OFFICIAL SYLLABUS WILL BE PROVIDED IN THE COURSE

EAST TENNESSEE STATE UNIVERSITY

College of Arts and Sciences

Department of Physics and Astronomy

PHYS 3710 ELECTRICITY & MAGNETISM SPRING 2020

Instructor: Dr. Gary Henson Office: S272 Phone: 439-6906 hensong@etsu.edu
Office Hours: 10:30-12:00 WF, 1:40-2:40 MWF, 11:15-12:30 TTh or by Appointment

Text : "Introduction to Electrodynamics", 4th ed. By Griffiths (earlier editions are OK)
I encourage you to also use other E&M texts you can find in the ETSU library or Room 260 library, web-based resources, and each other for reference. Although the subject matter of this course is now 150 years old, it remains difficult to comprehend. You will likely benefit from exposure to explanations from various sources.

Course Description: This course is an introduction to advanced methods in the investigation of Electricity and Magnetism. It is intended to cover mainly the areas of electrostatics and magnetostatics, i.e., stationary charges and magnetic fields and their properties in vacuum and in media. The mathematics involves extensive use of vector calculus from one to three dimensions so the course begins with a review of these tools and a general treatment of mathematical methods for solving E&M problems. We will then investigate the nature of the electric field and electric potential; tackle the more complex geometries for electric fields with boundary value problems; and explore electric fields in matter. The course will finish with a study of a by-product of moving charges, the creation of magnetic fields and their structure in the area of magnetostatics. { The above material can be found in the first 6 chapters of Griffiths text. }
If time or student interest allows, there may be a brief introduction to the area of electrodynamics and the time dependent Maxwell equations which is presented in Ch 7 of Griffith.

NOTE: This course has been designated as Writing Intensive for majors (see below).

Honors Requirement*: A special term project (experiment, program, research paper, etc.) must be completed and will be added to the homework percentage for grading purposes. A few additional homework problems will also be assigned or more problems will be graded on each set.*

NOTE: Physics 3710 is a **writing intensive course** to fulfill department standards for writing proficiency in the major. As such, all homework problems, even those which are predominantly numerical in nature, are to be worked out and submitted with narrative comments. I expect to be able to read through a well described and organized solution to each homework problem. Some examples of the writing form to use for numerical problems are posted on the course D2L pages. Short essay type homework problems should obviously be written with formal rules of grammar.

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The emphasis will be on the quality and content of your writing as it pertains to the concepts of physics that it addresses. However, the use of proper grammar, spelling, etc. will be expected in all writing tasks. Your course grade will, of course, be determined mainly by your mastery of the subject material BUT poorly written work will lower your grade. I will continually remind you of this, so please start out with good form and you'll find it easier to maintain. ALSO, you'll understand the work you've done much better if you explain it well as you go along. The same level of writing will be expected for exams as it is for homework problems.

Homework Sets: Physics at this level is best learned by working through problems, lots of problems! I may assign more problems than I will be able to efficiently grade. In such a case, I will randomly pick a subset of problems to grade in detail, but will check all assigned problems for completeness. Your homework grade will be based on both the graded problems and a score for problems attempted. Homework will be assigned approximately once a week. I will post the assignments with due dates on D2L. Because of the need to discuss and understand the correct solutions as we move on to new material, LATE HOMEWORK WILL NOT BE ACCEPTED. I will post solution outlines on D2L for all homework immediately after the due date.

Exams: All exams will be closed book, in class exams given on Tues or Thurs (our longest meeting times). Although I will write them with expectations that you complete the exams within 80 minutes, I will extend the time before and/or after our typical class time to give you an extra 20 minutes or so if desired. Also, I will supply any necessary constants and relations *unless you are specifically responsible for them for an exam.* I will also have integral tables available, but only simple integral forms will be present on exams. The exams will consist of a mixture of problem types from numerical solutions to essay or short answer, perhaps even something like multiple choice questions. The exam questions will relate to the assigned homework so you should make every effort to work on all homework problems. I will supply a brief outline of topics and some old exam questions to help you study for each exam. Detailed solutions of complex integrals, derivatives, etc. will not be a part of the exams. Exams will instead focus on simple geometries with straightforward numerical solutions or simply the proper setup of a more complex problem in addition to questions on key concepts, methodology, and terms. The final exam will not be strictly comprehensive, but will emphasize methods and concepts that are essentially used in all chapters. Part of the final exam will consist of new material from the last few lectures (most likely from CH 6). Calculators of any type are allowed for all exams.

Course Grades: Final Grades will be determined based on the following percentages:

Homework ---------- 40%
3 semester Exams ----- 45%
Final Exam---------- 15%

The final letter grades will be based on the following scale:

A = 90% or better	**B-** = 73-75.9%	**D+** = 56-58.9%
A- = 88-89.9%	**C+** = 70-72.9%	**D** = 50-55.9%
B+ = 86-87.9%	**C** = 62-69.9%	**F** = Less than 50%
B = 76-85.9%	**C-** = 59-61.9%	

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Approximate Time Frame for Material

I will give more explicit details in class as we progress. The schedule may be adjusted if we need more time to cover mathematical methods or difficult sections in the material as necessary for success in the course. Alternately, we may can go at a faster pace and get all the way through CH 7. CHECK D2L REGULARLY for homework postings which I will also announce in class. Typically, I will post new homework assignments before the due date of the previous assignment and encourage you to start work early.

Chapter 1 -- (2 weeks)
Chapter 2 -- (2 weeks)
First Exam (~ mid February)

Chapter 3 -- (2 to 3 weeks)
Second Exam (just before or after Spring Break)

Chapter 4 – (1 to 2 weeks)
Chapter 5 – (2 weeks)
Third Exam (~ mid April)

Chapter 6 -- what's left and maybe brief Electrodynamics lecture with Chapter 7
(1 to 2 weeks)
One day of lecture during the last week of classes will be used primarily for presentations made by students in the honors section (if enrolled) and also for final exam review.

Final Exam -- Will typically use the T-Th exam schedule but can adjust that to allow you more time to take the exam if needed.