Physics 350: Electricity and Magnetism I
Spring 2008

Meeting: Trexler 271
Instructor: Matthew C. Fleenor
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web space: http://faculty.roanoke.edu/fleenor/

Time: MWF 10.50 – 11.50
Office: Trexler 270B
Office Hours: T 9.30–10.30
MWF 3–4


Required Prerequisites: Physics 202

Aspiration: Electrodynamics is an introductory framework for understanding and appreciating the world of “field theory”. Because the E and B are adequately and sufficiently explained via the concept of a vector “field”, they present themselves as the primary place of introduction to this branch of physics. The application of field theory spans all of physics, from the most classical (fluid mechanics) to the most ethereal (string theory). Specifically, electrodynamics serves as the backbone for the following branches of physics: astrophysics, biophysics, cosmology, electrical engineering, the whole spectrum of materials science, and particle physics. Therefore, a thorough understanding of the course will serve you well whatever your endeavors.

The trick for most of us can be filed under the following clique: Don’t miss the beauty of the forest for the overwhelming (and intimidating) trees. The “trees” of vector calculus, differential equations, and Green functions are towering oaks not to be taken lightly or without a complete resolve to focused energy and thought. However with this sort of effort, you will walk away with a clear vision of one of the most ubiquitous and all-pervasive concepts – the electromagnetic field. Let’s don’t miss the vision of the physical beauty for the mathematical minutia.

Attendance: Although roll will not be taken (there are only five of us), daily attendance is expected. Due to the mathematically rigorous nature of the course, you may not miss more than four classes without a legal excuse (court, hospital, police, etc.). Late arrivals greater than 10 minutes will constitute an official absence.

Office Hours: Besides the normal class hours, my office door is open to each student (at least) five more hours each week. If you are unable to meet with me during these times and still desire some help, please make an appointment with me. Drop-ins (aka. ‘academic drive-bys’) are at the total mercy of my daily schedule, for which I have the freedom to say, “I’m too busy.”

Blackboard (Bb): The information found within the Bb environment is an essential component to the course itself. Notes, announcements, assignments (and solutions), links, and course documents will all be placed within the Bb pages for the course. Please do NOT forget to check the Bb before you come to class or if you have a question about previous assignments.

Academic Integrity: I want to foster a mutual respect for the classroom hours that we have together. In light of this, please remember to turn off cell phones, PDAs, etc. during the class (including laptops) and come prepared (e.g., book, paper, and pencil). Furthermore, academic integrity seeks to honor the
money, time, and effort others have spent to bring you and me to the College. Yes, I know, it sounds like a guilt trip, but it really makes sense if we let it. Plagiarism exists when someone takes personal credit for another's creative (usually written) work and will not be tolerated. Please refer to the "Integrity" page and links on Bb, which includes how violations of the College's academic integrity policy are handled.


Grading Rubric: Your grade is determined according to the following distribution:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Exams (3)</td>
<td>30%</td>
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<tr>
<td>Final</td>
<td>20%</td>
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<tr>
<td>Quiz (weekly)</td>
<td>15%</td>
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<tr>
<td>Problem Sets</td>
<td>30%</td>
</tr>
<tr>
<td>History/Bio</td>
<td>5%</td>
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Exams: All exams are designed for completion within the class hour. However, I will arrive on test days ASAP to administer the test. Furthermore, you may include the 5–10 minutes after the class hour is complete. Exam 3 will be given on the day of the final, and so, you will have two different exams during that period. Make-up exams will only be allowed as a result of a discussion with me beforehand or a note related to the emergency (death, hospitalization, misdemeanor, etc.) signed by a governing official (medical doctor, parent, law enforcer, etc.).

Problem Sets: Un-/assigned problems (like those in the problem sets) are "when and where" you will learn the course material. For better and for worse, there is no way to learn the depth of E&M within the one-hour sessions that we will have together. Due to the nature of problem solving, I expect that you will work together toward a solution. However, I also expect that you will create an original solution to each assigned problem. Substitutions and simplifications should NOT be left to the "reader" (that’s me) to figure out. If necessary, words and phrases need to be properly placed so that I can follow your train of thought. Problem sets are your final draft essays and/or compositions that display the fruit of your higher-level critical thinking skills, so you need to view them in that light.

Life (and therefore, this course) is NOT about obtaining the correct answer. The questions that need answering are ‘Do you understand how the answer was/is obtained?’ and ‘Are you able to apply the answer to other questions and applications and within other contexts?’

Quizzes: Bi-weekly quizzes (FRIs) are completed individually in class and graded. These are test-prep opportunities. The quiz will consist of one problem from the problem set and/or class discussion, which contain the more important concepts and/or phenomena.

History/Bio: Physics has a significant history with tie-ins into many other scientific fields (biology, astronomy, chemistry, economics) and philosophical thought (relativity, empiricism, pacifism). You will choose a particular personality, topic, or issue related to the physical principles/phenomena that the course covers. I will list some potential topics within the Bb pages, OR you may suggest one to me. Each student will complete a written report (~2 pages) discussing your topic/personality.