical reasoning skills, and, of course, physics.
- Expectations:** Students in Electromagnetic Universe are expected to have a solid background in calculus and to be concurrently enrolled in PHY 250 or Multivariable Calculus if they have not already successfully completed it. The instructor realizes that not all topics will be discussed in the math course before they will be needed in this class and will tailor the discussions appropriately. In addition, all students are required to be concurrently enrolled in **PH216, Electromagnetic Universe Laboratory**.
- Learning Styles:** Recognizing that students learn science in a variety of ways, the instructor will take advantage of many different techniques, including collaborative learning, to maximize the overall effectiveness of this course. Although collaborative efforts will be encouraged for solving in-class problems, assigned homework, labs, and some quizzes, they are **not allowed** for most quizzes and all exams. The instructor will make it clear which quizzes are to be group efforts and which are not to be.
- Class Meetings and Reading Assignments:** The class will meet five days a week (M-F) for lecture, discussion, homework review, quizzes, and exams. Quizzes and exams are indicated on the following schedule. The student is responsible for reading the text **before** coming to class and completing the reading quiz questions in Moodle.
- Reading Quizzes:** Each day that there is a reading assignment, there will be a reading quiz administered via Moodle. The quiz must be completed by each student before coming to class, and the Moodle assignment for that day will expire 10 minutes before class begins, i.e. at 8:50 AM. Reading quizzes are subject to the Honor Code.

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6. **Homework:** Problems will be assigned on a weekly basis. Problems will be graded and returned to the student. Homework should be neat and orderly. Late homework will be accepted at the discretion of the instructor with some loss of points. Collaboration on homework assignments is expected to some degree. It is important that students realize the importance of individual effort in this area. The instructor believes that students who do their own homework will do better on exams and this should be reward enough. However, it appears to be necessary to discourage outright copying from other students or answer books in other ways as well. Thus, the following penalties will apply: First incident of copying – Credit for the problem(s) will be split between those involved (1/2 credit from answer book); Second incident – Zero credit for the problem(s); Third incident – Zero credit for the assignment.
7. **Group Problems:** Frequently in class, students will work together, in assigned groups of 3-4 members, to cooperatively solve problems. A group solution will be submitted, with all group members receiving the same grade. There will be no make-up for group problems missed due to absence. These activities will not be scheduled and may be used to test students' knowledge of old material or to introduce new material. Although collaborative efforts will be encouraged for solving in-class problems, assigned homework, labs, and some quizzes, they are **not allowed** for most quizzes and all exams. The instructor will make it clear which quizzes are to be group efforts and which are not to be.
8. **Attendance:** Regular attendance at all lectures is expected and excessive absenteeism will result in some reduction of final grade.
9. **Quizzes:** There will be ten to fifteen minute quiz almost every week that there is no exam, as scheduled below.
10. **Exams:** There will be four one-hour exams and a two-hour final exam as scheduled below.
11. **Missed Exams:** Students are expected to arrange in advance to take an exam at other than the announced time. Permission to make up a missed exam after the fact will be at the discretion of the instructor.
12. **Incompletes:** A grade of incomplete will be given only for work not completed due to circumstances beyond the control of the student.
13. **Physics Tutors:** Limited tutoring for this course will be available at times announced in the departmental tutoring schedule.
14. **Email:** You may contact me by electronic mail; **chuck@gustavus.edu**. I will respond as soon as I can to any questions that you might have.
15. **Office Hours, etc.:** My scheduled office hours are 1st and 3rd hour every day. I will make every effort to be available during these times for individual assistance and advising. I will also be available at other times by appointment. In general, if you want to stop in and you see me in the office, feel free to ask for help. If I can't help you then, I'll suggest some later time. Don't be afraid to ask for help.

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16. **Classroom and Lab Environment/Ethos:** It is expected that all members of this classroom community will treat each other in a respectful and positive manner. This expectation is independent of your role associated with this course. Respectful treatment of others associated with this class is expected whether you are a student in the class, a TA for the class, a tutor for the class, or the professor for the class. Furthermore, should any problem / issue arise, it is expected that an attempt to resolve the situation will be made directly, calmly, respectfully, and professionally by the parties involved. If this fails to resolve the issue and the problematic behavior continues, or if the initial situation is deemed to be of a more serious nature, then the professor for the course should be contacted directly. Physics can, at times, be challenging for all of us. Please do your part in helping to create a positive environment where all members of this classroom community can do their best work.
17. **Academic Honesty:** You are expected to live up to the high expectations that the college sets regarding academic honesty (see the college's honor code below). By writing your name or clicking submit on any graded assignment for this class, you are attesting to the fact that it has been completed in accord with the highest standards of academic honesty. I take this responsibility seriously and I expect that you will also. If you have any doubt about what constitutes appropriate use of someone else's work, please ask. Any student found in violation of these policies will be dealt with appropriately.

Honor Code: As a community of scholars, the faculty and students of Gustavus Adolphus College have formulated an academic honesty policy and honor code system, which is printed in the Academic Bulletin and the Gustavus Guide. As a student at Gustavus Adolphus College I agree to uphold the honor code. This means that I will abide by the academic honesty policy, and abide by decisions of the joint student/faculty Honor Board.

Honor Pledge: On my honor, I pledge that I have not given, received, or tolerated others' use of unauthorized aid in completing this work.

The instructor is bound to abide by the College's Honesty Policy and therefore must report all incidents of academic dishonesty (cheating, copying, etc.) to the Dean's Office.

18. **Requesting Accommodations:** Gustavus Adolphus College is committed to ensuring equitable and inclusive learning environments for all students. If you have a disability and anticipate or experience barriers to equal access, please speak with the accessibility resources staff about your needs. A disability may include mental health, attentional, learning, chronic health, sensory, physical, and/or short-term conditions. When appropriate, staff will guide students and professors in making accommodations to ensure equal access. Accommodations cannot be made retroactively; therefore, to maximize your academic success at Gustavus, please contact them as early as possible. Accessibility resources staff are located in the Academic Support Center (<https://gustavus.edu/asc/accessibility/>) (x7227). Accessibility Resources Coordinator, Corrie Odland (codland@gustavus.edu), can provide further information.
19. **Multilingual Student Support:** Some Gusties may have grown up speaking a language (or languages) other than English at home. If so, we refer to you as "multilingual." Your multilingual background is an incredible resource for you, and for our campus, but it can come with some challenges. You can find support through the Center for International and Cultural Education's (<https://gustavus.edu/cice/>) Multilingual and Intercultural Program

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Coordinator (MIPC), Pamela Pearson (ppearson@gustavus.edu). Pamela can meet individually for tutoring in writing, consulting about specific assignments, and helping students connect with the College's support systems. If you want help with a specific task (for example, reading word problems on an exam quickly enough or revising grammar in essays), let your professor and Pamela know as soon as possible. In addition, the Writing Center (<https://gustavus.edu/writingcenter/>) offers tutoring from peers (some of whom are themselves multilingual) who can help you do your best writing

20. **Mental Wellbeing:** The Gustavus community is committed to and cares about all students. Strained relationships, increased anxiety, alcohol or drug problems, feeling down, difficulty concentrating, and/or lack of motivation may affect a student's academic performance or reduce a student's ability to participate in daily activities. If you or someone you know expresses such mental health concerns or experiences a stressful event that can create barriers to learning, Gustavus services are available to assist you, and include online options. You can learn more about the broad range of confidential health services available on campus at <https://gustavus.edu/counseling/> and <https://gustavus.edu/deanofstudents/services/>.
21. **Title IX: Sexual Misconduct Prevention and Resources:** Gustavus Adolphus College recognizes the dignity of all individuals and promotes respect for all people. As such, we are committed to providing an environment free of all forms of discrimination including sexual and gender-based discrimination, harassment, and violence like sexual assault, domestic violence, dating violence, and stalking. If you (or someone you know) has experienced or is experiencing these types of behaviors, know that you are not alone. Resources and support are available; you can learn more online at <https://gustavus.edu/titleix/>.

Please know that if you choose to confide in me, I am required by the College to report to the Title IX Coordinator, because Gustavus and I want to be sure you are connected with all the support the College can offer. Although it is encouraged, you are not required to respond to outreach from the College if you do not want to. You may speak to someone confidentially by contacting the Sexual Assault Response Team (SART/CADA), Chaplains, Counseling Center, or Health Service staff; conversations with these individuals can be kept strictly confidential. SART/CADA can be reached 24 hours a day at 507-933-6868. You can also make a report yourself, including an anonymous report, through the form at <https://gustavus.edu/titleix/>.

22. **COVID:** Faculty will follow the most up-to-date [COVID policy of the college](#) with regard to masking, social distance, food and beverage in the classroom, and sanitizing of technology and spaces. Individual faculty members may request additional COVID precautions at their discretion in their formal academic instructional spaces. The college strongly recommends surgical or N95 or KN95 masks. Students and faculty are not required to report to the College if they test positive for COVID-19; informing close contacts and isolation is self-managed. Information on managing a COVID exposure or a positive case can be found online at <https://gustavus.edu/covid/> or by emailing g-covidresponse@gustavus.edu.

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23. Evaluation:

Hour Exams	40%	A	94 - 100	C+	74 - 78
Final Exam	15%	A-	90 - 94	C	70 - 74
Homework	20%	B+	86 - 90	C-	66 - 70
Quizzes	15%	B	82 - 86	D+	62 - 66
Group Problems & Participation	10%	B-	78 - 82	D	58 - 62
		F	< 58		

Assignment of final letter grades will also take into account the instructor's subjective evaluation of the student's attendance, initiative, class participation, preparation (particularly quantity and quality of homework), and evidence of improvement.

24. Course Schedule

<u>Week Beginning</u>	<u>Chapter</u>	<u>Title</u>	<u>Reading Assignment</u>
September 5	Chapter 22	Electric Fields	Chapters 22

September 9 ****** Quiz 1 on Chapters 22 *****

September 12 Chapters 22 & 23 Gauss's Law Chapter 23

September 14 ****** Quiz 2 on Chapters 23 *****

September 19 Chapters 23 & 24 Electric Potential Chapter 24

September 21 ***** Quiz 3 on Chapters 24 *****

September 26 Chapter 24 & 25 Capacitance and Dielectrics Chapter 25

September 28 & 29 ******* Nobel Conference - No Classes *******

September 30 ****** Exam 1 on Chapters 22-24 *****

October 3 Chapter 25 Capacitance and Dielectrics Chapter 26

October 7 ****** Quiz 4 on Chapter 25 *****

October 10 Chapters 26 Current and Resistance . Chapter 27

October 14 ****** Quiz 5 on Chapter 26 *****

Course Schedule (Continued)

<u>Week Beginning</u>	<u>Chapter</u>	<u>Title</u>	<u>Reading Assignment</u>
October 17	Chapter 26 & 27	Direct Current Circuits	Chapter 28

October 21 ****** Exam 2 on Chapters 25-27 *****

October 22 - 25 ******* Reading Days (Fall Break) *******

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October 24	Chapter 28	Magnetic Fields	Chapter 29
October 31	Chapter 28 & 29	Sources of Magnetic Fields	Chapter 30
November 3	*** Quiz 6 on Chapters 28 ***		
November 7	Chapter 29 & 30	Faraday's Law	Chapter 31
November 11	*** Quiz 7 on Chapters 29 ***		
November 14	Chapter 30 & 31	Inductance	Chapter 32
November 18	**** Exam 3 on Chapters 28-30 ***		
November 21	Chapter 31 & 32	Alternating Current Circuits	Chapter 32
Nov. 23 - 27	***** Thanksgiving Break *****		
November 28	Chapter 32	Alternating Current Circuits	Chapter 33
November 30	*** Quiz 8 on Chapter 32 ***		
December 5	Chapter 33	Electromagnetic Waves	Review
December 9	**** Quiz 7 on Chapter 33 ***		
December 12	Chapter 33 & Review		
December 13	*** Exam 4 on Chapters 31 - 33 ***		
December 19, 8-10 am	*** Final Exam - Comprehensive ***		