

Fall 2020 PHYS-2110-LT1 XL Syllabus

General Physics – Life Sciences I

PHYS 2110

Fall 2020

Instructor: Dr. Boyd F. Edwards

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Availability: I'm happy to help via e-mail, telephone, or Zoom anytime that I'm free. Please contact me for immediate help (if I'm available) or to set an appointment.

Prerequisites: Math 1100 or 1210 (calculus). You need algebra and trigonometry for this course, but you do not need calculus (despite the prerequisite). To waive the prerequisite, please contact Karalee Ransom, karalee.ransom@usu.edu.

Texts: (1) *PHYS 2110 Workbook* (required)

(2) *PHYS 2110 Laboratory Manual* (required)

(3) *Physics*, Cutnell and Johnson, eleventh edition or earlier (optional)

Credits: 4 credit hours

Class: M 5:15 – 7:45 PM and W 5:15 – 6:30 PM

Laboratory: W 6:45 - 8:35 PM

Laboratory Locations and Assistants:

Brigham City: Brigham 151, James Coburn, james.coburn@usu.edu

Logan: SER 112, Gavin Held, gavinoheld@gmail.com

Price: Reeves 246, David Kardelis, david.kardelis@usu.edu

Vernal: B 134, William Booth, dr.willbooth@gmail.com

Course: <http://canvas.usu.edu/> (<http://canvas.usu.edu/>)

OUTCOMES

After successfully completing this class, you will be able to:

- Identify forces and torques on objects and use Newton's laws to predict their motions.
- Apply conservation of energy, linear momentum, and angular momentum to solve problems.
- Understand fluid buoyancy and the interplay between pressure and velocity.
- Describe internal energy, temperature, heat flow, and the increase of entropy.
- Describe biomedical applications of these principles.
- Explain basic, everyday physical phenomena and apply this knowledge in solving real-world problems.
- Explain why physics is important and how it applies to everyday life.

OVERVIEW

This is a flipped class. Before attending class, you will watch videotaped lectures and attempt to solve the assigned problems. During class, you will complete the problems through group study and help from me as needed. You will be graded on tests (60%), laboratories (12.5%), assignments (12.5%), activities (10%), and group participation (5%). The flipped format offers help when you most need it - when you are stuck on a problem. The vast majority of my students prefer the flipped format to the traditional lecture format.

The course material is divided into learning modules, with one module covered during each class period. The workbook contains copies of lecture PowerPoint slides, assignments, activities, and practice problems for each module. Before coming to class each day, you will watch lectures, transcribe concepts, and solve as many of the problems on the assignment and the activity as you can. In class, you will work in assigned study groups to complete these problems and to submit your answers to Canvas, with assignments submitted by individuals and activities submitted by groups. I will be available during class to answer questions and to provide feedback.

To comply with USU's COVID-19 guidelines and to limit the spread of the virus, classes will be held on Zoom. Before class, you'll watch lectures online and you will complete as many of the assigned problems as you can. Then you'll attend class to finish the problems, using Zoom breakout rooms to collaborate with your group, with me providing assistance through Zoom as needed. Or you may arrange to meet with your group in person to work on the problems as long as you stay 6 feet apart and wear masks. This (<https://usu-edu.zoom.us/j/98671995053?pwd=NkxrT1R0bVBCNXI5dWozVytUd00ydz09>) is the Zoom link for all classes.

It is not necessary to solve all of the problems before class - that's what class is for! But good-faith efforts by all students to solve the problems before class, and to identify areas of weakness, will promote efficient, targeted, and productive group discussions, and will help us make the best possible use of class time. At the end of the semester, you will complete a survey to assess the quality of group participation of each member of your group, including yourself. Your participation grade will be the average of the assessments made of you by all members of your group.

The purpose of lectures, assignments, activities, practice problems, and laboratories is to help you learn, and learn to apply, essential concepts that are identified and discussed in the lectures. Tests are designed to assess your mastery of these concepts. To this end, I encourage you to transcribe them and to refer often to them as you work on problems.

ASSESSMENTS

1. Tests (60% of grade). The purpose of tests is to assess your mastery of the concepts. There will be four tests, three during the semester and one during finals week. Each test counts for 15% of the grade, and will cover approximately one fourth of the material in the course. The last test will not be comprehensive. Each test will have 25 multiple-choice questions including both conceptual questions and quantitative problems. Each test may be taken through Canvas any time during a four-day window (Tuesday - Friday), according to the schedule below. You will be allowed 2 hours to complete each test. You are permitted to use your printed PHYS 2110 Workbook, notes, and calculator (any type) during the test. Internet use during the test is restricted to Canvas on your computer. Other access to the internet on your computer, phone, or calculator is not permitted. Your phone must be turned off completely and must remain off and stowed during the test. No communication with other students about the contents of the test is permitted before, during, or after the test. Proctorio software will be used to record and proctor tests, with settings chosen to encourage compliance with these expectations. The penalty for academic dishonesty on a test is a zero on that test. All tests will count toward the final grade (none will be dropped).

2. Laboratories (12.5% of grade). The purpose of laboratories is to give you hands-on experience to assist you in mastering the concepts. Laboratories will be held at 6:45 - 8:35 PM on Wednesday evenings during the semester, according to the schedule below. You will complete four face-to-face ("F2F") labs and four online ("Online") labs during the semester, based on your assigned lab group ("G1" or "G2"), according to the schedule below. For F2F labs, 6-foot social distancing and mask wearing are required; please do not attend lab if you are sick, even if your

symptoms are mild. Each laboratory is worth 10 points, 7 points for completing the lab and 3 points for the lab quiz, which consists of three multiple-choice questions on the material covered by the laboratory. All laboratories will count toward the final grade (none will be dropped).

3. Assignments (12.5% of grade). The purpose of assignments is to give you practice in answering questions that are similar to those on tests. You may submit each assignment up to three times; only the highest score counts toward your grade. Assignments are graded automatically by Canvas, with wrong answers flagged so you can correct them on a subsequent submission (if you have any submissions left). Assignments are due at 11:59 PM on the day of class and may be submitted before, during, or after class. You may collaborate with the other members of your group as you work on assignments, but you submit your answers to Canvas individually. Write out solutions to all assignment problems in your workbook to assist you later in studying for the test, and to assist you while taking the test. All assignments will count toward the final grade (none will be dropped).

4. Activities (10% of grade). The purpose of activities is to give you practice in solving problems that are similar to the more challenging problems on tests, with the added benefit of detailed instructor feedback on your solution methods. Activities are submitted to Canvas collaboratively, with all members of your group receiving the same score on each activity. Any member of your group may submit an activity, but each submission by any member of the group counts as a submission for all members of the group. Your group may submit each activity up to three times; only the highest score counts toward your grade. Activities are due at 11:59 PM on the day of class. You may submit an activity before, during, or after class, but should submit it only after receiving authorization from your group. After all group members have completed an activity and agree on the solutions, one group member will take a photograph of his/her work and upload this photograph to Canvas. I will grade each submission and will provide feedback and suggestions for improvements to all members of the group. Write out solutions to all activities in your workbook to assist you later in studying for the test, and during the test. All activities will count toward the final grade (none will be dropped).

5. Participation (5% of grade).

The purpose of group study is to assist you in mastering the material through in-class discussions of assignments, activities, concepts, and practice problems. These discussions deepen understanding for all students, both those needing help and those providing it. Your participation grade is based on four criteria:

1. *Attends class:* Arrives on time to class and remains in class until all members of the group have solved the problems on the assignment and the activity. When unable to attend class punctually, sends an e-mail before class to group members to notify them of the absence or the late arrival.
2. *Prepares well for group discussions:* Watches lecture videos, attempts to solve all problems in the workbook, and brings the workbook and laptop to class. When unable to attend class, attaches a copy of his/her work on the activity to the e-mail (see above).
3. *Participates productively in group discussions:* Works supportively with others, asks questions, offers explanations while respecting others' autonomy to complete problems on their own, and regularly submits activities to Canvas.
4. *Takes responsibility for learning:* Asks questions until full understanding is achieved for each problem, works out all problems in his/her workbook, shows more interest in mastering the material than in getting the right answers, and shows interest in the success of all group members.

At the end of the semester, you will complete a participation survey to assess the consistency of each member of your group in meeting these criteria. Your participation grade will be the average of the assessments made of you by all members of your group, including your self assessment. These assessments measure effort, not mastery, and are designed to encourage a supportive environment in which all learn and contribute. Students who spend significant time helping other students need not receive higher participation grades than students who prepare well before class but need more help to complete the problems.

Please complete this participation survey honestly. The other members of your group will not see your responses, and will receive participation grades based on the average of the responses of all members of your group. The participation survey may be completed on Canvas during the last week of class.

6. IDEA Survey (1% of extra credit). Students who complete the IDEA survey for the course (administered near the end of the semester) will be given 1% of extra credit, regardless of their answers on the survey. Please complete the survey thoughtfully; your answers will be used to evaluate the effectiveness of instruction and to make improvements in the course.

7. Pre-Post Surveys. Pre-test and post-test surveys may be used to evaluate the effectiveness of instruction and to make improvements to the course. These are required but do not count toward your grade.

TO DO BEFORE CLASS

1. Watch the lecture videos. The purpose of the videos is to introduce the concepts that form the basis of assignments, activities, laboratories, practice problems, and tests. Links to the videos are found in Canvas. You can watch videos faster or slower than normal speed, and can pause or replay videos as needed. This flexibility allows you to take control of the learning process and to optimize your time spent. Take written notes (on the copies of the PowerPoint slides in the workbook, for instance) as you watch the lectures because such note taking has been shown to improve retention. Demonstrations in the videos show that physics really works, help you to visualize and remember concepts, and put the fun in physics. Examples in the videos show how to apply concepts in solving problems. Clicker-style questions in the videos provide an opportunity for active learning; for maximum benefit, pause the video when a clicker question is shown, do your best to answer the question, and resume the video to compare your answer with the answer given in the video. Real-life biomedical applications discussed in the videos demonstrate how physics is at the heart of biomedical technologies that have vastly improved healthcare and quality of life.

2. Make transcripts of the concepts. A thorough understanding of concepts and how to apply them is key to your success. Concepts are identified in the videos by concept numbers (like "C1-1") and red boxes, and clearly define what you need to know on quizzes, group assignments, and tests. If it's in a concept, you need to know it. If it's not, you don't. To facilitate easy reference to these concepts as you work to master them, you are encouraged to transcribe them and use this transcription as you work on assignments, activities, and tests. The concepts form the foundation of physics knowledge in biomedical fields and help you prepare for entrance exams such as the MCAT.

3. Attempt all of the problems on the assignment and the activity. Carry out these attempts starting from information in one or more concepts. Write out solutions to these problems in your workbook to assist you later in studying for tests.

TO DO DURING CLASS

1. Arrive punctually to class. Bring your workbook, concept transcripts, and laptop.

2. Reconcile your answers to problems on the assignment and the activity with the other members of your group. Ask and answer questions until all group members understand how to solve the problems, consulting with me as needed. Merely knowing which equation to use on a problem is not understanding. Understanding is knowing which concepts apply to the problem, why they apply, and how they apply.

3. Submit the assignment and the activity. Submit these a second or third time, if necessary. You may submit the assignment or the activity before, during, or after class, but you should not submit the activity without authorization from the other members of your group, since a submission by any member of the group counts as a submission for all members of the group. The assignment and the activity are both due at 11:59 PM the day of class.

4. Learn the concepts. Use class time to quiz the members of your group on the concepts until you are satisfied that you and the other members of your group know them thoroughly.

5. Work practice problems. Class time can be used to work practice problems to help you prepare for upcoming tests. Copies of these practice problems are included in the workbook, and their solutions can be found under Files in Canvas.

ANNOUNCEMENTS

Canvas announcements are used to communicate with students outside of class. Please either configure your Canvas settings to receive announcements as e-mails, or check these announcements frequently.

RECORDINGS

Video recordings of all class sessions are made using Zoom. These recordings are available under "My Media" in Canvas.

TUTORING

Free online tutoring is available through USU's partnership with the Western eTutoring Consortium (<http://www.usu.edu/online/tutoring/> (<http://www.usu.edu/online/tutoring/>), select "Login to eTutoring.org"). Free face-to-face tutoring is available at the USU Physics Learning Center, located in SER 219 in Logan (<https://physics.usu.edu/classes/learning-center> (<https://physics.usu.edu/classes/learning-center>)).

GRADE SCALE

A > 93%,

A- > 90%,

B+ > 87%,

B > 83%,

B- > 80%,

C+ > 77%,

C > 73%,

C- > 70%,

D+ > 67%,

D > 60%,

ENVIRONMENT

Academic integrity is expected of all students in this course, and the USU honor code will be strictly enforced. Any suspected violations of the honor code will be reported promptly. For more information, please visit <http://studentconduct.usu.edu/studentcode/article6> (<http://studentconduct.usu.edu/studentcode/article6>).

I am committed to fostering a nurturing learning environment based upon open communication, mutual respect, and non-discrimination on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color, or national origin. Accommodations for physical, sensory, emotional, or medical impairments may be coordinated through the USU Disability Resource Center, at (435) 797-2444. Veterans may be eligible for accommodations. Please advise me if you anticipate needing any type of accommodation to participate in this class.

Other USU policies, including expectations of students during the COVID-19 pandemic, may be found here (<http://www.usu.edu/provost/faculty-life/syllabus.cfm>).

SCHEDULE

Week of

Monday

Wednesday

Aug 31	1A	1B, Online Lab: G1, G2
Sept 7	Labor Day Holiday	3A, F2F Lab: G1
Sept 14	3B	3C, F2F Lab: G2
Sept 21	4A, Test 1 (Ch 1-3)	4B, Test 1 (Ch 1-3), No Lab
Sept 28	4C	5, F2F Lab: G1
Oct 5	6A	6B, F2F Lab: G2
Oct 12	7A	7B, Online Lab: G1, G2
Oct 19	8A, Test 2 (Ch 4-7)	8B, Test 2 (Ch 4-7), No Lab
Oct 26	9A	9B, F2F Lab: G1, Online Lab: G2
Nov 2	10A	10B, F2F Lab: G2, Online Lab: G1
Nov 9	11A	11B, F2F Lab: G1
Nov 16	12, Test 3 (Ch 8-11)	13, Test 3 (Ch 8-11), F2F Lab: G2
Nov 23	14	Thanksgiving Break
Nov 30	15A	15B, No Lab
Dec 7	16A	16B, Online Lab: G1, G2
Dec 14	Test 4 (Ch 12-16)	Test 4 (Ch 12-16), No Lab

Designations like "1A" signify the module covered that day. You will complete four face-to-face ("F2F") labs and four online labs during the semester, based on your assigned lab group ("G1" or "G2").