

Physics 203: Intro Physics II

Spring, 4 Units (3 Lecture, 1 Lab)

MWF 10:30-11:20 AM — Room: Bullock G-09

Prof. Nicole Ackerman

nackerman@agnescott.edu

Office: Bullock 106W — 404-471-5627

COURSE DESCRIPTION

From Catalog: A calculus-based course with laboratory covering electricity, magnetism, circuits, and light.

Intended Audience

This course is for physicists, engineers, chemists, biologists, biochemists, neuroscientists, and anyone with experience in calculus who is interested in understanding the fundamental rules that govern the world around us. This class will use examples from real life situations, in addition to applications in engineering, biology, and medicine.

Students will practice useful problem solving approaches, including utilizing units and estimation. Critical thinking will be developed through group work, calculations, and short written assignments.

Pre-requisites Physics 202 (or 110). Because Math 119 was a co-requisite for PHY202, it is assumed that students are comfortable with content from that class.

Course Goals

This course will further many of the goals from Physics 110, including:

1. Use multiple representations to solve problems, including simple sketches, plots, and equations
2. Choose and justify appropriate simplifications that allow you to analyze real world problems
3. Take measurements and interpret data regarding physical systems
4. Estimate conceptual relationships and quantities using units and orders of magnitude
5. Explain physical phenomena in terms of charges

Additionally, content-specific goals for this class include:

1. Develop a model for charges and their interactions
2. Define and utilize electric fields and potentials
3. Utilize a conceptual model for DC circuits
4. Develop a model for magnetism from multiple sources
5. Calculate the interaction between magnetic fields and charged particles

COURSE DETAILS

Credits:	4 Credits	3 Lecture, 1 Lab
Class Sessions:	MWF 10:30-11:20 AM	Bullock G-09 (Teasley)
Lab Sessions:	Monday 2:00-5:00	Bullock 104W
	Tuesday 2:00-5:00	Bullock 104W
Office Hours:	Monday 4:00 - 5:00 PM	Bullock 106W
	Tuesday 11:00 - 12:00 AM	Bullock 106W
	Tuesday 4:00 - 5:00 PM	Bullock 106W
	Wednesday 4:00 - 5:00 PM	Bullock 106W
Workshop Leader:	Victoria Wood	
Course Tutors:	Xian Tang, Romesa Afzal	

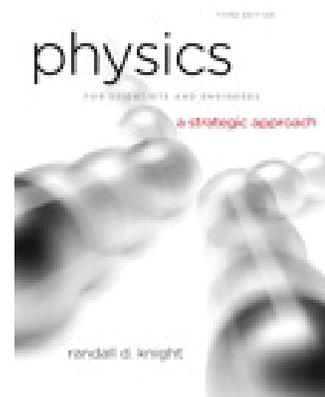
In addition to time spent in lecture and lab, you will be responsible for time outside of class spent on weekly reading assignments, online warm-ups, written problem sets, and online exercises. If you need additional assistance in order to succeed in the course, you will want to attend tutoring and office hours. I will always be happy to provide additional practice problems.

You should expect to spend at least 3 hours per week on the reading, weekly warm-up, and preparing for class. The amount of time necessary to complete the homework will depend on your previous knowledge and comfort with the material. You should spend about 2 to 3 hours solving online problems and at least 3 to 4 hours on the problem sets that will be turned in. There will be a weekly hour-long Workshop that will further assist you with conceptual understanding and problem solving skills.

Required Materials

Required Textbook: *Physics for Scientists and Engineers, 3rd Ed*
 By Randall Knight
 Required Online Software: *MasteringPhysics for Knight, Physics for Scientists and Engineers with Modern Physics, 3e*
 The software can be purchased online through Pearson *without the book* for \$66. For \$112 you can purchase the software with an electronic copy of the book. Please note that if you purchase a used copy of the book (or rent it), you will still need to purchase the software. Make sure you get the *third* edition of the book and the corresponding software. The same textbook and software will be used in the spring semester for Physics 203.

We will primarily be using volume 4, which covers chapters 25-36. We will also be using parts of chapter 20-23, which are in volume 3.



GETTING HELP

There are many resources available to help you learn in this course. Myself, the textbook, and assignments may be the most obvious ones, but there are additional tools that can be used if you want to improve your performance.

Moodle

I will heavily use Moodle, including posting resources and assignments. There is a class forum which I encourage you to use to ask questions! It is possible that another student has the same question,

so sharing the question and answer with everyone is beneficial. I will try to reply to questions on Moodle as soon as I see them, but occasionally I am away from the computer for hours at a time. You should typically expect a response within 24 hours. I will notify the class if I am traveling and Moodle responses will be slower.

I will post some optional resources to Moodle, such as videos and simulations, that you may find helpful if you are struggling with a particular topic. I will indicate on Moodle whether these are associated with a particular assignment or not. Please let me know if you find any of them particularly useful (or terrible). I encourage you to send me any online resources that you find helpful, or you can post them to the forum to share them with your classmates.

Videos

In lecture we will focus on activities where *you* (the students) are practicing physics. For examples of problem solving, you will want to watch videos that I have made on an iPad and uploaded to YouTube. There will be links on Moodle to videos, which are also arranged in a YouTube playlist. Please do not share the links for these videos outside of this class.

Office Hours and Appointments

Questions are often addressed quickest in person, so I encourage you to come to office hours with any and all questions. I have “open” office hours, meaning that I leave the door open so students can come and go as needed. Many of you may have the same challenges with certain problems, so I encourage group discussions. If a student comes later with a question that has already been answered, I may ask one of the students present to explain. Teaching is a great way to learn!

If you are unable to make it to my normal office hours or wish to meet one-on-one, please schedule an appointment with me. Use **Compass** to book an appointment during one of my appointment slots (separate from office hours). These appointments can be used for homework, general questions, or advising. If you are unable to meet with me during any of my scheduled appointment slots, send me an e-mail.

Due to my teaching schedule (and appointments with students), I may not be available if you just drop by my office. Please note that I will not be available to help with homework right before it is due.

E-mailing and Calling Me

Typically, I will not see e-mail any quicker than Moodle posts. Of course, I’m happy to address questions and concerns through e-mail that you don’t want to share publicly. Using e-mail is preferable to the phone; the phone sits on my desk, while I am usually near an e-mail (and Moodle!) retrieving device. I don’t always check e-mail during the weekends, but I will try to reply to e-mail within 24 hours during the weekdays.

Science Learning Center and Workshop

There will be additional assistance offered through the Science Learning Center and a weekly workshop. Attending the Workshop sessions is a part of your grade because it is highly beneficial. Many test problems will be based on problems addressed in the Workshop. Workshop times and tutoring hours will be announced as soon as possible.

Students with Documented Disabilities

Agnes Scott College seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in this class, please contact Kelly Deasy in the Office of Academic Advising (x6150) to make complete the registration process. Once registered, please contact me so we can discuss the specific accommodations needed for this course.

Title IX

Title IX provision: “No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.”

As stipulated by the Title IX Educational Amendments of 1972, Agnes Scott College has a Title IX Coordinator, Ms. Karen Gilbert, Director of Human Resources; and a Deputy Title IX Coordinator, Ms. Kristian Contreras, Director of Diversity Programs. If you need to report an incident of sexual discrimination on campus, please contact one of them directly using the information below.

Ms. Karen Gilbert
Title IX Coordinator
kgilbert@agnesscott.edu
404-471-6435

Ms. Kristian Contreras
Deputy Title IX Coordinator
kcontreras@agnesscott.edu
404-471-6394

EVALUATION

Grades will be determined by the following percentages.

Type of Assignment	Total Percent of Grade
Participation	7%
Weekly Warm-ups and Reading Quizzes	10%
Problem Sets	15%
MasteringPhysics	13%
Lab Work	20%
Tests	20%
Final Exam	15%

There will also be some extra credit opportunities throughout the course. The point value (and category) will be announced ahead of time. These extra credit opportunities may require attendance of events (such as Observatory open houses), writing, or completing online activities. My standard late penalty applies and I may give partial or no credit if the work is low quality.

Participation

Learning physics requires a substantial amount of work - you will be rewarded for the time that you invest studying physics, not just the scores you earn on homework on tests. The participation grade is based on attending lecture, completing the class benchmark assessments, reflection writings, and attending workshop or tutoring.

Lecture Attendance

Attending lecture will be essential in this class. In lecture we will discuss concepts and problem solving approaches, focusing on those that are most challenging. A significant portion of lecture will be dedicated to you working on conceptual and quantitative problems, often discussing them with others in the class. These interactions will benefit both you and your classmates, so it is imperative that you arrive on time, prepared, and dedicate your attention fully to lecture while in the room.

We will use *clickers* as a tool in lecture to gauge student understanding and make experimental predictions. This technique requires all students responding in a timely fashion, so **clickers will be registered to individual students and your participation will be tracked**. Your participation grade for each lecture will be based on responding to at least 75% of the clicker questions. “Correctness” will not be a factor in the grade. This does mean that you will need to sit in the *same seat* every class and let me know if your clicker is not functioning properly. You will receive 2 points for responding to 75% or more of the questions, and 1 point for attending but not answering enough questions.

The **two lowest** attendance grades will be dropped, including missed lectures. Because of this policy, I am unlikely to provide ‘excused absences’ for travel, sickness, and other conflicts.

Reflections

Every week there will be a short reflection topic due Wednesday. You will receive feedback on your reflection, which will be graded based on effort alone: 2 points for complete effort, 1 point for insufficient effort, and 0 points for nothing submitted. Occasionally other activities (such as a self-reflection rubric) will be used in place of the reflection. The format of the reflection will be more fully explained on Moodle.

Physics Assessment

Every semester we administer a benchmark questionnaire at the beginning and end of the course. This allows us to evaluate the *course*, not the students. In no way will it impact your grade, but we do ask that you do your best on both benchmarks. This year the assessment will be delivered online, rather than in person. You need to complete the benchmark by Wednesday, January 20th. The deadline for the post-class assessment will be announced near the end of the class. Completing each assessment will be worth 10 participation points.

Workshops and Tutoring

Attending workshop has a positive impact on student learning. Participating in workshop is part of your grade in this class to recognize the value and time required. Since workshop is scheduled at times more likely to have conflicts, you need to participate in a minimum of **5** workshops. Attending tutoring at the SLC for *one hour* can be substituted for participating in workshop. Participating in one session of tutoring or workshop is worth 2 points. Attendance will be periodically updated through the semester as I receive reports from the SLC.

Late Assignments and Makeup Tests

Assignments have a specific date and time they are due. Tests have a specific class period they will be given. This information is available far ahead of time so that you can arrange your schedule accordingly. If you turn in an assignment late, you will lose 20% for every day it is late, including

days of the weekend. Assignments turned in after homework has been graded will not be accepted. You should e-mail me to co-ordinate where you will turn homework in if it is late. Warm-ups and reading quizzes cannot be submitted after the deadline.

If you miss a class where a test was given and did not contact me ahead of time, you will receive a zero on that test. Accommodations may be made in two cases: if you contact me to reschedule a test *at least one week ahead of time* or if you have a medical or family emergency. These issues will be dealt with on a case-by-case basis. I am flexible about rescheduling tests if you have many tests occurring on the same day or a reasonable conflict, but you *must take the test ahead of when the rest of the class takes it*.

Grades

The final grades will be determined according to the following percentages. Descriptions are provided only as a guideline: grades cannot be negotiated.

A: 93-100	The student participated in all class sessions and turned in all assignments on time. Tests and homework demonstrated excellent conceptual understanding and ability to perform calculations.
A-: 90-92	
B+: 87-89	The student attended all class sessions and turned in assignments on time. Homework was mostly correct, but tests indicated a few problems with calculations or conceptual understanding.
B: 83-86	
B-: 80-82	
C+: 77-79	The student missed some classes. Some assignments were turned in late or incomplete. Homework may have had many mistakes, and the scores on tests indicate that the student has not mastered the conceptual understanding and calculations.
C: 73-76	
C-: 70-72	
D+: 67-69	The student missed classes and minimally participated when present. Some minor assignments were not turned in, or many were turned in late. Low test scores reflect poor preparation and problems with calculations and conceptual understanding.
D: 63-66	
D-: 60-62	
F: <60	The student missed numerous classes. Assignments were turned in late or not at all. The student's performance on tests shows a lack of preparation and misunderstanding of the core material of the course.

ASSIGNMENTS

Weekly Warm-Ups

It is essential that you do the reading before coming to the lecture. In order to bridge the reading and lecture, there will be weekly warm-ups. These will be administered through Moodle. They will be due by 8 PM on Sunday night. The schedule, including reading assignments, is posted separately on Moodle. Further details will be posted on Moodle with the weekly warm-up. There may be additional materials (websites, videos) that need to be read/watched before class.

You are encourage to complete the warm-ups *early*, if you have already finished the reading; it will not be possible to take them after they are due. Warm-ups will be graded for completion and will based on open-ended questions. You may loose points if your answers are particularly unclear or incomplete. The lowest score will be dropped.

MasteringPhysics

The online exercises on MasteringPhysics provide immediate feedback regarding whether you understand the concepts and how to do calculations. Many of the problems will be ‘tutorial’ style, providing assistance and walking you through the calculations. MasteringPhysics learns what concepts you are having difficulty with and assigns problems based on your unique learning needs. Please complete MasteringPhysics assignments *on your own* so that the system is accurately gauging your own learning.

Primary MasteringPhysics assignments will be due on **Tuesdays at 11:59 PM**. Follow-up assignments (Adaptive), tailored to your learning needs, will be due five days later (Sunday). There is a specific page on Moodle on MasteringPhysics - please see it for more info. The lowest MasteringPhysics grade will be dropped. There will not be an Adaptive assignment following the final MasteringPhysics assignment.

Problem Sets

Homework will give you the opportunity to practice problem solving, an essential part of learning physics. Problem Sets will be due at the end of lecture on Fridays. You will lose 20% for every day that it is late, including weekends. I will try to have homework graded by Monday: once homework has been returned, late homework will no longer be accepted. Please do e-mail me if you will be submitting your homework late; I try to post the solutions as early as possible, and late homework will not be accepted if I already posted the solutions.

You are encouraged to collaborate with each other and to seek help from myself and the course tutors. However, you are to submit your own written solution and will only receive full credit for clear and complete work.

Labs

Experimental work is an important component of physics. You will explore the concepts we cover in class through hands-on lab activities. The first day of lab will be January 25th or 26th (depending on your section).

Your lab instructor is Allison Smith. Her labs and my lecture are co-ordinated, but grading policies are independent. There may be a separate Moodle page for pre-lab assignments.

This semester the labs do not “line up” with the material that we will cover in lecture. We will spend a significant amount of time in lecture covering material that is relatively theoretical in nature and not easily explored in the lab setting. Conversely, there are numerous interesting labs dealing with light phenomena and circuits, topics that are best appreciated in a hands-on environment.

TESTS AND EXAMS

Tests

There will be 4 in-class (50 minute) tests given during the semester. The tests will be closed book and closed note. In order for you to focus your time on conceptual understanding and problem solving, an equation sheet will be provided for all tests. About a week before the test, you will be provided with a list of the material that you are responsible for on that given test. *If a test conflicts with a holiday that you observe, please let me know and we will find another day for you to take it.* Due to the rhythm of the semester, you may end up with days with many tests. I am willing to let

you take the test **early** (remember the honor code!), but it is not possible to take the test after the class has taken it.

Note that any type of calculators can be used for tests in this course.

Final Exam

There will be a comprehensive final exam, consisting of both calculations and multiple choice questions. An equation sheet will be provided, but otherwise it will be closed book and closed note. Please note that you are responsible for all material covered in the class, even if it did not appear on a previous test.

INCLUSION

This course adheres to the principles of diversity and inclusion integral to the Agnes Scott community. We respect people from all backgrounds and affirm people's gender expressions and identities. Please feel free to correct me (in person or via e-mail) if your preferred name or gender pronoun are different from that listed on the class roster.

It is important to me that the examples and language we use in physics classes are welcoming to all students. I make efforts to avoid analogies based in sexist and heteronormative language, but you may find these when looking at online resources on your own. If you are comfortable doing so, I welcome feedback on how I can make my examples more relevant to students from diverse backgrounds.

ACADEMIC HONESTY

The Agnes Scott College honor code embodies an ideal of character, conduct, and citizenship, and is an important part of the College's mission and core identity. This applies especially to academic honesty and integrity. Passing off someone else's work as your own represents intellectual fraud and theft, and violates the core values of our academic community. To be honorable, you should understand not only what counts as academic dishonesty, but also how to avoid engaging in these practices. You should:

- review each course syllabus for the professor's expectations regarding course work and class attendance.
- attribute all ideas taken from other sources; this shows respect for other scholars. Plagiarism can include portraying another's work or ideas as your own, buying a paper online and turning it in as if it were your own work, or not citing or improperly citing references on a reference page or within the text of a paper.
- not falsify or create data and resources or alter a graded work without the prior consent of your professor. This includes making up a reference for a works cited page or making up statistics or facts for academic work.
- not allow another party to do your work/exam, or submit the same or similar work in more than one course without permission from the course instructors. Cheating also includes taking an exam for another person, looking on another person's exam for answers, using exams from previous classes without permission, or bringing and using unauthorized notes or resources (i.e., electronic, written, or otherwise) during an exam.

- not facilitate cheating, which can happen when you help another student complete a take home exam, give answers to an exam, talk about an exam with a student who has not taken it, or collaborate with others on work that is supposed to be completed independently.
- be truthful about the submission of work, which includes the time of submission and the place of submission (e.g., e-mail, online, in a mailbox, to an office, etc.).

You should understand that penalties result from dishonest conduct, ranging from failure of the assignment to expulsion from the college. You should speak with your professors if you need clarification about any of these policies.

The following behaviors are encouraged:

- Attempting a problem set or MasteringPhysics problem and bringing your work to the tutor or professor for feedback on your understanding and approach.
- Discussing your approach to a problem set problem with your classmates.
- Studying with classmates before a test, including brainstorming what may appear as test questions.

The following actions are considered a violation of the honor code:

- Searching the internet for the text of a problem set or MasteringPhysics problem to find the answer.
- Copying the work of a classmate on a problem set or MasteringPhysics problem.
- Utilizing solutions manuals for the textbook.
- Discussing any aspect of a test or the final exam with classmates before *everyone* has completed the test, including discussing how hard it was or how you feel you did.
- Using notes, solutions, or other materials from students who previously took the class.

Modified Pledge

Students pledge that they have completed assignments honestly by attaching the following statement to each problem set, test, quiz, paper, lab, or other work:

I pledge that I have neither given nor received any unauthorized aid on this assignment.
(Signed) _____

For Moodle quizzes, we will use an electronic equivalent to this statement.

JANUARY 2016

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

			L1: Charge Model		L2: Charge Model	
	11	12	13	14	15	16

Week 2 W↑1: Ch 25, 26.1-4	No Class: MLK	MP1 Due	L3: Coulomb's Law and The Field Model Assessment Due Reflection 1 Due		L4: Field from Charges Problem Set 1 Due	
17	18	19	20	21	22	23

Week 3 W↑2: 26.5-6, Ch 27 Adaptive 1 Due	L5: Continuous Charge Distribution Lab 1	MP2 Due Lab 1	L6: Parallel Plate Capacitor, Trajectories Reflection 2 Due		L7: Flux, Gauss Problem Set 2 Due	
24	25	26	27	28	29	30

Week 4 W↑3: 27.4-6 Adaptive 2 Due
31

Legend:

Lecture

Mastering

Reflection

Test

Problem Set

Warm Up

Lab

FEBRUARY 2016

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	L8: Gauss's law <i>Last day to Drop</i> Lab 2 1	MP3 Due Lab 2 2	Review Reflection 3 Due 3	4	TEST 1: Electric Fields, Forces 5	6
Week 5 W↑4: Ch 28, 29.1-4 Adaptive 3 Due 7	L9: Potential Energy Lab 3 8	MP4 Due Lab 3 9	L10: Electric Potential Reflection 4 Due 10	11	L11: Potential and Field Problem Set 3 Due 12	13
Week 6 W↑5: 29.5-7, Ch 30, 31.1-2 Adaptive 4 Due 14	L12: Capacitance Lab 4 15	MP5 Due Lab 4 16	L13: Current and Resistance Reflection 5 Due 17	18	L14: Ohm's Law, Kirchhoff's Circuit Laws Problem Set 4 Due 19	20
Week 7 W↑6: 31.3-9, 32.3-4 Adaptive 5 Due 21	L15: Simple Circuits Lab 5 22	MP6 Due Lab 5 23	L16: Grounding, RC Circuits Reflection 6 Due 24	25	L17: Magnetism Problem Set 5 Due 26	27
Week 8 W↑7: 32.3-4 Adaptive 6 Due 28	L18: Magnetic Fields Lab 7 29					

Legend:

Lecture

Mastering

Reflection

Test

Problem Set

Warm Up

Lab

MARCH 2016

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

MP7 Due
Lab 7
1

Review
Reflection 7 Due
2

Dr. A Away
3

TEST 2: Potential, Circuits
4

5

Week 9
Adaptive 7 Due
6

No Class: Spring Break
7

No Class: Spring Break
8

No Class: Spring Break
9

No Class: Spring Break
10

No Class: Spring Break
11

12

Week 10
13

No Class: Peak Week
14

No Class: Peak Week
15

No Class: Peak Week
16

No Class: Peak Week
17

No Class: Peak Week
18

19

Week 11
W↑8: Ch 32
20

L19: Dipoles, Solenoids
Lab 7
21

Midterm grades posted
MP8 Due
Lab 7
22

L20: Magnetic Forces
Reflection 8 Due
23

24

No Class: Easter Break
25

26

Week 12
W↑9: Ch 33
Adaptive 8 Due
27

L21: Induced Currents, Lenz's Law
Lab 8
28

MP9 Due
Lab 8
29

L22: Faraday's Law
Reflection 9 Due
30

Last day to withdraw
31

Legend:

Lecture

Mastering

Reflection

Test

Problem Set

Warm Up

Lab

APRIL 2016

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

					L23: Applications and Circuits Problem Set 6 Due	
					1	2
Week 13 W↑10: 20.1-4 Adaptive 9 Due	L24: Wave Basics Lab 9	MP10 Due Lab 9	Review Reflection 10 Due		TEST 3: Magnetism	
3	4	5	6	7	8	9
Week 14 W↑11: Ch 34 Adaptive 10 Due	L25: Reference Frames, Transforming Fields, Displacement Current Lab 10	MP11 Due Lab 10	L26: Maxwell's Equations, EM Wave Properties Reflection 11 Due		L27: Polarization Problem Set 7 Due	
10	11	12	13	14	15	16
Week 15 W↑12: 20.5-7, Ch 21 Adaptive 11 Due	L28: Sound and Light Lab 11	MP12 Due Lab 11	L29: Standing Waves Reflection 12 Due		L30: Adding Waves, Intereference Problem Set 8 Due	
17	18	19	20	21	22	23
Week 16 W↑13: 22.1-4 Adaptive 12 Due	L31: Diffraction	No Class: SpARC MP13 Due	Review Reflection 13 Due		TEST 4: Waves, Light	
24	25	26	27	28	29	30

Legend:

Lecture

Mastering

Reflection

Test

Problem Set

Warm Up

Lab

MAY 2016

Sunday

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

Week 17 W↑14: 23.1-7 Adaptive 13 Due 1	L32: Ray Optics 2	MP14 Due 3	Review 4	5	6	7
Week 18 8	9	10	11	12	13	14

Legend:

Lecture

Mastering

Reflection

Test

Problem Set

Warm Up

Lab