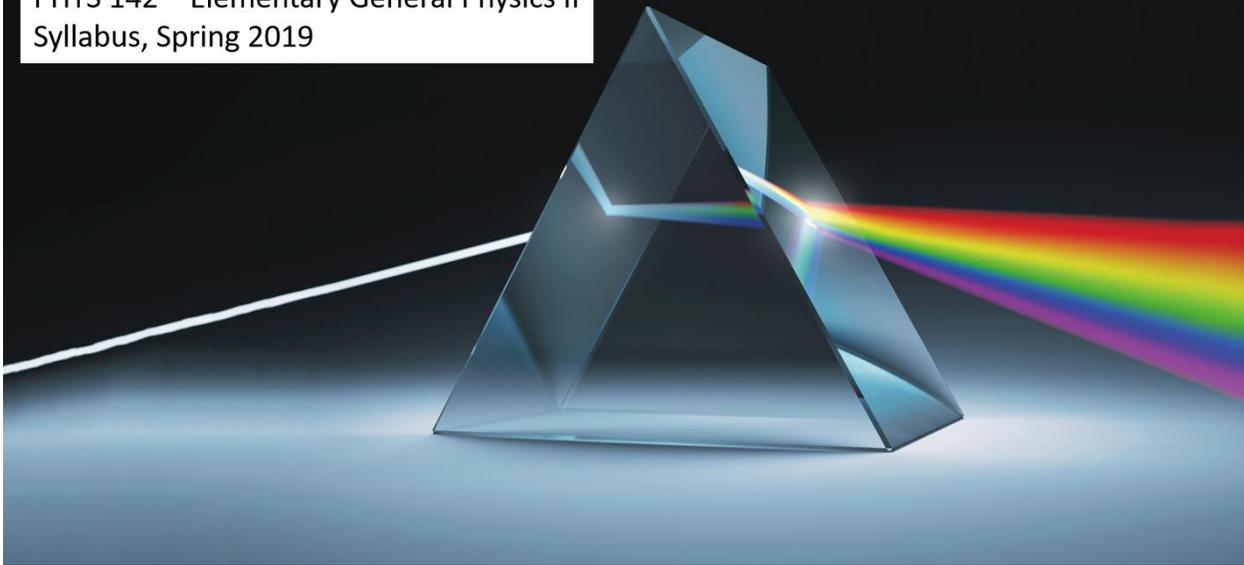


PHYS 142 – Elementary General Physics II
Syllabus, Spring 2019



Instructor

Dr. Keith Foreman
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Office Hours: MW 3:30-5:30pm and TR 9:30-11:30am
or by appointment



Times and Location

We will meet each Monday, Wednesday, and Friday in Jorgensen Hall, room 136.
Section 150 meets 8:30-9:20am and Section 250 meets 9:30-10:20am.

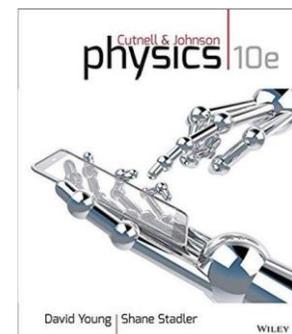
First meeting: Monday, January 7th
Last meeting: Friday, April 26th
Final Exam: 6:00pm to 8:00pm Monday, April 29th

We will not meet Monday, January 21st (Martin Luther King Jr. Day), or the week of March 18th (Spring Break).

Text

Cutnell & Johnson, *Physics* (Wiley, 2015, 10th Edition, Volume 2, Chapters 18-32).

You don't actually need to buy a hardcopy version of the text because an electronic version of the text (eBook) is available through *WebAssign*, to which you are required to subscribe. More information on *WebAssign* can be found below.



Prerequisites

Physics 141 (or 141H) and its prerequisites.

ACE Certification & Course Objectives

This course has been certified by the [Achievement-Centered Education](#) program at UNL to satisfy Student Learning Objective #4: “Use scientific methods and knowledge to pose questions, frame hypotheses, interpret data, and evaluate whether conclusions about the natural and physical world are reasonable.”



PHYS 142 is the second of two courses in the algebra-based general physics sequence. It is a study of electricity, magnetism, optics, and atomic and nuclear physics. An understanding of algebra, simple geometry, and trigonometry are required. The main focus of this course is on the qualitative and quantitative appraisal of simple physical systems through a comprehensive process of problem solving designed to arrive at a thorough understanding of relationships between systems and their behavior. This process can be separated into four distinct phases. The first phase consists of an inquiry into what the system is and its essential components. The available data (which are given in the statement of the problem, or in diagrams, graphs, or reference tables, or some combination thereof) and the key physical principles and laws governing the system should be identified during this phase. The second phase is to interpret the physical principles and laws and the data in order to develop a plan and define goals for a solution. During this phase, the inferences that can be drawn from the data, the best way to approach the problem, the necessary mathematical relations and methods to solve the problem, and any requisite intermediate information that must be obtained should be identified. This plan is implemented in the third phase through detailed analysis, with careful attention to accurate execution of the mathematical relations representing the underlying physical principles. Critical evaluation of the reasonableness of the solutions and conclusions is the essential fourth and final phase of problem solving. This evaluation includes checking units, recalculating some quantities by a different route, and judging whether the magnitude of the answer is within reasonable physical limits.

The sections “What You Will Do” and “Exams and Grading” below explain how your ability for appraising physical situations will be developed and assessed.

The successful student will develop the critical thinking and problem-solving skills necessary for careers in the life sciences.

What You Will Do

The learning process will involve you actively in online pre-class quizzes, in-class discussions, recitations, and laboratory exercises. Your responsibility is to come to lectures, recitations, and laboratory sessions ready to participate, having familiarized yourself ahead of time with the material in the textbook which is to be discussed, and to do the online pre-class quizzes and assigned homework.

A few words on each activity:

ONLINE PRE-CLASS QUIZZES - (in *WebAssign*) will generally be due Monday, Wednesday, and Friday by 7am, a few hours before lecture begins. These quizzes help you prepare for lecture, so do them *after* you complete your reading assignment for the upcoming lecture. The quizzes also help *me* find out which topics are difficult for the group as a whole and may need more attention. They are due a few hours before lecture so that I have time to review the results, and make adjustments to the lecture as needed.

LECTURE - Lectures will consist of presentations, demonstrations, and discussion-based problem solving. Both attendance and participation, at all lectures, are necessary to be successful in this course. Lectures are an activity and should not be wasted by passivity: listen—think—discuss—ask questions—answer questions—and be courteous. Being “courteous” means not being a distraction to other students; cell phones, in particular, should not be used during lecture. During class you will participate in Peer Instruction activities using the Campus “iClicker” response system (see below).

PEER INSTRUCTION - During lecture, you will answer conceptual questions using a “clicker”. This is a radiofrequency remote device which is part of the “iClicker” system used in many courses at UNL. A computer in the lecture room will record and process all responses and display the result. If I notice poor understanding at this point, you will discuss the question with two or three of your classmates, your peers, after which you may revise your answer in a second voting round.



This approach, called “[Peer Instruction](#)” is an evidence-based teaching pedagogy proven to greatly improve comprehension. A student that is proactive about his or her education will not waste this opportunity to improve comprehension by sitting alone and not engaging classmates in discussion. This method also helps me learn what difficulties students are having and work them out on the spot, instead of until after an exam. Students should take these conceptual “clicker questions” seriously, as some may appear again on other for-credit work. On rare occasions, these concept questions themselves may be given for credit. To be able to receive credit for clicker responses, you will need to register your clicker on the course Canvas page, using your clicker ID – an eight digit/letter code found on your clicker.

RECITATION - The best way to master the physics this course will cover is to *work through* physics problems. To that end, you are required to attend an informal discussion section, that meets once a week, called a recitation. At recitation, you will learn and practice problem solving strategies in the presence of a recitation instructor that can give you immediate feedback and guidance concerning the difficulties encountered in solving problems. Attendance and class participation are required and problems assigned during recitation will be graded and count toward your overall course grade. You are encouraged to ask your recitation instructors for help with any aspect of the course including the homework assignments, but they will not do your homework for you. A student that is proactive about his or her education will be actively engaged with his or her peers when working through the

problems. The recitation questions themselves should be considered “practice runs” for exam questions, and thus taken seriously.

ONLINE HOMEWORK – Homework is assigned weekly, as a *WebAssign* (more on *WebAssign* below) assignment. Occasionally, written homework may also be assigned, which will be posted on Canvas (more on Canvas below). If you get stuck and need a hint, contact me. Homework assignments will generally be due by midnight one week after lecture on the relevant chapter has concluded. My late policy is very simple: *Late homework will not be accepted except in extreme circumstances. Contact me as soon as possible if you believe you have reason to be granted an extended deadline.*

As stated above, the best way to learn physics is to do physics. While searching for the answers to your homework questions online may be tempting, a student that has not truly mastered his or her homework will not perform well on exams. Pure memorization will not be enough to be successful in this course: staring at a solution until you have memorized the steps is *not* the same thing as learning physics. Mastering your homework means being able to do every problem, without giving in to the temptation of looking up a solution, and truly understanding *why* each step was done the way it was done. A student that has mastered the homework will be well prepared for exams.

LABORATORY – Held in Jorgensen Hall, you will attend weekly laboratory sessions beginning the first week of classes. In these laboratory sessions, you will strengthen your understanding of the physics we learn about in lecture through hands-on physics experiments. You will see, first hand, the relation between physics concepts and real-world, human-based applications. You will also develop the crucial skill of collecting and analyzing data – to form meaningful conclusions from data sets.

You are required to attend every scheduled session. The laboratory manual is *Physics 142 Laboratory Manual, 2019*, and will be provided to you by your lab instructor. As detailed in the lab manual, under extreme circumstances you may reschedule one lab (refer to the lab manual for instructions on how to do so). If rescheduling is not possible, fill out the “Lab Excusal Request Form” found in the Course Documents page on Canvas and bring this form *along with* supporting documents for your reason missing a lab (e.g. a doctor’s note) to the Lab Manager for approval. The Lab Manager’s office is Jorgensen 139. A student does not need to seek my permission to reschedule a lab or get a lab excused – both of these decisions require the approval of the Lab Manager, and the Lab Manager’s decisions are final. Again, missing a lab is acceptable only under extreme circumstances – **perfect attendance is mandatory.**

One unexcused lab absence will incur a **50% reduction of your overall lab grade.**

Two unexcused lab absences will result in a **0 for your overall lab grade.**

Three unexcused lab absences will result in a **0 for your overall course grade.**

If you have previously taken PHYS 142 and you are satisfied with your previous lab grade, you may carry your previous lab grade over to this semester. To do this, fill out the “Re-use

Lab Grade Form” found in the Course Documents page on Canvas and bring it to the Lab Manager for approval. Once approved, the Lab Manager will send me your previous lab grade.

The pre-class quizzes, clicker questions, laboratory exercises, and homework exercises focus on specific knowledge, basic computational skills, and grasp of key concepts. Your integrative understanding of physical principles and problem-solving is assessed with the more complex homework problems, recitation problems, and the exams.

Course Websites

PHYS 142 has two primary websites.

Canvas. The PHYS 142 Canvas website is accessible through my.unl.edu. You may look up your Canvas login via [MyRED](#), UNL’s student information system portal. Be sure to check this site often. I will use Canvas to make announcements relevant to course as well as post other information you may find helpful.



WebAssign. The pre-class quizzes and online homework assignments for PHYS 142 are implemented using the online learning environment *WebAssign*, accessible through webassign.net. After logging in, you can see current and past assignments. Normally, there will be a pre-class quiz (PQ01, PQ02, ...) due before a lecture (Mondays, Wednesdays, and Fridays). Regular homework assignments (HW01, HW02, ...) will also be completed via *WebAssign* with approximately one assignment due per week.



WebAssign ENROLLMENT INSTRUCTIONS - You will use self-enrollment to access the course material on *WebAssign*. Visit <https://www.webassign.net/wa-auth/login> and click “Enter class key.” Follow the on-screen instructions to create a *WebAssign* account. At some point you will be required to enter the class key to sync your account with our course. **Please enroll in WebAssign using your name as it appears in Canvas.**

The class key for PHYS 142 Section 150 Spring 2019 is: unl 6569 0794

The class key for PHYS 142 Section 250 Spring 2019 is: unl 4254 2900

At some point in the enrollment process, you will also need to enter a *WebAssign* access code. Access codes can be purchased from the Nebraska Bookstore or bought online through the *WebAssign* website itself during the enrollment process. **Please note**, that if you purchase a textbook online from a third-party site (e.g. amazon.com), it may not come with a valid access code.

There are also several other websites you may find useful throughout the semester. The webpages of [Hypermath](#) may help you with reviewing the relevant mathematics for this course. Other recommended online resources are [Hyperphysics](#) and [Wolfram|Alpha](#). The latter, in particular, offers a wealth of information on a broad range of topics. See what happens if you enter ‘iron’ (omit quotes), or ‘time in Australia’, ‘sin(3i)’, ‘steam’, ‘1/4 inch bolt’, or ‘C major 7th chord’. This “engine” does symbolic calculation as well. Alternatively, simply enter ‘sin(x)’ to see variety of information on the sine function including plots, identities, derivatives, integrals, and series expansions.

Exams and Grading

Progress in the course as a whole will be assessed with two midterm exams and a 2-hour, comprehensive final exam held **Monday, Apr. 29th from 6:00pm to 8:00pm** according to [UNL’s Final Exam Schedule](#). **Midterm 1 will be held Monday, Feb. 18th from 7:00pm to 9:00pm** and **Midterm 2 will be held Monday, Apr. 1st from 7:00pm to 9:00pm**. The locations for the exams will be announced in class and on Canvas. You will need a hand-held electronic calculator during the exams. Graphing calculators are acceptable (and recommended), but calculators cannot be shared amongst students during exams. Phones will not be allowed to serve as calculators and the use of a phone during exams is strictly prohibited. Using a phone during an exam will be considered cheating and will result in a score of 0 for that exam. There are no make-up or alternative exams outside of the dates given here. Make-up exams due to absences will only be granted only in the most extreme of circumstances. *If you miss an exam due to an extreme circumstance, such as a serious illness or family emergency, you must contact me at your first opportunity. A doctor’s note may be required for absences due to illness before a make-up exam will be granted.* An unexcused absence for an exam will result in a score of 0 for that exam.

Grading. Your grade will be derived from the following course activities:

Pre-Class Quizzes*	50
Recitation*	100
Laboratory*	150
Homework*	150
Midterm Exam I	150
Midterm Exam II	150
<u>Final Exam</u>	<u>250</u>
Max. Total Score	1000

*Scores will be weighted out of the indicated number of points. There will not be any “dropped” quizzes, recitations, homework assignments, or labs.

Additional for-credit work may be assigned as well. Letter grades will be assigned after all grades are available (after the final), but historically, letter grades have usually been assigned as follows:

A+	98 – 100%
A	93 – 98%
A-	90 – 93%
B+	86 – 90%
B	82 – 86%
B-	78 – 82%
C+	74 – 78%
C	70 – 74%
C-	66 – 70%
D+	62 – 66%
D	58 – 62%
D-	54 – 58%
F	0 – 54%

Those opting for the “Pass/No Pass” option will earn a “Pass” if their letter grade would have been a C or better, and “No Pass” otherwise. An incomplete grade (I) will not be granted as a substitute for poor performance.

Note: I may deviate from the above letter grade assignments in justified cases and in response to special circumstances.

Honors Contracting

Honors contracts are not available for this course. Those seeking honors contracts should enroll in Phys 142H.

Approximate Course Schedule

We will cover about 1 chapter per week, in order, starting with Chapter 18 and omitting Chapters 23 and 28. However, rather than sticking to a rigid, inflexible schedule, we will spend more time discussing the important chapters (e.g. Chapter 18 and 21), than others. Furthermore, I may adjust the pace as needed to find the right balance between student comprehension and quantity of covered content. Nevertheless, the pace may still seem fast for some, so it is imperative that you stay diligent with your studying to not fall behind. As a rough estimate, the first midterm exam will cover Chapters 18-22, the second will cover Chapters 24-27. The final exam is comprehensive, but will focus on material covered after the second midterm exam, omitting Chapter 28.

Students with Disabilities

Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or

to meet course requirements. To receive accommodation services, students must be registered with the [Services for Students with Disabilities](#) (SSD) office, 132 Canfield Administration Building.

Academic Dishonesty

All forms of academic dishonesty including cheating, fabrication and falsification, plagiarism, misrepresentation to avoid academic work etc. will be dealt according to the rules of [Disciplinary Procedures of the Student Code of Conduct of UNL](#).

FAQ

Q: I could not login to a course webpage (e.g. Canvas, *WebAssign*), and now I lost credit. How can I avoid this?

A: Your problem is that you have waited too long. It is your own responsibility to visit course webpages in time. All material will be posted early enough to guarantee availability. Do not wait until the last moment to download homework from Canvas or to log in to *WebAssign*, but rather be early (and safe).

Q: How do I get excused for missed activities?

A: Key guideline: **communicate with me** if something interferes with your course activities. Contact me in case of emergencies (medical or other), military service, other academic activities, jury duty, and other situations you think might justify absence. I will excuse you if I decide the situation justifies doing so. In this case I need from you a note, with your handwritten signature, in which you briefly state the nature of the situation (keep it general, no personal details needed), and list the missed activities that I excused you for. If you have written proof of the circumstances from another source (a medical care provider; your military superior; a member of the clergy (priest, rabbi, pastor, etc.); a judge; the law enforcement; etc.) or an official letter from, say, another UNL Department, you may also sign that document and hand it in. Again, please also indicate what you missed.

Q: How to I prepare for the exams?

A: Master your homework. See the homework section above for a discussion on what is meant by this. Once you have truly understood the physics behind the homework questions (which is distinctly different than memorizing the solution), you can test yourself to see if you're prepared for an exam by selecting random problems from the end-of-chapter problems in the text. The answers to the odd-numbered problems are in the back of the text. If you can solve these without resorting to looking up a solution online, you are prepared for the exams.

Q: Any tips for effective study and working on problems?

A: This course may be tough for some of you, and easier for others, but past experience suggests that most students will fall into the former category. This depends a lot on your (academic) background, your personal interests, the amount of time you can make available, and other factors that vary from person to person. Given these factors, every student will, over time, develop her/his own personal study style. Let me give you some general advice here:

- If you really cannot solve a problem, contact me! Get my help anytime you feel you need it. I can always give you a useful hint.

- The text provides short answers to a large number of odd-numbered problems. I highly recommend that you do some of these extra problems – it is one of the best ways to learn physics (see note about recitations in the “What you will do” section above).
- Check your answers. Do you feel they could be OK? Not ridiculously large or small? Are the units OK? If you're asked to calculate a vector, do you have all three components: magnitude, direction, and unit? Carefully check each step in your reasoning. **THINK ABOUT WHAT YOU ARE THINKING:** Is your chain of reasoning correct or could you be making silent assumptions that could be false? You should be able to justify every single step you take to get your answer.

Finally: study, study, study. Make the material your own. The clicker questions in class will be helpful for you to find out where you have breakdowns in your conceptual understanding of the material. Many students find the book’s “Conceptual Examples” and “Check Your Understanding” sections very useful. Including everything (reading assignments, pre-class quizzes, lectures, recitation problems, homework, laboratory) 10 to 15 hours per week *minimum* is what most of you will need to invest to earn a good grade.