PHY 232A General University Physics II

Instructor:	Professor Kwok-Wai Ng	
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Office Phone:	257-1782	
Office hours:	hours: Wednesday and Thursday	
	1:00 PM to 2:00 PM	

Course Description:

A general course covering electricity, magnetism, electromagnetic waves and physical optics. Lecture, three hours; recitation, one hour per week

Prerequisites:

PHY 231

Corequisites: MA213

Meeting time and place:

Time: MWF 9:00-9:50 Place: Chemistry-Physics (CP) Building Rm 153

Course Webpage:

http://www.pa.uky.edu/~kwng/fall2017

Student Learning Outcomes:

After completing this course, the student will be able to:

- 1. Understand different electromagnetic phenomena, both qualitatively and quantitatively.
- 2. Describe Maxwell's equations and use it to explain the origin of electromagnetic radiation.

3. Use mathematics, including calculus, to solve physics and engineering problems in electricity and magnetism.

Course objectives:

Of the four fundamental forces in nature, besides gravitational force, electromagnetic force is the most common type of force that we can experience and play with in our daily life. Electromagnetic interaction at the atomic scale gives rise to all different kind of forces we have already learned in PHY231 – friction, restoring force (Hooke's Law) etc. It governs every chemical reaction occurring in laboratory or nature. Exactly because of its common occurrence, we learn how to make use of it to the fullest extent. Basically every invention in modern technology involves some kind of electromagnetic phenomena.

So, we are now at the point to study this important force, and we devote one semester to do this. We will learn the interaction between stationary charges, moving charges, and finally the origin and properties of electromagnetic waves.

Required Materials:

1. Online textbook: University Physics Vol. 2 by Samuel J. Ling, Jeff Sanny, and Bill Moebs (ISBN-13: 978-1-938168-16-1). You can download this textbook free and legally at the following website:

https://openstax.org/details/books/university-physics-volume-2

2. ExpertTA student account (for online homework)

Description of Course Activities and Assignments

1. Lecture

You should attend every lecture Monday, Wednesday, and Friday 9:00 to 9:50 in CP153. New concept will be introduced and discussed in every lecture. There are reading assignments for each lecture. This will help you to prepare for the materials to be discussed. There will be a short question at the beginning of each lecture to quiz your reading assignment. Class work will be given during the lecture for you to practice. The practice will help you to stay engaged and better understand on the materials we are discussing. You will work on the question on your own, but allowed to discuss with your classmates before submission of your work. While no attendance will be taken, you may start to lose quiz and class work points if you miss too many lectures. The intention of class work is not in taking class attendance, nor tests your knowledge in the subject. Instead, this is a device to stimulate class participation, and I will also use the result to gauge the pace of the class.

2. Recitation

Meeting time and place for recitation:

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Section 001	Thursday 8:00-8:50 CP208	Instructor: Lorente Campos
Section 002	Thursday 9:00-9:50 CP208	Instructor: Lorente Campos
Section 003	Thursday 10:00-10:50CP208	Instructor: Lorente Campos
Section 004	Thursday 11:00-11:50CP287	Instructor: Lorente Campos

In the recitation, the recitation instructor will help you to work on the homework that is due the next day (Friday). In the last 5 to 10 minutes of the class, a quiz will be given. There will be only one word problem in the quiz. To encourage students in attempting homework on their own efforts, this problem will be selected from the homework set. In different from the ExpertTA homework assignment, you are required to write down the solution in detail for the recitation quiz.

Course Assignments

Three 50-minutes tests at 100 points each One two hours final examination at 200 points Homework at 100 points total for the whole semester Recitation quizzes at 60 points for the whole semester Class work at 20 points total for the whole semester Reading assignment quiz at 20 points total for the whole semester

Total number of possible points: 700 points This will be scaled proportionally to 100% in determining the final course grade.

Summary Description of Course Assignments

1. Tests

There will be three 50-minutes test during the semester. In each test, there are 8 short questions (multiple choice, fill in the blanks, true or false etc.) and 2 open response problems. No partial credits will be given for the short questions. For the open response problems, detail solutions are required for partial credits. To encourage students in attempting homework on their own efforts, some questions and problems in the tests are similar to the ones in the homework.

In case if you have an excused absence, you should bring appropriate verification to the instructor as early as possible. If you miss a test with a valid excuse, you have the option of either doing a makeup test, or receive a score based on the average of your other two tests and the final examination in proportional to that of the whole class. If you miss two or more tests, or the final examination, you will receive an incomplete (I) grade and you have to complete the tests or final examination in the next semester.

The tests will primarily cover the material presented since the previous exam. All of the exams will be closed-book, closed-note, and no formula sheet will be provided. It is your responsibility to identify the most important formula to remember and learn how to use them effectively in solving problems. You can use a scientific calculator, but you cannot use the programming function of the calculator. Except the calculator, all electronic devices, including cell phones, laptop computers, clickers etc., have to be turned off during the tests and examination.

2. Final examination

The 2-hour final exam will be comprehensive. It roughly doubles the number of questions and problems in a 50-minutes test. Other rules are the same as those of the 50-minutes tests. If you miss the final exam with an excused absence, you will receive an incomplete (I) grade.

3. Homework

Homework will be administered and submitted via ExpertTA. To enroll in ExpertTA, you will go to:

https://login.theexpertta.com/registration/classregistration.aspx?regcode=USH19KY-22CBC4-1JI

and follow the instructions there to set up your account. The cost will be \$32.50.

You will be permitted 10 (ten) attempts at each individual problem. Late homework will not be accepted, and there will be no make-up homework assignments.

There will be a new homework set assigned at every Friday noon and it will be due 11:59pm next Friday. The homework set will cover materials of that Friday and classes in the following week. You should attempt the problems separately whenever you are prepared. You will receive more helps from the recitation class before the homework due. The homework sets may carry different points, but they will be normalized to 10 points each at the end of the semester. In other words, all homework sets have equal weight, independent of the level of difficulty and the number of problems assigned.

4. Recitation Quizzes

There will be a short (five to ten minutes) quiz in each recitation class. The quiz will have one problem similar to the problems in the homework set covered by that recitation class, so you should have no problem in doing the quiz if you prepare the homework on your own effort and understand the materials well. Since the homework is mostly just asking for numerical answers, the purpose of the quiz is to practice in expressing your idea and writing solution. This will bridge the gap between homework and the open response problems in the tests and the final examination.

Each quiz will be worth 10 points. There will be no make-up Recitation Quizzes. However, two of your lowest recitation scores will be dropped at the end of the semester and this will effectively allow you to miss two recitation quizzes with no penalty to your final grade. Of course, attending all of the recitations will make it more likely that you will earn the maximum possible points for recitation quizzes.

5. Lecture quizzes

At the beginning of each lecture you will be given a short quiz to test the reading assignment given in the previous class. Though the materials in the quiz have not been taught, the questions will be simple and straight forward and you should be able to finish it in five minutes. Most quizzes will be serviced by ExpertTA, so please bring a laptop or cell phone that have internet access to the lecture. No extra time will be given if you come to the class late. There will be no make-up for the class work as the lowest two scores will be dropped in the tabulation of the final grades. Each quiz will be worth 10 points and the total will be scaled to the 20 points listed in the Course Assignment section above.

6. Class work

I will give you some simple problems to solve in the middle of most lectures, mostly for you to practice the materials you have just learnt in the class. Again, you need to bring a laptop or cell phone that has internet access because the class work problems are provided by ExpertTA also. You are allowed to ask questions and discuss with you classmates, but you have to do your own calculation as the numbers given to each student will be different. You performance in the class work will provide a feedback to me in knowing how well you understand the materials. Each class work will be worth 10 points. The lowest two scores will be dropped in the tabulation of the final grades, so there will be no make-up for the class work. At the end of the semester, the total will be scaled to the 20 points listed in the Course Assignment section.

Course Grading

Grading scale for undergraduates:

92 % or above	А
80% or above	В
60% or above	С
50% or above	D
Below 50 %	E

The actual curve at the end of the semester may be adjusted according to the class performance and it may be slightly easier than the above letter grade assignment.

Final Exam Information

Wednesday, Dec 13th at 8:00 PM, in CP153. If there is any discrepancy, please follow the latest announcement from the University.

Course Policies:

Submission of Assignments:

Homework will be administered and submitted via ExpertTA. You need to have an account before you can receive and submit homework. Homework will be assigned every Friday. It will cover the lecture materials of that Friday and the following Monday and Wednesday. You will have about one week to complete the homework, and it is due midnight (11:59 pm) the next Friday.

Attendance Policy – Send around for more input.

We do not take attendance in lectures and recitations. However, if you miss too many classes, you will lose points in class work and recitation quizzes.

Excused Absences:

Students need to notify the professor of absences prior to tests and the final examination when possible. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison at the Dean of Students Office, (859) 257-2754.

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required.

Academic Integrity:

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct and may result in permanent dismissal. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Part II of Student Rights and Responsibilities (available online http://www.uky.edu/StudentAffairs/Code/part2.html) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where

students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Accommodations due to disability:

If you have a documented disability that requires academic accommodations, please see me as soon as possible after class or during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address: jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Classroom Behavior Policies (optional) add examples from Karen SW Syllabus

Describe any policies that you enforce in your classroom, e.g., no cellphones, guidelines for respectful dialogue, etc..

Course Evaluations

Course evaluations are an important component of the Department of Physics and Astronomy's instructional program. An online course evaluation system was developed to allow each student ample time to evaluate each component of the course and professor, thus providing the Department with meaningful numerical scores and detailed commentary while minimizing the loss of classroom instructional time. The evaluation window for the Fall 2014 semester is November 19 to December 10. To access the evaluation system during the evaluation window, simply go to the Department's webpage at https://pa.as.uky.edu, mouse over "Undergraduates" at the top of the page, and then follow the link for Physics and Astronomy Course Evaluations. You will need to enter your student ID number to login to

the system, which will allow the Department to monitor who has completed the course evaluations. However, after you login, you will be assigned a random number so that all of your comments and scores will be transmitted anonymously. Please remember the assigned number if you cannot complete the evaluation in a single session. You will need this number to log in the system again.

Tentative Course Schedule

Class #	Date	Topics – formula review	Textbook reading
1	Aug 23 (W)	Review: Circular motion and Gravitation	Vol.1: 4.4 and 13.1-
			13.5
2	Aug 25 (F)	Review: Work done and potential energy	Vol.1:7.1 and chapter 8
3	Aug 28 (M)	Labor day. No class	
4	Aug 30 (W)	Review: Torque and rotational motion	Vol.1: 2.4 and 10.6
5	Sept 1 (F)	Charges and Coulomb's Law	5.1-5.3
	Sept 4 (M)	Electric Field	5.4-5.7
6	Sept 6 (W)	Electric Flux and Gauss's Law	6.1-6.2
7	Sept 8 (F)	Application of Gauss's Law. Conductors in	6.3-6.4
		electrostatic equilibrium	
8	Sept 11 (M)	Electric potential and potential energy	7.1-7.2
9	Sept 13 (W)	Calculation of electric potential	7.3-7.4
10	Sept 15 (F)	Equipotential and conductors	7.5-7.6
11	Sept 18 (M)	Capacitance	8.1
12	Sept 20 (W)	Test 1	Chapters 5-7
13	Sept 22 (F)	Combinations of capacitors and energy	8.2-8.3
		stored in a charged capacitor	
14	Sept 25 (M)	Combinations of capacitors and energy	8.2-8.3
		stored in a charged capacitor	
15	Sept 27 (W)	Combinations of capacitors and energy	8.2-8.3
		stored in a charged capacitor	
16	Sept 29 (F)	Dipole and dielectric.	8.4-8.5
17	Oct 2 (M)	Current and resistance. Ohm's Law	Chapter 9
18	Oct 4 (W)	Resistors in series and parallel	10.1-10.2
19	Oct 6 (F)	Resistors in series and parallel	10.1-10.2
20	Oct 9 (M)	Kirchhoff's rules	10.3-10.4
21	Oct 11 (W)	Test 2	Chapter 8-9, and 10.1-
			10.2
22	Oct 13 (F)	RC circuits	10.4-10.6
23	Oct 16 (M)	Magnetic fields and magnetic forces	11.1-11.2
24	Oct 18 (W)	Midterm. Magnetic force on charge	11.2-11.4
		particles and currents	
25	Oct 20 (F)	Magnetic force and torque on a current loop	11.5
26	Oct 23 (M)	Hall effect	11.6-11.7
27	Oct 25 (W)	Biot-Savart Law	12.1-12.4
28	Oct 27 (F)	Ampere's Law	12.5-12.7
29	Oct 30 (M)	Magnetic Gauss's Law. Magnetism in	12.8
		matter	
30	Nov 1 (W)	Test 3	11.3-11.7, and Chapter
			12
31	Nov 3 (F)	Faraday's Law	13.1-13.4
32	Nov 6 (M)	Faraday's Law	13.1-13.4

33	Nov 8 (W)	Faraday's Law	13.1-13.4
34	Nov 10 (F)	Faraday's Law and Eddy currents	13.5-13.7
35	Nov 13 (M)	Inductance.	14.1-14.3
36	Nov 15 (W)	Energy in a magnetic field.	14.1-14.3
37	Nov 17 (F)	RL circuits	14.4
38	Nov 20 (M)	RL circuits	14.5
	Nov 22 (W)	Thanksgiving. No class	
	Nov 24 (F)	Thanksgiving. No class	
39	Nov 27 (M)	LC and RLC circuit	14.5
40	Nov 29 (W)	AC sources and simple AC circuits	15.1-15.2
41	Dec 1 (F)	RLC series (AC) circuits	15.3-15.5
42	Dec 4 (M)	RLC series (AC) circuits and transformer	15.3-15.6
43	Dec 6 (W)	Displacement currents and Maxwell's	16.1
		equations	
44	Dec 8 (F)	Electromagnetic radiation	16.2-16.5

Final examination: Wednesday, Dec 13th at 8:00 PM, in CP153. (If there is any discrepancy, please follow the latest announcement from the University.)