

PHYS 114 – General Physics II – Spring 2020**KSU - 4 credits**

<u>Section</u>	<u>Room</u>	<u>Instructor</u>	<u>Contact Info.</u>
LEC: TU 1:30 & 2:30	CW 103	Gary Wysin	532-1628, wysin@ksu.edu
QUIZ: M 5:30 - 6:45	CW 101–103	Gary Wysin	CW 309, M 1:30-4:00 & appt.
REC: W 8:30, 9:30	CW 219	Artem Rudenko	532-4470, CW 306, rudenko@phys.ksu.edu
REC: W 10:30	CW 219	Jeremy Schmit	532-1621, CW 330, schmit@phys.ksu.edu
REC: W 11:30	CW 219	Artem Rudenko	
REC: W 1:30, 2:30	CW 219	Jeremy Schmit	
Director of UG Physics Labs:	CW 401	B. Lohman	532-1605, bc16677@phys.ksu.edu

Important!

You must register for all four PHYS 114 sections, LEC, QZ, REC, and LAB. If you are missing any of these, get on the wait list immediately!

Text

OpenStax *College Physics*, Paul P. Urone and Roger Hinrichs, available for free online.

Response system

i>clicker+, i>clicker2, or iclicker cloud.

Online homework

Sapling Learning at www.saplinglearning.com.

Course Web Sites

Access the course textbook for free at:	openstax.org/details/college-physics
See your current grades at K-State Canvas:	canvas.ksu.edu
Information about i>clicker at:	www.iclicker.com
Do the on-line homework assignments at:	www.saplinglearning.com
See old lecture notes, exams and other aids at:	www.phys.ksu.edu/personal/wysin/GPII/

Prerequisites

Phys 113, and a basic knowledge of algebra, trigonometry, geometry and a calculator.

Description

PHYS 114 is an algebra/trigonometry based introductory physics course dealing with the topics of electricity, magnetism, light and quantum physics. Emphasis will be placed on the basic principles and concepts and their applications in everyday technology and in the world's economy.

Objectives

Successful students will understand how to analyze the processes of nature, what goes on in the world, and how some technology works, including the basic concepts and numerical estimates.

Grading

Grades will be determined from Recitation, Exams, Labs, and Homework, as follows:

<u>Task</u>	<u>Max. Points</u>	<u>Grading scale</u>
Chapter Exams (best 12/15 chapters)	480	A: 1000–900
Lab writeups (best 12/13 labs)	200	B: 900–800
Recitation work (best 14/15)	140	C: 800–700
On-line homework (best 14/15)	140	D: 700–600
i>clicker in Lecture (drop lowest 5)	40	F: below 600
Total	1000	

Recitation includes an in-class group-work problem on paper (10 pts. each, lowest 1 dropped) and help with the online homework at saplinglearning.com. The lowest online homework grade will be dropped. The best 12 lab scores will be scaled out of 200 points. Exam scores will be recorded for each of 15 chapters; the lowest 3 chapter scores will be dropped. The last exam for the last 3 chapters takes place at the

final exam time: 6:20 - 8:10 p.m., Tuesday, May 12 (See <http://courses.k-state.edu/exam-schedule.html>). Because lowest scores are dropped, there are no makeup recitations, labs, or exams.

Lecture i>clicker Questions

I will use i>clickers during lecture to help with concepts you are learning. Each day, I'll pose about 4 i>clicker questions. For each question there is 0.5 point for participation and 0.5 point for a correct answer. The questions will be based on the readings and any topics for that lecture. At the end of the semester, the total i>clicker points will be scaled out of 40 (4.0% of your grade) after dropping your lowest 5 scores. If you can't make it to class, there is no make-up. It will be a dropped score. Bring your clicker to class every lecture.

You can get an i>clicker+ or i>clicker2 at a bookstore, or use a mobile device (laptop or phone) and an i>clicker cloud account. Further info about i>clicker can be found in KSU Canvas or at the iclicker website.

Laboratory

The laboratory is a required and integrated part of the course, and counts 20% towards your grade. *A passing grade (60%) in the laboratory is required to pass the course.* See the lab manual and listen to your lab instructor for rules and grading procedures. Lab begins during the **first week** of class. You do not need to buy any lab manual. The lab information will be found in electronic form on KSU Canvas before each lab. Address your questions about lab grades and procedures either to your lab instructor or to Brandon Lohman, the Director of Undergraduate Physics Labs, CW 401.

Credit for Previous Lab Work

Students retaking the course, who have successfully completed the lab must contact Brandon Lohman in CW 401 (532-1605) prior to the first week of lab to get credit for the previous lab work. There is a special lab section to enroll in for retakes.

Recitation and Homework

Doing homework problems is an important part of obtaining success in physics, helping you organize your thoughts, **learn the concepts**, and **apply them**.

The recitation is where you can go for help and practice with problem solving and learning concepts. If you have already attempted some of the online HW before the recitation, you will get more out of it. The recitation will be oriented towards learning and applying ideas in general, not necessarily to particular problems. The recitation should improve your overall understanding of physics, and help you prepare for exams as well.

Group-work: In recitation, a group-work problem will be submitted each time on paper (10 points/week, lowest 1 dropped). Your recitation instructor will assign you to groups of four or less where you collaborate to make the solution of a written problem in class each week. Every student will write their own solution, however, they discuss within the group and also get help from the instructor. Only one group member's paper will be selected for grading each week; all group members get the same grade. You can help your group do its best by participating and making sure everyone understands what they are doing. Groups will be changed after each exam. If you don't attend the recitation your group-work score will be zero.

Your group-work problem shows the details of how you solved it: include necessary **diagrams**, identify the **concepts** or **physics principles** you are using, show the **equations** you apply, and show how the numbers with units are inserted after that, and finally, a numerical answer with the correct units. No credit will be given for just numbers or a yes/no response. Keep in mind that students who do best on exams are the ones who work carefully, writing things out clearly with well-organized presentation of the **concepts** and **equations** used before inserting numbers. See the problem solving tips on pages 4 and 5, and the Guide to Solving Physics Problems hand-out you can find at <https://www.phys.ksu.edu/personal/wysin/GPII/problem.solutions.pdf>.

On-line HW: Each week there is an on-line assignment at saplinglearning.com (140 points/semester). Each on-line assignment will be available at www.saplinglearning.com about 10 days before the associated

recitation. A link is available in KSU Canvas. The due dates will be Monday nights, but it will be better to get them done before that! Your lowest on-line score will be dropped. You are allowed to work with others (not copying) on your HW, which means discuss the ideas and things you don't understand, until you do. Many of the problems have randomized numbers: everybody gets different numerical values. So you will be happiest if you understand what you are doing. You are not allowed to use solution manuals, on-line solution websites, Cramster, etc. These are considered **unauthorized aids and a violation of the honor code**. The point of homework is to practice thinking, not copying a solution algorithm from another source.

Chapter Exams

These take place on some Mondays at 5:30–6:45 p.m. in CW 101,102,103, except for the last one, which will be in the final exam time, 6:20–8:10 p.m., Tuesday, May 12, see the schedule. If you have an **official University event**, such as participation in a KSU sports team, debate team, etc., that conflicts with an exam time, you might be able to take that exam *early*, ask me. There are no makeup exams, but your lowest 3 chapters scores of the 15 chapters will be dropped.

On exams, you will need to show how you solved problems, so it will be good to practice this when doing your HW, even if it is not necessary for submitting online HW. So for your own benefit, acquire the habit of writing out the details of your solutions. You can list the given quantities (with their symbols and values with units) and list the quantity you are looking for (with its symbol and units). Include necessary diagrams, the equations you applied, show how the numbers with units were inserted after that, and finally, give a numerical answer with the correct units. Practice thinking while doing your HW, then your exams will become easier. Remember that on exams, no credit will be given if just the final numerical answer is given.

The exam problems will be based on the same concepts as covered in the lectures and in homeworks. Old exams and solutions can be found on the course website. Try to **study the concepts** and **how to apply them**, *do not* just try to memorize how to solve *particular* problems. One page on the exam will be an equation sheet that summarizes the important formulas you may need to do the problems in those chapters. This equation sheet will be posted to KSU Canvas some days before the exams. Solution keys to the exams will be posted on the course website.

Final Exam

The Final Exam is the last set of chapter exams, covering Chapters 30, 31, 32 on Tuesday, May 12, from 6:20 – 8:10 p.m. in CW 101,102,103. If you are satisfied with the grades you have up to that point, then these 3 last chapter scores could be the ones that you drop, and your grade will be calculated with them as zeros. That means the Final Exam could be optional for you if you have done excellent work up to that point. These last 3 chapters scores will raise your grade if any of them are better than your lowest 3 scores on the earlier chapters.

Plan early, keep up with the course, take responsibility for your learning and your grade, and you can get done with PHYS 114 early and in good shape! If in doubt, take the final exam, it can only raise your grade or leave it unchanged.

Grades on KSU Canvas

Be aware that the total course grade you see in KSU Canvas during the semester is only an **estimate** of your grade. Until all homework, recitation and lab grades are entered, KSU Canvas does not give your precise grade, due to the low scores being dropped and scaling of points. Only when all components have been entered, is it correct.

Grades may be contested up to one (1) week after being posted on KSU Canvas - after that they become a permanent academic record. This applies to both the main gradebook for the course and the gradebook for the lab.

Tips on doing Physics II homework problems

* **Don't wait until the last minute.**

Begin homework assignments several days before they are due.

You can surely do some of them even before hearing about the topic in lecture.

* **What's going on here?**

Sketch the situation. Make it seem real for yourself.

Identify desired quantities, their symbols, and their units.

*I want to find **charge q** , in **coulombs***

List the quantities you know, with units.

*I know **potential V** , in **volts**.*

*I know **capacitance C** , in **farads**.*

Recall the definitions of these items, it may help a lot!

What are the important equations or relations between them?

*The **charge** is given by the capacitor formula. $q = CV$.*

* **Get help if you need it.**

Being completely stuck is no fun. If you really are getting nowhere, and have no idea what to do next, you are encouraged to cooperate with other students, or seek help from your instructors.

* **What's my strategy?**

What concepts and equations apply?

Briefly state your strategy in words and sentences.

(Pretend you are explaining to another student.)

Write down the equation(s) you will use, in symbols.

* **Solve algebraically for the desired quantity.**

Still stuck? Did you really draw a diagram?!

You may need to combine some equations, or use trigonometry, that's OK!

Get the quantity you want on the left of the equals sign, and everything else on the right.

Don't skip steps.

* **Do the arithmetic, with units.**

Substitute numbers with units in your equation.

Power $P = IV$ becomes $P = (8.0\text{ A})(24\text{ V}) = (8.0\text{ C/s})(24\text{ J/C}) = 192\text{ J/s} = 192\text{ W}$.

Keep the units on everything until the end. It's a useful check.

* **Write down the answer, with correct units!**

* **Does the answer make sense?**

Is the number of reasonable size, not excessively large or small?

If you change the given numbers to very simple cases, will you get an expected result?

If you modified the situation into a simpler one, will your approach still work?

* **Enjoy the challenge.**

Hey, you figured out something new. Now you understand it.

And it wasn't so simple.

Have confidence, you can do as well or better on the next problem!

Physics Study Hints:

1. Read the textbook, paying attention to the equations and figures.
2. When you take notes in class, don't just copy equations and diagrams. Listen to the instructor and write down the *ideas* behind the equations and diagrams!
3. Study the examples in the book in order to learn how to solve problems.
4. If you don't understand, formulate a question. Write down your questions so you can ask your instructor later. Then ask your instructor later!
5. Stop occasionally and think about what you just read. Try to think of real-life examples where the physics ideas might be applicable.
6. Look at extra questions and level I problems, just to see if you would know how to answer them. If so, you have a good grasp of the definitions of basic concepts.
7. If you can't work a difficult homework problem, try to work a related, but easier one first. Or, try breaking your problem into steps or parts.
8. Keep in mind, the level II problems usually require you to apply more than one concept. You probably need to use more than one equation.
9. In physics, the same idea can be expressed several ways: as a picture or diagram, equation, or graph. Look for the main idea. Think about how the different presentations help you to understand it.
10. Remember, physics isn't always complicated. Most of the ideas are simple and common-sense.

Laboratory Hints:

1. Work smart, which is to say, efficiently. Check yourself as you go along (hints 3,5,6 above). Do it right the first time, because you won't have time to do it over.
2. Write down the names and telephone numbers of your lab partners on your data sheet.
3. Read the lab manual before lab. Figure out what you want to look for, and how you will look for it. Write this down before you get to lab. (This is the start of your lab report.)
4. In lab, pay attention to the lab instructor's explanation. Some things aren't in the lab manual.
5. While taking data, make a graph right away so you can see if your data make sense. Professional physicists do this all the time. Plot each data point as soon as you've finished writing down the number. This habit can save a lot of trouble later, because you can immediately see what the data are doing!
6. After you have taken a few data points, do a sample calculation for analyzing the data. This will (a) let you know if your data make sense, (b) let you know whether you understand what you are doing, (c) let you know if you've forgotten to write down any quantities. A sample calculation will save you from getting home, then realizing that you forgot to get a number.
7. Write down everything on your data sheets. Never rely on your memory. Use pen. Never erase. Cross mistakes out neatly instead, so you can still read them if you have to. Write down ideas that occur to members of your lab group, too!
8. Work as a team. Make sure that everyone gets to play with the equipment. Report broken equipment to the lab instructor, so he can make sure it gets fixed.
9. Graphs on the data sheet may be crude. Graphs in the lab report should be drawn large enough to see, preferably on a full page. Graphs and tables must have titles. The axes on graphs must have labels (i.e., numbers, name of quantity being plotted, and its units).
10. Use words and sentences to describe what you are doing. Correct spelling and grammar are encouraged. Graphs, tables and equations supplement the words. They never replace words.

IMPORTANT STATEMENTS

University Statement Regarding Academic Honesty

Kansas State University has an Honor System based on personal integrity, which is presumed to be sufficient assurance that, in academic matters, one's work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor System. The policies and procedures of the Honor System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. The honor system website can be reached via the following URL: www.k-state.edu/honor. A component vital to the Honor System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: "On my honor, as a student, I have neither given nor received unauthorized aid on this academic work." A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

My Additional Statements on Academic Honesty

Note that you are permitted to work with (not copy from!) other students on homework problems (and labs) if you acknowledge cooperation by writing "I worked with (name)" on the assignment. Use of any kind of **solution manual** for doing homework is an **unauthorized aid**. All exams must be entirely your own work.

Statement Regarding Students with Disabilities

Students with disabilities who need classroom accommodations, access to technology, or information about emergency building/campus evacuation processes should contact the Student Access Center and/or their instructor. Services are available to students with a wide range of disabilities including, but not limited to, physical disabilities, medical conditions, learning disabilities, attention deficit disorder, depression, and anxiety. If you are a student enrolled in campus/online courses through the Manhattan or Olathe campuses, contact the Student Access Center at accesscenter@k-state.edu, 785-532-6441; for Salina campus, contact the Academic and Career Advising Center at acac@k-state.edu, 785-826-2649.

Faculty members who need assistance with accommodating a student with a documented disability should contact the access services office on the appropriate campus. Assistance may include administration of course exams with extended time and/or distraction reduced environment or providing an alternate format of text materials.

Statement Defining Expectations for Classroom Conduct

All student activities in the University, including this course, are governed by the Student Judicial Conduct Code as outlined in the Student Government Association By Laws, Article VI, Section 3, number 2. Students that engage in behavior that disrupts the learning environment may be asked to leave the class.

Campus Safety Statement

Kansas State University is committed to providing a safe teaching and learning environment for student and faculty members. In order to enhance your safety in the unlikely case of a campus emergency make sure that you know where and how to quickly exit your classroom and how to follow any emergency directives. To view additional campus emergency information go to the University's main page, www.k-state.edu, and click on the Emergency Information button.

Copyright Statement

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Schedule for General Physics II, Spring 2020

<u>Date</u>	<u>Reading</u>	<u>Lecture Topics / Recitation Chapters</u>	<u>Labs</u>
1-21 Tu	18-1,2,3	18. Electric Charge & Force: Coulomb's Law	Labs on 1-24 & 1-27: Introduction to Electrostatics
1-22 We	Recitation 1	18. See saplinglearning.com for homework.	
1-23 Th	18-4,5,7	18. Electric Field & Field Lines	
1-28 Tu	19-1,2,3,4	19. Electric Potential & Potential Energy	Labs on 1-31 & 2-03: Equipotentials & Electric Fields
1-29 We	Recitation 2	19.	
1-30 Th	19-5,6,7	19. Capacitance: Storing Charge & Energy	
2-04 Tu	20-1,2,3,4	20. Current & Resistance: Ohm's Law	Labs on 2-07 & 2-10: Ohm's Law & DC Circuits
2-05 We	Recitation 3	20.	
2-06 Th	20-4,5,6	20. Electric Energy Units & Hazards	
2-10 Mo	Exam #1	Chs. 18,19,20 – Basic Electricity	Labs on 2-14 & 2-17: Currents & Magnetic Fields
2-11 Tu	21-1,2,3	21. DC Circuits & Kirchhoff's Rules	
2-12 We	Recitation 4	21.	
2-13 Th	22-1,2,4,5	22. Magnetic Field and Forces	
2-18 Tu	22-7,8,9,10	22. Magnetic Applications: Solenoids, etc.	Labs on 2-21 & 2-24: Electromagnetic Induction
2-19 We	Recitation 5	22.	
2-20 Th	23-1,2,3,5	23. Induced Electromotive Force (Faraday's Law)	
2-25 Tu	23-5,6,7	23. Alternating Current and 23. Generators, Motors & Transformers, etc.	No Labs on 2-28 and 3-02
2-26 We	Recitation 6	23.	
2-27 Th	23-9,11,12	23. Inductance; AC Resonance	
3-02 Mo	Exam #2	Chs. 21,22,23 – Electromagnetics	Labs on 3-06 & 3-16: Ray Tracing
3-03 Tu	24-1,2,3,4	24. Electromagnetic Waves	
3-04 We	Recitation 7	24.	
3-05 Th	25-1,2,7	25. Images by Reflection, Mirrors	
3-10 Tu	Spring Break	No Classes All Week	No Lab
3-11 We	Spring Break	No Classes All Week	
3-12 Th	Spring Break	No Classes All Week	

The online homework assignments are found online at saplinglearning.com and due on Sunday nights at 11:59 p.m. Exams are at 5:30 – 6:45 p.m. on the indicated Mondays, except for Exam 5, see the next page. Exam scores will be saved for each chapter; the lowest three chapters are dropped.

Schedule for General Physics II, Spring 2020 (continued)

<u>Date</u>	<u>Reading</u>	<u>Lecture Topics / Recitation Chapters</u>	<u>Week's Lab</u>
3-17 Tu	25-3,4,6	25. Images by Refraction, Lenses	Labs on 3-20 & 3-23: Human Eye & Simple Camera
3-18 We	Recitation 8	25.	
3-19 Th	26-1,2,4	26. Optical Instruments & Vision	
3-24 Tu	27-1,2,3,4	27. Light Waves & Interference	Labs on 3-27 & 3-30: Diffraction & Interference
3-25 We	Recitation 9	26,27.	
3-26 Th	27-5,6,8	27. Rayleigh's Diffraction Limit; Polarization	
3-30 Mo	Exam #3	Chs. 24,25,26 – Optics	Labs on 4-03 & 4-06: Polarization of Light
3-31 Tu	28-1,2,3	28. Relativity – Time & Length	
4-01 We	Recitation 10	28.	
4-02 Th	28-4,5,6	28. Relativity – Mass & Energy	
4-07 Tu	29-1,2,3,4	29. Thermal-photons, Photo-electrons	Labs on 4-10 & 4-13: Photoelectric Effect
4-08 We	Recitation 11	29.	
4-09 Th	29-4,5,6	29. Photons & Matter Waves	
4-14 Tu	29-6,7,8	29. Quantum Mechanics & Uncertainty	Labs on 4-17 & 4-20: Atomic Spectra
4-15 We	Recitation 12	29.	
4-16 Th	30-1,2,3,6	30. Atomic Spectra & Bohr's Model	
4-20 Mo	Exam #4	Chs. 27,28,29 – Modern Physics	Labs on 4-24 & 4-27: Simulated Nuclear Decay
4-21 Tu	30-7,8,9	30. QM Rules for Atoms; Periodic Table	
4-22 We	Recitation 13	30.	
4-23 Th	31-1,2,3,4	31. Nuclear Physics & Radioactive Decays	
4-28 Tu	31-4,5,6	31. Half-Life, Decay Rates & Activity	Labs on 5-01 & 5-04: Radiation
4-29 We	Recitation 14	31.	
4-30 Th	32-1,2,3,4	32. Radiation Damage & Dosimetry	
5-05 Tu	32-5,6	32. Nuclear Energy, Fission, Fusion	No Labs
5-06 We	Recitation 15	32.	
5-07 Th	32-2,5,6	32. Quantum & Nuclear Physics Review	
5-12 Tu	Exam #5	Chs. 30,31,32 – Quantum & Nuclear Physics	CW 101,102,103

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