

# SYLLABUS

## PHYSICS 416G

### FALL 2009

Lecturer: Prof. Michael A. Kovash  
Office: CP-371, 257-1150  
Office Hours: Mon., Wed., and Fri. 9 - 10  
email: kovash@pa.uky.edu

Physics 416 is an intermediate-level course in electrostatics. Although that may sound rather benign, don't be fooled. Ours will be a mathematically sophisticated discussion of the fields associated with arbitrary static distributions of charge and dielectric materials. You will, at long last, put to use most of the vector calculus you have studied in math class! The material we will discuss this semester will be challenging for everyone, and you should plan to use your very best study skills and rise to the level of the challenge. If on occasion you find that you are having trouble (and everyone will have trouble at some time), don't be discouraged. You will be given the tools required to master the material, so just sit down and do it!

Your success in Physics 416 is important. Since the material is strongly cumulative, falling behind or not understanding material in one week's lecture will affect your learning for the remainder of the year! Therefore, be aggressive in seeking out help when you need it.

Our goals for the semester are:

- To learn methods by which physical systems can be mathematically modeled,
- To establish a sure-footed calculational capability using three-dimensional vector calculus,
- To develop problem-solving skills at the intermediate level, and
- To understand the meaning and implications of one of Maxwell's laws of electrodynamics.

Classwork will consist of regular lectures on topics taken directly from the book, *Introduction to Electrodynamics*, third edition, by David J. Griffiths. Students will find it advantageous to read the assigned sections of the text *before* they arrive for class.

Homework problems will be assigned to accompany each lecture; students should put in the time and effort required to solve all of these exercises. We will hold regular 'homework days,' during which problem solutions will be given and student answers will be collected. Two problems from each of these homework sets will be graded.

Students are not discouraged from working together on the homework assignments. However, given that most of the learning process occurs while searching for the homework solutions, students are warned not to become the weak, non-contributing member of a homework coalition. For these students, the proper alternative is to seek help from the instructor. Also, when doing homework problems, students are encouraged not to solve integrals exclusively with one of the math software packages that are now readily available in the Department. These tools will not be available during the exams, when integrals will need to be done by hand or taken from a book.

We will have two in-class hour exams, and a cumulative 2-hour final exam which will be given on Monday, 14 December at 8:00 AM. All exams will be held in the classroom where the lectures are given and will consist of problems similar to, but not the same as, those assigned for homework. Students must bring integral tables and a calculator to the exams.

Students with an academic excuse for missing an exam should discuss it with the instructor before the exam, if possible. A grade of zero will be given for an unexcused absence from an exam. A student with an excused absence will be given the option of taking a make-up exam or receiving a 'virtual' grade which preserves their rank within the class. Students must complete at least one of the hour exams, or their make-ups, as well as the final exam to receive a passing grade for the course.

Throughout the semester a series of 12 quizzes will be given – generally on the days when the homework assignments are due. These quizzes will usually consist of just 1 problem which reflects both the content and the general level of difficulty of the homework assignment. No makeup quizzes will be given.

Final total scores will be based upon the following components: two 1-hour exams, 200 points; a 2-hour final exam, 200 points; the 10 best homework scores, 200 points; and the 10 best quiz scores, 200 points. Among these four components, each student will be able to drop the one with the lowest overall score, making a maximum possible score of 600 points – 200 each for the three remaining component scores. Final letter grades will be assigned according to a 'curve' of the final point distribution. Students who have chronically poor class attendance will be explicitly penalized when final letter grades are assigned.

*Physics 416 is a heavy-duty course – one that will require a lot of work on your part throughout the entire semester to achieve mastery. If you find that you are falling behind and not able to understand the material or do the homework problems, you should seek assistance quickly. The material is strongly cumulative, so it simply will not be possible to dismiss your misunderstandings and try to move on. The instructor is available during office hours, and at other times by appointment, to help you learn this material. Take advantage of that opportunity.*

Course evaluations are an important component of our Department's instructional program. An on-line course evaluation system was developed to allow each student ample time to evaluate each component of the course and instructor, thus providing the Department with meaningful numerical scores and detailed commentary while minimizing the loss of instructional time in the classroom. To access the system, simply go the Department of Physics Web page at [www.pa.uky.edu](http://www.pa.uky.edu) and click on the link for Course

Evaluations; then follow the instructions. You will need to use your student ID# to log into the system, and this will also allow us to monitor who has filled out evaluations. However, when you log-in you will be assigned a random number that will keep all your comments and scores anonymous.

DATE	LECTURE/READING	HOMEWORK
W 26 Aug.	Ch. 1.1	1.1-10
F 28 Aug.	Ch. 1.2	1.11-13
M 31 Aug.	Ch. 1.3	1.14-21
W 2 Sept.	Homework; Quiz 1	
F 4 Sept.	Ch. 1.3,1.4	1.22-25
M 7 Sept.	HOLIDAY	
W 9 Sept.	Ch. 1.4	1.26-31
F 11 Sept.	Homework; Quiz 2	
M 14 Sept.	Ch. 2.1-3	2.1-4
W 16 Sept.	EXAM - Ch. 1.1-1.4	
F 18 Sept.	Ch. 2.3	2.5(E first)-8
M 21 Sept.	Homework; Quiz 3	
W 23 Sept.	2.2	2.9-11
F 25 Sept.	3.1,2.5	2.12-14
M 28 Sept.	Homework; Quiz 4	
W 30 Sept.	3.4	3.1,2
F 2 Oct.	3.4	3.3,4
M 5 Oct.	3.4	3.5,6
W 7 Oct.	Homework; Quiz 5	
F 9 Oct.	2.4	3.7,8
M 12 Oct.	2.5	3.9-11
W 14 Oct.	4.1,2	4.1
F 16 Oct	Homework; Quiz 6	

DATE	LECTURE/READING	HOMEWORK
M 19 Oct.	EXAM - Ch. 2,3,4	
W 21 Oct.	4.2,3	4.2
F 23 Oct.	4.4	4.3-5
M 26 Oct.	4.4; Quiz 7	4.6-8
W 28 Oct.	4.4	4.9-11
F 1 Nov.	problem 4.5	
M 2 Nov.	Homework; Quiz 8	
W 4 Nov.	4.4	4.12-14
F 6 Nov.	3.1,3.2	5.1
M 9 Nov.	Homework; Quiz 9	
W 11 Nov.	3.2	5.2,3
F 13 Nov.	3.2	5.4,5
M 16 Nov.	Homework; Quiz 10	
W 18 Nov.	3.1,3.3	6.1,2
F 20 Nov.	3.3	6.3-5
M 23 Nov.	Homework; Quiz 11	
W 25 Nov.	HOLIDAY	
F 27 Nov.	HOLIDAY	
M 30 Nov.	3.3	6.6
W 2 Dec.	3.3	6.7
F 4 Dec.	3.3; Quiz 12	6.8,9
M 7 Dec.	cylindrical solutions	6.10
W 9 Dec.	Homework	
F 11 Dec.	Homework	