

PY 208 Syllabus – Spring 2016 (all sections)

Course description

Physics for Engineers and Scientists II – PY 208 is the second course in a two-semester sequence of introductory calculus-based physics courses. The focus is on electricity, magnetism, and optics.

Course objectives

By the end of this course, you will be able to

- acquire an overview of the general principles of physics, and how they apply to electromagnetic phenomena. In PY208 these phenomena include charge, electric and magnetic forces and fields, electrostatic potential, dc currents, voltages, and circuits, electromagnetic induction, electromagnetic waves, and optics.
- solve elementary physics problems systematically, logically, and quantitatively through the use of techniques based on algebra, trigonometry, calculus, and graphical methods

Student learning objectives

The Learning Objectives for each exam will be posted on each section's web site prior to the first lecture of the sequence leading up to that exam and will serve as both a study outline and a summary of items to review. The Learning Objectives list the topics that a student must *know* and *apply* to demonstrate mastery of the material presented in this course.

Course prerequisites

The prerequisites for PY208 are PY205 and MA 241, all with a grade of C– or better. A high degree of fluency in algebra, geometry, trigonometry, and calculus (differential and integral) is essential. Students not meeting the prerequisite must either drop the course or present a written request for exemption signed by their advisor or the appropriate person in the Academic Affairs Office or Dean's Office of their College. Students who do not meet the prerequisite and do not obtain an approved exemption may be dropped from the roll.

Course co-requisites

The co-requisite for PY 208 is PY 209 - 1 credit hour laboratory course. You must enroll in PY 209 to keep your enrollment status of PY 208, unless you have passed PY 209 in a previous semester.

Expectation of students

- That you read the book, attend classes, and do the assignments on time;
- That you evaluate your own mastery of the material multiple times every week;
- That you are courteous to the other students, that is, no talking or reading newspapers in class;
- That cell phones are either shut off or set to vibrate during class;
- That computer or tablets should be used only for class relevant activities. Please be aware that the computer use is disruptive to those who are next or behind you;
- That you ask questions (in class or during office hours) when you do not understand a concept or problem. These questions also provide feedback to instructors, and as a result can be invaluable to the entire class as well as the instructors.

Expectation of instructors

- That the instructor is knowledgeable about the course materials
- That the instructor is available for help during office hours, email, and/or Moodle site
- That the instructor is respectful of the students

Instructor Information

Section: 001

Name: Dr. xxxxxxxx

Email: xxxxxxxx@ncsu.edu

Office: Riddick xxx

Office Hours:

Monday: 3 PM – 4 PM

Tuesday: 3 PM – 4 PM

Wednesday: 3 PM – 4 PM

Thursday: 10 AM – 11 AM

Required materials: options and approximate costs

WebAssign: Course PY208 (Giancoli)	\$29.95
Clicker – Response Card NXT If you already own a TurningPoint Response Card from a previous class, you do not need to purchase a new one.	\$50.00 (new) \$34.00 (used)
Textbook: Giancoli, <i>Physics for Scientists and Engineers with Modern Physics</i> , Fourth Edition, Pearson/Prentice-Hall, © 2009 Option 1: Full volume in hardcover (covers PY205 & PY208) Option 2: Vol. 2 (covers PY208 only) These are NCSU Bookstore hardcover prices. More options: Fixed time electronic rental versions are also available through the Bookstore following links at http://shop.bookstore.ncsu.edu/ . A variety of other options are available online through other vendors.	\$266 or \$198 (used) \$127 (used)
Scientific/graphing calculator

Grade and course components

The final grade in the course will be determined on the following basis:

Lecture participation (attendance and quiz)	5%
Homework	11%
Reading Quizzes	3%
Exam (3 @17% each)	51%
Final Exam	30%
Total	100%

Below is a breakdown of each course component with expectations and policies.

Lecture	<ul style="list-style-type: none">You are expected to read the textbook sections prior to every class; it makes for efficient learning.Attendance is required, and is worth a small percentage of your final grade. Many students do not realize how important it is to come to class, and giving credit for work in class is one way of emphasizing its importance.Clickers will be used to track attendance and promote active learning by providing instant feedbacks for both the instructor and students. Clickers might also be used to do in-class quizzes. If your clicker does not work, if you forget your clicker, or your ResponseWare subscription has expired, you will not receive attendance credit. (Note: if your clicker stops functioning, contact the bookstore for the warranty and replacement policy.)During the course of a semester, it is understandable that you might miss a few
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	<p>lectures. Attendance credit will be excused for days missed due to illness or for participation in university sponsored events (documentation required). Excuses for unanticipated absences must be reported to the instructor no more than one week after the return to class.</p> <ul style="list-style-type: none"> Your participation grade will have 10% added on to your actual participation percentage, but your participation grade will be capped at 100%. If you miss class, it is your responsibility to find out what you missed.
Homework	<ul style="list-style-type: none"> A major part of what you are expected to learn will come as a result of doing homework. You need to fully <i>understand</i> how to solve the assigned homework problems to do well on the exams and to succeed in this course. Individual homework will be submitted via the WebAssign online system. As a general rule, assignments will be due on Mondays and Thursdays at midnight, though the due dates may be adjusted on occasions. Homework will be due during the last week of classes. You are normally allowed three free submissions per question part. Additional submissions will incur a 25% penalty per submission. (Example: 4 submissions – 25%, 5 submissions – 50%) It is therefore important that you work each problem carefully on paper before submitting your answers. This practice is vital to learning the material and will also help you when reviewing the assignments before a test. You can request an automatic extension any time up to 2 days after the assignment is due. Each extension (up to 2) will grant you 24 hours to work the unanswered problems at a 25% penalty of all unearned points. Extensions will be granted on homework deadlines with excused absences. There are websites where you can view (or perhaps purchase) solutions to homework problems. I cannot stop you from cheating, but I strongly recommend you do not. <i>Consider your goals...are you trying to just get the homework done or do you actually want to learn something?</i> I guarantee that the more you use solutions written by someone else, the less likely you will be able to produce your own solutions on quizzes and exams.
Exams	<ul style="list-style-type: none"> Three 90 minute exams will be given on Tuesday nights. See the schedule for dates. Each exam will consist of a mix of multiple-choice questions and show-your-work problems. Equation sheets, learning objectives, and a few tests from previous semesters will be provided well before the exam. Required material for each exam are <ul style="list-style-type: none"> --a calculator: no cell phones, laptops, and tablets --NCSU Photo ID --A number 2 Pencil There are no scheduled makeup tests. Students with excused absences, in accordance with the NCSU attendance policy, will be given options to correct the missed grade at the discretion of the instructor. http://policies.ncsu.edu/regulation/reg-02-20-03
Final Exam	<p>The final exam is comprehensive and will cover everything in the course. The final exam is important, because it offers an opportunity to show what you have learned in the course. It is worth 30% of your course grade.</p>

Numerical ranges for final grades

Grade	Percent	Grade	Percent	Grade	Percent	Grade	Percent
A+	97–100	B+	87–89.9	C+	77–79.9	D+	67–69.9

A	93–96.9	B	83–86.9	C	73–76.9	D	63–66.9
A–	90–92.9	B–	80–82.9	C–	70–72.9	D–	60–63.9
						F	<60

Exam and course grades are determined on an absolute basis rather than “grading on the curve.” Why should one assume that x% of students will be failing? If everyone were to learn the material extremely well, everyone should get an A. How well your neighbor is doing will not affect your grade. *Help your peers and learn from each other.*

There is NO extra credit at the end of the term. It is far easier to fix problems early in the semester than after the tests have been taken.

Tutorial center

Physics Tutorial Center: Information on hours of operation and the location of the Physics Department’s free, walk-in tutorial center can be found at the Physics Tutorial Services web site: <http://www.physics.ncsu.edu/classes/tutor.php>.

University Tutorial Center: NCSU also offers free tutoring and supplemental instruction at the University Tutorial Center. See <http://tutorial.ncsu.edu/>.

Statement on academic integrity

I am committed to upholding the University policy on academic integrity, as described in the Code of Student Conduct – POL 11.35.01. This Code can be found at <http://policies.ncsu.edu/policy/pol-11-35-01>. I expect students enrolled in this course also to abide by University policy concerning academic integrity. In placing your name on any paper (homework, test, final exam) to be graded, you affirm that you have neither given nor received unauthorized aid on the work submitted. Should this not be the case, the work will not be accepted and a grade of zero will be recorded. If you are caught cheating on a test or exam, the minimum penalty will be a grade of F on the exam and the maximum will be a grade of F in the course and other actions taken by student conduct.

Statement for students with disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 919-515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation (REG02.20.01) <http://policies.ncsu.edu/regulation/reg-02-20-01>.

Statement on extra expenses

Beyond the purchase of the textbook, WebAssign access, response card, and a suitable calculator, there are no significant extra expenses.

Statement on electronic course components

Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course.

Statement on transportation

Not applicable

Class evaluations

Class evaluations will be available for students to complete online. An Email reminder will be sent by NCSU as the time approaches. All evaluations are confidential: instructors will not know how any one student responded to any given question, and students will not be able to access the ratings for any instructor. More information can be found at <http://oirp.ncsu.edu/eval/clev/students-info>.

General Education Program

PY 208, when taken with PY 209, counts towards completion of the Natural Sciences category of the GEP Requirements. As can be seen from the Learning Objectives, this course will thoroughly help students to: 1) use the methods and processes of science in testing hypotheses, solving problems and making decisions; and 2) make inferences from and articulate, scientific concepts, principles, laws, and theories, and apply this knowledge to problem solving.

Policies, Regulations, and Rules

Students are responsible for reviewing the NC State University PRR's, located at <http://oucc.ncsu.edu/course-rights-and-responsibilities> which pertains to their course rights and responsibilities.

Non-Discrimination Policy

NC State University provides equality of opportunity in education and employment for all students and employees. Accordingly, NC State affirms its commitment to maintain a work environment for all employees and an academic environment for all students that is free from all forms of discrimination. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and/or NC State University policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and/or NC State University policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. NC State's policies and regulations covering discrimination, harassment, and retaliation may be accessed at <http://policies.ncsu.edu/policy/pol-04-25-05> or <http://oied.ncsu.edu/oied/>. Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Institutional Equity & Diversity at 919-515-3148.

Supporting Fellow Students in Distress

As members of the NC State Wolfpack community, we each share a personal responsibility to express concern for one another and to ensure that this classroom and the campus as a whole remains a safe environment for learning. Occasionally, you may come across a fellow classmate whose personal behavior concerns or worries you. When this is the case, I would encourage you to report this behavior to the NC State Students of Concern website: <http://studentsofconcern.ncsu.edu/>. Although you can report anonymously, it is preferred that you share your contact information so they can follow-up with you personally.

Other information relevant to the course

Your instructor may post contact information, lecture notes, FAQs, or other study aids on the Section web site as the course progresses. You will be notified of these either in the lectures or by email.

PY 208 Schedule – Spring 2016, MWF

Wk	Date	Topics	Readings¹	Homework²
1	Jan 6 (W)	Class Overview/Syllabus Electric Charge, Induced Charge	21.1-21.4	<u>HW#0</u> • Intro to WebAssign • Math Review • Syllabus
	Jan 8 (F)	Coulomb's Law	21.5	
2	Jan 11 (M)	Electric Field	21.6	<u>HW#1</u> Ch21: 6, 8, 12, 13
	Jan 13 (W)	Electric Field Continuous Charge Distribution	21.7	
	Jan 15 (F)	Field Lines, E-Fields and Conductors, Charges-Particle Motion, Electric Dipoles	21.8-21.11	
3	Jan 18 (M)	Martin Luther King, Jr. Day – No Class		<u>HW#2</u> Ch21: 26, 28, 33, 36, 49, 56, 57
	Jan 20 (W)	Electric Flux, Gauss's Law	22.1-22.2	
	Jan 22 (F)	Gauss's Law Applications	22.3	
4	Jan 25 (M)	Electric Potential: Fields and Point Charges	23.1-23.3	<u>HW#3</u> Ch22: 1, 9, 13, 21,36 <u>HW#4</u> Ch23: 3, 11, 14, 26, 28, 34
	Jan 27 (W)	Electric Potential: Charge Distributions, Equipotentials, Dipoles	23.4-23.6	
	Jan 29 (F)	Electric Potential: Calculation of Fields, The Electron Volt	23.7-23.8	
5	Feb 1 (M)	Review for Exam 1		<u>HW#5</u> Ch23: 43, 45, 84, 31, 51, 54, 58
	Feb 2 (T)	Exam 1, 7:10-8:40 pm, Ch 21-23, Location TBD		
	Feb 3 (W)	Capacitors, Capacitance, Series and Parallel Connections	24.1-24.3	<u>HW#6</u> Ch24: 3, 5, 15, 22, 45, 46, 58, 77
	Feb 5 (F)	Dielectrics	24.4-24.5	
6	Feb 8 (M)	Electric Current, Ohm's Law, Resistors and Resistivity, Electric Power	25.1-25.7	<u>HW#7</u> Ch25: 7, 10, 13, 17, 39, 45, 83, 32, 38
	Feb 10 (W)	EMF, Resistors in Series and Parallel	26.1-26.2	
	Feb 12 (F)	Kirchhoff's Laws	26.2-26.4	
7	Feb 15 (M)	RC Circuits	26.5	<u>HW#8</u> Ch26: 4, 7, 12, 76 <u>HW#9</u> Ch26: 34, 44, 45, 48, 49
	Feb 17 (W)	Magnets and Magnetic Fields, Electric Currents and Fields, Forces on Currents	27.1-27.3	
	Feb 19 (F)	Forces on Moving Charges, Torque on Current Loops	27.4-27.5	

¹ Readings are to be done before coming to class.

² Homework is due at times noted on WebAssign assignments. Numbers listed are textbook end-of-chapter problems. Additional questions might be assigned on WebAssign in addition to the end-of-chapter problems.

8	Feb 22 (M)	Electric Motors, Magnetic Fields of Currents	27.6 28.1	<u>HW#10</u> Ch27: 1, 7, 10, 69, 16, 19, 39, 41
	Feb 24 (W)	Forces Between Wires, Ampere's Law	28.2-28.4	<u>HW#11</u> Ch28: 1, 7, 8, 10, 56, 66
	Feb 26 (F)	Magnetic Fields of Solenoids, Biot-Savart Law	28.5-28.7	
9	Feb 29 (M)	Review for Exam 2		<u>HW#12</u> Ch28: 26, 27, 35
	Mar 1 (T)	Exam 2, 7:10-8:40 pm, Ch 21-28		
	Mar 2 (W)	Induced EMFs, Faraday's and Lenz's Laws	29.1-29.2	<u>HW#13</u> Ch29: 5, 6, 12, 14, 18, 28
	Mar 4 (F)	Motional EMF, Electric Generators	29.3-29.4	
10	Mar 7-11	Spring Break – No Class		
11	Mar 14 (M)	Transformers and Power Transmission	29.4, 29.6	<u>HW#14</u> Ch29: 38, 47 Ch30: 1, 5, 9, 15
	Mar 16 (W)	Mutual Inductance, Self-Inductance, Energy Storage in Magnetic Fields	30.1-30.3	
	Mar 18 (F)	LR Circuits	30.4	
12	Mar 21 (M)	LC Circuits and Oscillations	30.5	<u>HW#15</u> Ch30: 24, 72, 31, 34, 35
	Mar 23 (W)	Maxwell's Equations, Electromagnetic Waves, Speed of Light	31.1-31.6	
	Mar 25 (F)	Spring Holiday – No Class		
13	Mar 28 (M)	Poynting Vector, Radiation Pressure, Wireless Communications	31.7-31.10	<u>HW#16</u> Ch31: 13, 14, 18, 41, 30, 34, 47, 56 <u>HW#17</u> Ch32: 4
	Mar 30 (W)	Law of reflection and plane mirror	32.1-32.2	
	Apr 1 (F)	Spherical Mirror	32.3-32.5	
14	Apr 4 (M)	Snell's law and total internal reflection	32.6-32.7	<u>HW#18</u> Ch32: 9, 14, 16, 25, 36, 45, 58 <u>HW#19</u> Ch33: 10, 13
	Apr 6 (W)	Thin Lens, Lens Combinations	33.1-33.3	
	Apr 8 (F)	Camera, Eye, Magnifying Glass, Telescope	33.5-33.8	
15	Apr 11 (M)	Review for Exam 3		<u>HW#20</u> Ch33: 21, 22, 39, 48, 61, 62
	Apr 12 (T)	Exam 3, 7:10-8:40 pm, Ch 21-33		
	Apr 13 (W)	Huygens' Principle Diffraction, Huygens' Refraction, Young Double-Slit Experiment	34.1-34.3	<u>HW#21</u> Ch34: 4, 8, 15, 23, 30, 32
	Apr 15 (F)	Thin Films Interference	34.5	
16	Apr 18 (M)	Single-Slit Diffraction	35.1,35.4	<u>HW#22</u>

	Apr 20 (W)	Diffraction Gratings	35.7	Ch35: 1, 9, 35 <u>HW#23</u>
	Apr 22 (F)	Polarization	35.11	Ch35: 53
17	Apr 25 (M)	Final Exam Review		
18	Apr 27 (W)	Final Exam, 6:00-9:00 pm, Ch 21-35		

Important dates:

January 12, Tuesday—Last day to add a course

January 20, Wednesday—Last day to withdraw a course without a W grade

March 2, Wednesday—Last day to drop a course

PY 208 Schedule – Spring 2016, TH

Wk	Date	Topics	Readings³	Homework⁴
1	Jan 7 (H)	Class Overview/Syllabus Electric Charge, Induced Charge, Coulomb's Law	21.1-21.5	<u>HW#0</u> • Intro to WebAssign • Math Review • Syllabus
2	Jan 12 (T)	Electric Field, Electric Field Continuous Charge Distribution	21.6-21.7	<u>HW#1</u> Ch21: 6, 8, 12, 13
	Jan 14 (H)	Field Lines, E-Fields and Conductors, Charges-Particle Motion, Electric Dipoles	21.8-21.11	
3	Jan 19 (T)	Electric Flux, Gauss's Law	22.1-22.2	<u>HW#2</u> Ch21: 26, 28, 33, 36, 49, 56, 57
	Jan 21 (H)	Gauss's Law Applications, Electric Potential: Fields	22.3 23.1-23.2	
4	Jan 26 (T)	Electric Potential: Point Charges, Charge Distributions, Equipotentials, Dipoles	23.2-23.6	<u>HW#3</u> Ch22: 1, 9, 13, 21,36 <u>HW#4</u> Ch23: 3, 11, 14, 26, 28, 34
	Jan 28 (H)	Electric Potential: Calculation of Fields, The Electron Volt	23.7-23.8	
5	Feb 2 (T)	Review for Exam 1		<u>HW#5</u> Ch23: 43, 45, 84, 31, 51, 54, 58
	Feb 2 (T)	Exam 1, 7:10-8:40 pm, Ch 21-23, Location TBD		
	Feb 4 (H)	Capacitors, Capacitance, Series and Parallel Connections, Dielectrics	24.1-24.5	<u>HW#6</u> Ch24: 3, 5, 15, 22, 45, 46, 58, 77
6	Feb 9 (T)	Electric Current, Ohm's Law, Resistors and Resistivity, Electric Power	25.1-25.7	<u>HW#7</u> Ch25: 7, 10, 13, 17, 39, 45, 83, 32, 38
	Feb 11 (H)	EMF, Resistors in Series and Parallel, Kirchhoff's Laws	26.1-26.4	
7	Feb 16 (T)	RC Circuits, Magnets and Magnetic Fields, Electric Currents and Fields	26.5 27.1-27.2	<u>HW#8</u> Ch26: 4, 7, 12, 76 <u>HW#9</u> Ch26: 34, 44, 45, 48, 49
	Feb 18 (H)	Forces on Currents, Forces on Moving Charges, Torque on Current Loops	27.3-27.5	
8	Feb 23 (T)	Electric Motors, Magnetic Fields of Currents, Forces Between Wires	27.6 28.1-28.3	<u>HW#10</u> Ch27: 1, 7, 10, 69, 16, 19, 39, 41 <u>HW#11</u> Ch28: 1, 7, 8, 10, 56, 66
	Feb 25 (H)	Ampere's Law, Magnetic Fields of Solenoids, Biot-Savart Law	28.4-28.7	

³ Readings are to be done before coming to class.

⁴ Homework is due at times noted on WebAssign assignments. Numbers listed are textbook end-of-chapter problems. Additional questions might be assigned on WebAssign in addition to the end-of-chapter problems.

9	Mar 1 (T)	Review for Exam 2		HW#12 Ch28: 26, 27, 35
	Mar 1 (T)	Exam 2, 7:10-8:40 pm, Ch 21-28		
	Mar 3 (H)	Induced EMFs, Faraday's and Lenz's Laws, Motional EMF	29.1-29.3	HW#13 Ch29: 5, 6, 12, 14, 18, 28
10	Mar 7-11	Spring Break – No Class		
11	Mar 15 (T)	Electric Generators, Transformers and Power Transmission	29.4,29.6	HW#14 Ch29: 38, 47
	Mar 17 (H)	Mutual Inductance, Self-Inductance, Energy Storage in Magnetic Fields	30.1-30.3	Ch30: 1, 5, 9, 15
12	Mar 22 (T)	LR Circuits, LC Circuits and Oscillations	30.3-30.5	HW#15 Ch30: 24, 72, 31, 34, 35
	Mar 24 (H)	Maxwell's Equations, Electromagnetic Waves	31.1-31.5	
13	Mar 29 (T)	Speed of Light, Poynting Vector, Radiation Pressure, Wireless Communications	31.6-31.10	HW#16 Ch31: 13, 14, 18, 41, 30, 34, 47, 56
	Mar 31 (H)	Law of reflection, Plane Mirrors and Spherical Mirrors	32.1-32.3	HW#17 Ch32: 4
14	Apr 5 (T)	Snell's Law, Total Internal Reflection	32.4-32.7	HW#18 Ch32: 9, 14, 16, 25, 36, 45, 58
	Apr 7 (H)	Thin Lens, Lens Combinations, Camera, Eye, Magnifying Glass, Telescope	33.1-33.3, 33.5-33.8	HW#19 Ch33: 10, 13
15	Apr 12 (T)	Review for Exam 3		HW#20 Ch33: 21, 22, 39, 48, 61, 62
	Apr 12 (T)	Exam 3, 7:10-8:40 pm, Ch 21-33		
	Apr 14 (H)	Huygens' Principle, Diffraction, Huygens' Refraction, Young Double-Slit Experiment, Thin Films Interference	34.1-34.5	HW#21 Ch34: 4, 8, 15, 23, 30, 32
16	Apr 19 (T)	Single-Slit Diffraction, Diffraction Gratings	35.1, 35.4, 35.7	HW#22 Ch35: 1, 9, 35
	Apr 21 (H)	Polarization	35.11	HW#23 Ch35: 53
18	Apr 27 (W)	Final Exam, 6:00-9:00 pm, Ch 21-35		

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