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PHY213 Algebra-based General Physics II. Spring 2019.

Please read the entire syllabus – if you have questions about the structure or the administration of the course you'll likely find the answers here.

- **Required textbook and WebAssign access key:** College Physics, 10th Edition, by Serway and Vuille.
- **Teaching Assistants (Recitations):**
Sections 007, 009, 012: Joseph Peck (email: jpeck607@uky.edu)
Section 008, 011: Debarghya Chakraborty (email: debarghya.chakraborty@uky.edu)

1 Course description.

PHY213 is second-semester, algebra-based, general physics – the sequel to PHY211. In PHY213 we'll discuss a number of major discoveries in physics that truly changed our lives. We will

- explore the workings, features and applications of both the electrical interaction and the magnetic interaction,
- see how the nature and properties of light are understood by joining the theories of electricity and magnetism,
- tour Albert Einstein's Special Relativity and examine the extraordinary consequences for space, time and matter,
- discuss the fantastic properties of photons, electrons and other elementary building blocks of the material world.

Human beings – from our hearts and brains, to our muscles and nerves, and ultimately our cells – are electromagnetic devices fabricated from electromagnetic building blocks. Our understanding of electricity, magnetism, light and matter’s building blocks are therefore the foundations for the understanding of all living things.

Because we’ll use some mathematics in solving physics problems in electricity, magnetism, light and modern physics a working knowledge of algebra and trigonometry, as covered in MA 109 and MA 112, or demonstrated by a ≥ 25 ACT math score, is a prerequisite for this course. We will use Canvas (<https://uk.instructure.com>) for the organization of this course – consult Canvas for PHY213 class announcements, lecture materials, practice tests, homework / quiz solutions, and grade posting, *etc.*

2 Course format.

PHY213 consists of two lecture classes per week, one recitation class per week, and one laboratory class per week. The lecture classes are Tuesdays and Thursdays in CP153 at 11:00 am–12:15 pm and the recitation classes are various times on Monday.

Lecture time will be devoted to discussing and demonstrating the underlying physics principles as well as introducing problem solving techniques. Focus on the concepts and the methods rather than memorizing the equations (you’ll receive an equation sheet with each test). Before each lecture you should read the assigned material that is listed in the schedule.

Recitation time will be mostly devoted to the illustration of problem solving techniques and the sharpening of problem solving skills, *i.e.* how to apply the basic physical concepts to real-life problems. Your recitation instructor will work sample problems from the weekly homework assignments and answer your questions and queries. Before each recitation you should have attempted all the assigned problems from the weekly homework. The recitation is an important opportunity for some interactive instruction - so please ask questions.

3 Course grade.

Your course grade will be determined according to the following table:

Assignment	Maximum points
Hour exams	$3 \times 200 = 600$
Final exam	400
Recitation quizzes	200
Homework assignments	200
Laboratory grade	350
Total	1750

Final course score is calculated two ways, with the higher score used to determine the final course percentage:

1. $100\% \times (\text{sum of all points earned}) / (1750 \text{ points})$
2. $100\% \times (\text{sum of all points earned except recitation quizzes}) / (1550 \text{ points})$

Course grade is determined as follows

Grade	Final course percentage
A	80% or above
B	70% or above but below 80%
C	60% or above but below 70%
D	50% or above but below 60%
E	below 50%

Detailed information on the examinations, lecture quizzes, recitation quizzes and homework assignments is given below. Details of the laboratory grading are in the laboratory syllabus.

To succeed in PHY213 you must read the relevant textbook sections before each lecture class and attempt all the homework problems before each recitation class. Anticipate spending ten or more hours a week outside the classroom on reading and homework. Take an active role in the learning process – ask questions to yourself and classmates. Talk with your lecturer, recitation teacher or laboratory instructor if you don't understand something. When you read the textbook, identify the key ideas and their significance. When you solve the problems, write down your solutions in a clear step-by-step manner.

3.1 Exam grade (1000 points).

The scheduled dates/times and relevant material for the hour exams and the final exam are given in the table at the end of this syllabus.

There will be three mid-term exams over the course of the semester given during regular lecture times. Mid-terms only include material that has its associated homework due before the exam. The final examination is a comprehensive test on the entire semester's material. Details of the exam procedures will be provided later in the semester the lecture immediately preceding exams. At the end of the semester, if the lowest mid-term score is less than half of the final exam score, the lowest mid-term score will be replaced with half of the final exam score. This effectively replaces your weakest mid-term grade with the final exam grade if it is in the best interest of your final course score.

During the midterm exams and the final exam you are not allowed to consult textbooks, reference books, or class notes. You are not permitted to use cell phones, laptops, *etc.*, during exams. An equation sheet containing the relevant equations and physical constants will be provided with each exam, *i.e.* memorization of constants and equations is unnecessary.

3.2 Homework grade (200 points).

Every student must register with the WebAssign homework service for the required weekly homework assignments. To access the homework please connect to WebAssign via Canvas: 1). login to Canvas and navigate to PHY213, and 2). click Modules and then the WebAssign link. The first

time you access WebAssign from Canvas you are prompted to link your current WebAssign account or create a new WebAssign account.

The weekly homework cycle is as follows. Each Tuesday morning the weekly homework assignment will be available on the WebAssign site. The relevant material is then covered on the Tuesday / Thursday lecture classes and the following week's recitation class. The deadline for completing the online homework is at 11:59 pm on the Monday immediately following the Tuesday / Thursday lecture sequence.

3.3 Recitation grade (200 points).

During recitation class your recitation instructor will work problems and answer questions from the current homework assignment.

Your recitation grade is based upon recitation quizzes that are administered at the end of each recitation. The recitation quizzes will be similar to a homework problem from the homework assignment. To avoid the need for make-ups your lowest two quiz scores will be dropped in the calculation of your recitation grade. Your quizzes will be graded and then returned by your recitation instructor in the following class. Your total score from the recitation quizzes will be normalized to a 200-point scale.

3.4 Course evaluations.

Course evaluations are an important component of our Departments instructional program. Our class will use the University's Online Teacher Course Evaluation System (TCE). You will receive an email invitation and frequent reminders to participate in the TCE during the TCE window. During the TCE window the evaluation will be available at evaluate.uky.edu/blue and can be completed using a computer, tablet or smart phone.

4 Excused absences, etc.

If you miss a hour exam with a valid excuse, you will receive a score based on the average of your other tests and the final. If you miss two tests with a valid excuse, you will receive an incomplete (I). Examples of excusable absences are (University Senate rule 5.2.4.2): (i) Illness of the student or serious illness of a member of the student's immediate family, (ii) the death of a member of the student's immediate family, (iii) trips for student organizations, university classes, and intercollegiate athletics. Each case requires written verification. When feasible the student should notify the instructor prior to the absence, and never more than one week after the absence. "Falling behind" and "sleeping in" are not valid excuses.

Lastly, cheating on exams and copying of homework are very serious academic offenses. Offenders are subject to punishment in accordance to University Senate rules section 6.3 and 6.4.

5 Where to get help?

Feel free to talk with your course instructors about physics problems, questions, *etc.* All instructors have office hours, or meet with them by appointment. In addition, a list of physics tutors is available in the Physics office (room 177) in the Chem-Phys building. Solutions to the homework will be available on our Canvas web-page after the deadline for each assignment. Solutions to the examinations will be posted to the Canvas webpage after the completion of each exam.

DATE	MATERIAL	READING ASSIGNMENTS
L1: R Jan 10	Coulomb's Law & Electric Field	15.1-3, 15.4-6
L2: T Jan 15	Electric Field, Gauss Law	15.4-6, 15.8-9
L3: R Jan 17	Electric Energy and Potentials	16.1-4
L4: T Jan 22	Capacitance	16.6-10
L5: R Jan 24	Current and Resistance	17.1-8
L6: T Jan 29	DC Circuits	18.1-3, 18.6-7
L7: R Jan 31	Kirchhoffs Rules, RC Circuit	18.4-5
T Feb 5	Test One	Chap. 15, 16, 17, 18
L8: R Feb 7	Magnetism & Magnetic Field	19.1-3
L9: T Feb 12	Magnetic Force and Torques	19.4-6
L10: R Feb 14	Amperes Law	19.7-10
L11: T Feb 19	Inductance & Faradays Law	20.1-3
L12: R Feb 21	Self-Inductance, Magnetic Energy	20.4-7
L13: T Feb 26	AC Circuits	21.1-6
L14: R Feb 28	Electromagnetic Waves	21.8-13
T Mar 5	Test Two	Chap. 19, 20, 21
L15: R Mar 7	Light, Reflection & Refraction	22.1-7
	Spring Break	
L16: T Mar 19	Mirrors and Lenses	23.1-7
L17: R Mar 21	Wave Optics: Interference	24.1-5
L18: T Mar 26	Wave Optics: Diffraction	24.6-9
L19: R Mar 28	Optical Instrument	25.1-4
L20: T Apr 2	Relativity	26.1-6
L21: R Apr 4	Quantum Physics	27.1-3

DATE	MATERIAL	READING ASSIGNMENTS
T Apr 9	Test Three	Chap. 22, 23, 24, 26
L22: R Apr 11	Quantum Physics	27.5-8
L23: T Apr 16	Atomic Physics	28.1-7
L24: R Apr 18	Nuclear Physics	29.1-7
L25: T Apr 23	Review	
L26: R Apr 25	Review	
10:30 am M Apr 29	Final Exam	All material