

PH 202: General Physics II (CRN 31232, 31233)

Linn Benton Community College: Winter 2020, 5 c.h.

Instructors: Daniel Summerton, summerd@linnbenton.edu, MH-111
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Lab Instructor: Jonathan Alfson, alfsonj@linnbenton.edu, MH-111

Student Hours: MW 2 pm – 2:30pm (Daniel)
MW 11 am – 12 pm, T 11 am – 2pm, F 10:30am – 11:30am (Ralph)
T 2 pm – 3pm (Jonathan)

When and where this course meets:

Lecture:

MW 3:00pm – 4:50pm, MH 113, **CRN 31232, 31233**

Laboratory:

Tuesday 8:00 am – 10:50 am, MH 114 (CRN 31232)

Tuesday 11:00 am – 1:50 am, MH 114 (CRN 31233)

Final: Monday, March 16, 3:00 pm - 4:50 pm

We are constantly striving to become better teachers, and find ways to support you better in your learning. Therefore this document is subject to change.

Welcome to General Physics II. You decided to take another step forward in our universe and try to explain all the miracle and wonder around you. Here you find the information to support you walking that path. Please read carefully. Understanding these guidelines is crucial for your success in this class.

Math requirements for this class and for physics in general:

As you have seen in PH201 we use symbolic language for a large part of what we do in physics. You will use your math skills! PH202 has often been called “Applied PH201”. To be successful in PH202, we’ve created the following prerequisites:

- Completion of PH 201 General Physics with a “C” grade or better.

Physicists rely heavily upon the compact language of mathematics to speak to one another in all parts of the world. An added benefit of this class is that you will leave it with a greater understanding of just what all that math you’ve been studying is about.

The two most important mathematical skills that you will need for this course are solving simultaneous equations and adding, subtracting and finding components of vectors. **If you have not taken PH201 at LBCC, you are advised to review the material from MTH 111 and MTH 112 at your earliest convenience.**

Course Information Online: You will find course materials for our class on the ‘Moodle’ website at <http://elearning.linnbenton.edu>. The course is entitled “PH202-201903-General Physics”. Check the Moodle page regularly.

Contacting us: The best way to contact us is in person during student hours or via email. Also, usually whenever you see us, we are happy to talk to you. We recommend that you see us at least 3 times this term, once in the first three weeks, once in the middle of the term, and once towards the end of the term. Even better check in regularly to discuss your work.

Us contacting you: Check your LBCC email – this is one path I take to support you.

Required Materials:

Text: *College Physics: A Strategic Approach* 4E, by Randall D. Knight, Brain Jones, and Stuart Field; Pearson Publishing, with Mastering Physics. Also purchase and regularly use the workbook that accompanies this book. The workbook questions are best to study on your own when preparing for class after you read the chapter the first time. We will also use the workbook in class. All materials will also be used in PH203.

Mastering Physics (MP) subscriptions: New purchases of the text come with an option for an access code to subscribe to the *masteringphysics.com* website, which is required. Subscriptions last for 2 years from the date of activation. If you buy a subscription to Mastering Physics online, you can purchase a paper copy of the book for \$45 through Mastering Physics. Make sure you select the course name **PH202WINTER2020** when registering with MP. The course is connected to the text ***Knight/Jones/Field, College Physics, 4^{ed}ition.*** You still need to purchase a copy of the workbook.

PH 202 Lab Manual available in the LBCC bookstore, and a **Computation Notebook**.

Course Activities

Reading: Successful students familiarize themselves with the physics principles involved in the class activities by reading the relevant sections in the textbook and answering the questions in the reading guide before each class. The questions from the reading guide we will ask you in very regular reading quizzes.

Class time will be spent practicing being a physicist. We use a variety of activities, including group work, discussions, problem-solving sessions, and demonstrations. Unless you make special arrangements with me, I expect your **cell phone or PDA will be turned off during class**, I will collect your phone for the time of the class, if that is needed.

Group Work: Physics education research has shown that group discussions with peers support physics learning, and that particularly a person explaining a topic to a second person has often significant learning gains. Yes, therefore we will work in groups a lot!

Labs: Much of the learning that goes on in physics happens in the lab. Laboratory work is consequently a significant part of the grade. A part of each exam and of the Final will consist of topics covered in the lab. **Prelab** and **Postlab** exercises support you learning in the laboratory environment. Each lab report includes a short summary in which you write what you did in the lab, and what you learned. The rubric helps you writing your lab report.

Journal: Each week you will summarize and reflect on your learning and struggles in your personal Journal. For details see Guidelines for your Journal on Moodle.

Homework (HW): This class includes two kinds of homework:

Mastering Physics assignments from the end of the chapters in our text book are to be completed online at www.masteringphysics.com. When you buy your textbook in the campus store website access comes with it: Enter **PH202WINTER2020** as the Course ID. Over the years students have asked to split the HW up into small sections. We have followed that wish and now post homework on Mastering Physics usually three times each week. We will post each assignment a few days before the HW is due.

Hand-In Problem (HIP) and Enhancement (ENH): Additionally to Mastering physics you will hand in a HW assignment every week (HIP) that will often wrap up the learning of the week. The Enhancement (ENH) allows you to reflect on the connection between the physics material we studied in class and in your homework and the rest of your life. I hope you will enjoy this part. It is always fun for me to learn how students use the physics they learn, and I am curious to read your work. See guidelines on HIP and ENH on Moodle.

Exams: We will write 4 group exams and 4 individual Exams.

The Final: The final exam is comprehensive. Physics is about learning concepts, so it is not enough to memorize the problems we have discussed in class or in the exams, but to understand the concepts discussed and be ready to solve new problems.

Ethical Conduct (Cheating): We expect everybody in the class to adhere to the highest ethical standards. For every action/decision you take, consider the “headline test”: if your action was printed as the front page headline in the newspaper, and all those you care about – your friends, your family, your peers, your teaching staff – would read it, how would you feel? In extreme cases, e.g. copying work of others without citing the source (plagiarism), interfering with the performance of others, communicating during individual parts of assessments, you show academic dishonesty. In the case of academic dishonesty your grade will drop by at least one grade, and we will report incidents to the college administration. If you have questions about what does and does not constitute cheating, talk to us *before you turn the questionable work in*. Bear in mind that a misconduct in a team exercise affects the score for the entire team, as every team member is responsible for the entire content of the assignment, even if you decided to divide the work among team members. And one very specific case: If you use Chegg.com to prepare your homework, you are cheating, and we will treat it as mentioned above.

Calculator Policy: Students will be required to use a non-graphing/non-programmable scientific calculator for quizzes and/or exams. Department approved calculators are: TI 30xa, TI 30X IIs, Casio fx-260, or HP 10s. If a student does not wish to purchase one of these calculators the department will provide appropriate calculators for use on exams and/or quizzes.

Resources:

The **Science Help Desk** in the atrium of Madrone Hall is open for several hours each week, where you can drop in for homework help. Also, you can sign up for individual Math and Physics tutoring in the **Learning Resource Center**. We established a tutor assisted study session (**TASS**) specifically for PH202. When you start using this service we will continue this service through the year. One of the best resources I found are your fellow students in your class. Study together, ask each other questions, answer questions, dig in, have fun with it, be persistent, and bug me (-:

Students in need of accommodations: Students who may need accommodations due to documented disabilities, who have medical information that the instructor should know, or who need special arrangements in an emergency should speak with their instructor during the first week of class. If you believe you may need accommodations but are not yet registered with CFAR, please visit the CFAR website at www.linnbenton.edu/cfar for steps on how to apply for services or call 541-917-4789.

LBCC Nondiscrimination Statement: LBCC prohibits unlawful discrimination based on race, color, religion, ethnicity, use of native language, national origin, sex, sexual orientation, marital status, disability, veteran status, age, or any other status protected under applicable federal, state, or local laws.

HELP: Any student who has difficulty affording groceries or food, or who lacks a safe and stable place to live, is urged to contact a Student Resource Navigator in the Single Stop Office (T-112): Amanda Stanley, stanlea@linnbenton.edu, 541-917-4877. The navigator can connect students to resources. Furthermore, please talk with your instructor (me) if you are comfortable doing so. This will enable me to provide any resources we might have.

The Add/Drop date and date for payment is the 2nd Monday of the term.

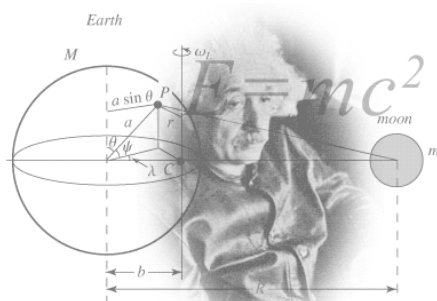
Objectives:

Physics is the study of nature and therefore search to explain pretty much everything that you see around you. It is the study of how rainbows are formed. It is the study of why the sky is blue, why the stars twinkle, and how the planets move through the heavens. Applications of physics have given us eye glasses, levers, pulleys, the combustion engine, transatlantic steamers and communication, television, lasers, computers, satellites, space flight, and new insights into the universe that startle the imagination and can only make one hungry to learn more. This second term of the sequence we will focus on the use of energy, properties of matter (solids, fluids and gases), the physics of oscillations and waves and finally optics partially an application of waves.

PH202 starts of where PH201 ended, with the concept of energy, and how we use this concept in various settings. Particularly we will add an understanding of heat to the concept of energy. We will then study properties of matter, oscillation and waves and optics.

Upon successful completion of this course, students will be able to:

- Describe and explain physical objects in simple harmonic motion.
- Design and conduct experiments to determine critical motion parameters of simple harmonic motion (period, frequency).
- Solve quantitative simple harmonic motion problems using algebra and graphical methods.
- Solve physics problems involving superposition of waves.
- Select ray optics or wave optics methods to solve real world optics problems.



Of course, to me, still the most important reason to study physics is because it is simply fun. Physics is about understanding everything around you. Physicists have the neatest toys—many of which we hope to share with you—and we get to do “Gedanken Experiments” – experiments that previous generations couldn’t even imagine.

We will continue building our understanding of the universe on everyday observations by the end of the term we will end up having learned some pretty neat things about where the heat in our house or our body comes from, how heat interacts with matter, what properties matter has and what we can conclude from these properties. We will be able to explain to people what waves are and where these waves result from, and we will understand what and how we see with our eyes. In short we continue to building a model towards understanding the universe in which we live - and all through this term we will be glad that we have had PH201 when we continue to use the fundamental physics from that term to explain and understand more advanced phenomena.

As you continue on in Physics, in Physics 203 you will focus on electric charges and fields, the origins of magnetism, and the fundamental origins of the formation of light and you will be able to connect all this to your personal goals.

Grading for this course:

Carefully read how your grade will be determined. In this class you will not count up points. We believe that point based grading systems giving you less specific feedback on your outcome achievement, and that detailed feedback is an important part of our job. We will give you detailed feedback through comments and through the use of detailed rubrics. For most of the work in this class you can determine your grade before handing in your work. To achieve a higher grade you will have to do more work, which usually goes along with more learning. In this classroom model learning is about active participation in the many activities of the class. This is how learning happens. I hope you will participate enthusiastically and learn a lot, and achieve the grade you plan for in your physics course!

The following regular activities are prepared for you:

- Mastering Physics Homework (MP)
- Hand-in-homework (HIP) including Enhancements (ENH)
- Journals
- Reading quizzes
- A group project
- In class activities
- Labs, including Prelab, Postlab (**you need to participate in at least 9 labs to pass**)
- Exams and Final Exam

To receive a D in this course you must meet all of the following criteria:

- a) Reach 50% of Mastering Physics score.
- b) Hand in at least 5 HIP/ENH ALL developing or better.
- c) Have an average of at least 30% in the Exams and Final Exam.

To receive a C in this course you must meet all of the following criteria:

- a) See your instructor for 15min in the first 2 weeks of class.
- b) Have an average of 50% in Reading quizzes.
- c) Reach 60% of Mastering Physics score.
- d) Hand in 8 HIP/ENH, 2 ALL accomplished or better, 4 more ALL developing or better.
- e) Participate in a group project.
- f) Have 2 labs ALL accomplished and another 2 labs ALL developing.
- g) Have an average of at least 50% in the Exams and Final Exam.

To receive a B in this course you must meet all of the following criteria:

- a) See your instructor for 15min in the first 2 weeks of class.
- b) Have an average of 60% in Reading quizzes.
- c) Reach 70% of Mastering Physics score.
- d) Hand in 8 HIP/ENH, 4 ALL accomplished or better, 2 more ALL developing or better.
- e) Participate in a group project.
- f) Have 4 labs ALL accomplished and another 2 labs ALL developing.
- g) Have an average of at least 60% in the Exams and Final Exam.
- h) You can also reach a B in the course by fulfilling a), e), f) and have an average of at least 80% in the Exams and the Final Exam.

To receive an A in this course you must meet all of the following criteria:

- a) See your instructor for 15min in the first 2 weeks of class.
- b) Have an average of 75% in Reading quizzes.
- c) Reach 80% of Mastering Physics score.
- d) Hand in 8 HIP/ENH, 6 ALL accomplished or better, 2 more ALL developing or better.
- e) Participate in a group project.
- f) Have 6 labs ALL accomplished, another 2 labs ALL developing,
- g) Have an average of at least 75% in the Exams and Final Exam.
- h) You can also reach an A in the course by fulfilling a), e), f), and have an average of at least 90% in the Exams and the Final Exam.

What does “ALL accomplished”, and “ALL developing” mean:

HIP/ENH and Lab activities have a rubric with several measures (emergent, developing, accomplished and exemplary). You, the successful student will always strive for accomplished work, if you fall short complete work will be developing. While “Emergent” basically means that you decided not to complete your work, “Exemplary” means that you did the activity better than we were imagining, something that might be time consuming (-:

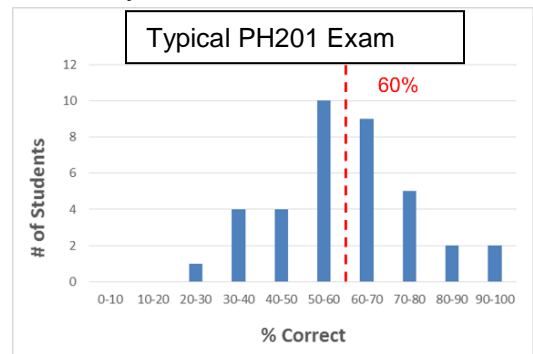
Calculation of the average of Exams and Final Exam:

Exams are preparing you for the final. Therefore the Exams together will be worth as much as the final. We have planned four Exams for the class, so they are each worth 12.5%, the final is worth 50% of your exam grade.

As an example assume you have the following 4 exam results:

1. 15/20 (15 points out of 20 points)
2. 12/20
3. 16/30
4. 5/25 (everybody can have a bad day (-:)

In the Final you have 78 out of 100 points.



Based on these assumptions, how would you calculate the grade?

$$\% \text{ Exams and Final} = 12.5*(15/20) + 12.5*(12/20) + 12.5*(16/30) + 12.5*(5/25) + 50% * (78/100) = 65\%$$

This example would qualify you for a B in the class. Don't be fooled. Exams in physics courses have shown to be tricky. 65% is a good result in an exam as shown in the figure.

Benefits:

So what are the benefits we hope to bring to you the student in this model? It's really pretty simple – we have evidence that you will learn more and better under this model. Here are some reasons supported by research about student learning and others based on student feedback and observations. Most of what we do is about your engagement with your learning. You always have been responsible for your learning and this grading scheme makes these connection more direct.

Do you agree with us in the following? You want to do your jobs well, and you want to have choices about your life in general, and what jobs you do in particular. We have created opportunities for you to rise up to a high standard of 100% accomplished work. Think about your past experiences or your future in a professional environment. Will you be judged on a job 60% nicely done, or on a job done well in time allotted? During the learning process here in the physics course we want you to learn to get the job done. We will allow you to take some extra time as outlined below.

Timing:

We do not recommend falling back in class, but we will always accept late work, if you schedule 15min during office hours for each late activity. In that case in office hours you explain what you did and learned when you hand in your assignment. You can only defend one single assignment per office hour. If you cannot schedule time during office hours, please confirm an appointment with an instructor at other times. You cannot receive an “Accomplished” grade for late work. You cannot be late for an exam or the final exam.

Because the grade penalty in this class is less abrupt in most activities we hope you will spend more time observing and thinking A) WHY things are the way they are and B) HOW you best learn about them.

1. Can you hand in late work for this course? What is the procedure?

2. At what times/assessments are you not allowed to use a graphing calculator?

3. What are two of the outcomes of PH202 listed in the syllabus?
 - a.
 - b.

4. Of the following, what would be considered cheating? Please circle
 - a. Copying solutions into Mastering physics from some internet resource
 - b. Copying solutions into Mastering physics from a friend
 - c. Handing in a HIP you solved together with a fellow student without clearly acknowledging your fellow student.
 - d. Copying solutions to a Prelab exercise from a fellow student.

5. What do you do with your cell phone in class?

6. When do you ideally use the workbook that accompanies our textbook?

7. I would like to discuss the following questions/issues about the syllabus in class:

I have read and understood the syllabus for this course. I have listed above all questions I would like to clarify in class or during my first visit during office hours.

Signature: _____

PH202 Winter 2020, LBCC, Schedule Ralph Tadday (subject to change):

Week	Key Topics	Monday	Tues Lab	Wednesday
1	Introduction, Using and transforming Energy, Heat and Temperature, Entropy, 1 st and 2 nd Law of Thermodynamics	<i>6. Jan</i> Introduction Reading Ch. 11.1-11.4	<i>Lab #1</i> Ch. 11.1-11.4 Lab Safety Conservation of Energy	<i>8. Jan</i> Ch. 11.5-11.8 Lab1 Due
2	The atomic model of matter, Ideal Gas Law, Specific Heat	<i>13. Jan</i> Ch. 12.1-12.4 HIP1 Due	<i>Lab #2</i> Ideal Gas Law	<i>15. Jan</i> Ch. 12.5-12.9 Lab2 Due Group Exam1
3	Heat Transfer Fluids, Density, Pressure	<i>20. Jan</i> MLK Day No School	<i>Lab #3</i> Ch. 12.5-12.6 Specific Heat HIP2 Due	<i>22. Jan</i> Ch.11-12 Review Lab3 Due Exam1
4	Buoyancy, Fluid Dynamics Equilibrium&Oscillations	<i>27. Jan</i> Ch. 13.1-13.4 HIP3 Due	<i>Lab #4</i> Archimedes Principle	<i>29. Jan</i> Ch. 13.5-13.7 Lab4 Due Group Exam2
5	Linear Restoring Force and Simple Harmonic Motion (SHM), Energy in SHM, Damped and Driven Oscillations.	<i>3. Feb</i> Ch. 14.1-14.5 HIP4 Due	<i>Lab #5</i> Oscillations& Harmonic Motion	<i>5. Feb</i> Ch. 14.6-14.7 Lab5 Due Exam2
6	Traveling Waves, the wave model, Graphical and Mathematical Description of Waves, Sound and Light, Doppler Effect	<i>10. Feb</i> Ch. 15.1-15.4 HIP5 Due	<i>Lab #6</i> Nature of Waves	<i>12. Feb</i> Ch. 15.5-15.7 Ch. 16.1-16.2 Lab6 Due Group Exam3
7	The principal of Superposition, Standing Waves on a String and of Sound. Interference	<i>17. Feb</i> President's Day No School	<i>Lab #7</i> Ch. 16.3-16.4 Standing Waves HIP6 Due	<i>19. Feb</i> Ch. 16.5-16.7 Lab7 Due Exam3
8	Wave Optics, What is Light?, Interference, Diffraction, Thin Films	<i>24. Feb</i> Ch. 17.1-17.3 HIP7 Due	<i>Lab #8</i> Optical Interference	<i>26. Feb</i> Ch. 17.4-17.6 Lab8 Due Group Exam4
9	Ray Optics, Reflection, Refraction, Image Formation by Refraction, Ray Tracing (Thin Lenses)	<i>2. Mar</i> Ch. 18.1-18.4 HIP8 Due	<i>Lab #9</i> Index of Refraction	<i>4. Mar</i> Ch. 18.5-18.7 Lab9 Due Exam4
10	Optical Instruments, Camera, Human Eye, Magnifier, Microscope, Telescope	<i>9. Mar</i> Ch. 19.1-19.2 HIP9 Due Project Movies	<i>Lab #10</i> Ch. 19.3-19.5 Focal Length of a Lens	<i>11. Mar</i> Ch. 19.6-19.7 Review Lab10 Due
11		<i>16. Mar</i> Final 3pm class 3-4:50pm		<i>18. Mar</i> Final 9:30am class 10-11:50am

For Due Dates of Mastering Physics please check the Mastering Physics (MP) Web-site.

Regular MP-due dates are **Sunday, Tuesday, Thursday at 11:59pm**, possible exceptions on holiday weeks and in week1.

