PH 202: General Physics II (CRN 40680)

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

Instructor: Ralph Tadday, Ph.D., taddayr@linnbenton.edu, MH-112, (541) 917-4743

Due to COVID-19 this course will be taught remotely, supported by ZOOM meetings
Student Zoom Hours: MW 11 am – 11:45 am, F 10:30am – 11:30am

When and where this course meets:

Class:

MW 1:00pm – 2:20pm, F 1:00 pm – 1:50 pm, Zoom

Laboratory:

Tuesday 2:00 pm – 4:50 pm, Zoom

Final: Friday, June 12, 1:00 pm - 2:50 pm

I am constantly striving to become a better teacher, 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 SPRING2020 - GENERAL PHYSICS". Check the Moodle page regularly.

Contacting me: The best way to contact me is via email or during zoom hours. When you need any other time, please arrange via email, we will make it happen! I recommend that you check in by zoom at last 3 times this term, one 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.

Me contacting you: Check your LBCC email – this is the most common path I take to support you. When you are in this class, I expect you to check your LBCC-email.

Required Materials:

Text: *College Physics: A Strategic Approach* 4E, by Randall D. Knight, Brain Jones, and Stuart Field; Pearson Publishing, with Mastering Physics. **The textbook is available for $48 through the Mastering Physics (MP) website if you purchase a subscription online.** Make sure you also buy 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 at times use the workbook in class. The text, the workbook, and MP will also be used in PH203. Talk to me if you own the 3rd edition of the textbook, the workbook, or MP.

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 so if you already have a current subscription you do not need to purchase the text with the access code. If you purchase an access code through the MP website you have access to a check hard copy of the book.

Make sure you select the text ***Knight/Jones/Field, College Physics, 4edition*** when registering with MP. The course name is **PH202SPRING2020**.

Lab notebook (**Computation Notebook**) in LBCC bookstore (or use PH201 lab notebook).

Course Activities

Reading: You are responsible for familiarizing yourself with the physics principles involved in the class activities by reading the relevant sections in the textbook. The course schedule includes the required weekly readings – you are asked to study ahead, the reading schedule ensures that you are prepared for activities in class. I ask you this term to answer all reading questions in your Journal. Much of your homework at Mastering Physics I have set up in such a way that you will be able to answer the question without further instruction. Please let me know how well I was doing!

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. We will continue to work in groups during our zoom meetings

Class time will be spent on a variety of activities, including group work, discussions, problem-solving sessions, and demonstrations. I am curious how this will work out in the new remote environment. Education and learning research shows that more or less nothing has ever been learned by means of listening to somebody else. How did you learn walking, reading, cooking, fishing, writing a letter, and calculating an angle? You will DO a lot of physics in class instead of watching me doing it. Together we create the desired learning environment. I rely on you, you can rely on me. It will benefit you to participate enthusiastically, if you do we will all have more fun. Unless you make special arrangements with me, I expect your **cell phone or PDA will be turned off during class**, even though we meet electronically this term.

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. Each lab report includes a short summary you write that summarizes shortly what you did in the lab, and what you learned.

Journal: Each week you will summarize your learning and struggles in your personal Journal. For details see Guidelines for your Journal on Moodle. I ask you to answer all reading questions that you find posted in the reading guide on moodle in writing in your Journal.

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 **PH202SPRING2020** as the Course ID. Over the years students have asked to split the HW up into small sections. I have followed that wish and now post homework on Mastering Physics usually three times each week.

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. This part of the assessment has regularly brought to the surface conceptual understanding that might need correcting. See guidelines on HIP and ENH on Moodle. This term HIP/ENH are handed in each week on Moodle.

Exams: You will ask yourself how much you learned in class. To make sure you know where you stand, we will write regular Exams to monitor your learning progress.

The Final: One aspect of physics is that every week builds upon what was learned in the previous weeks. 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): I 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, family, peers, 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 I will report incidents to the college administration. If you are making use of the work of others, cite the source. If you have questions about what does and does not constitute cheating, talk to me *before you turn the questionable work in*.

For all work you hand in for PH202 you will agree to the following statement:

All work handed in for PH 202 is legitimately my own.
I have not used any information that came from another person or a web resource, unless specifically stated in my work.
I understand that acts of academic dishonesty will result in a score of zero for my work.
I recognize that I am responsible for understanding the provisions of the Linn-Benton Community College Student Conduct Code as they relate to my academic exercises.

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.

Resources:

We are working on options for a remote **Science Help Desk** and a remote TASS session. Also, you can sign up for individual Math and Physics tutoring in the **Learning Resource Center**. 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, 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.

Suggestions for success from former students taken from Journals and Portfolios:

- I have a hard time to wake up in the morning and drag myself to school. So I was late a lot. One day my lab partner […] said she would look for another group and stop helping me with the homework if I would not come prepared and in time. I started coming to class in time or even early to discuss some reading questions and somehow the stuff started to make sense.
- Thanks for putting all this support up on Moodle. I am glad I found it.
- I did not do my homework last week and that made this week much more difficult.
- I started reading the textbook before every class and answer the reading questions. Class is actually fun now.
- After I realized how much I forget during the week, I even started writing into my Journal after every class instead of just Thursdays or Friday morning.
- I was used from high school that important stuff is always repeated in class. At the end of the term I started repeating exercises from past weeks – wow I forget a lot!
- When we meet with the study group we now answer a few of the conceptual problems [in the textbook at the end of each chapter] before doing the Homework.
- Since I do the workbook questions I feel more comfortable answering questions in class. I am also more involved on my table and friends ask me questions.
- [Last weekend] I was home for the long weekend and opened the mastering physics Homework of the week. I could actually answer a few of the questions and recognized others when we discussed a few problems in class. That was cool!
- Initially I googled the solutions for much of the Homework until about 6 weeks into the class, but after we talked in office hours at I started actually doing homework myself or with the help of my friends, the tutor at TASS or with Ralph. I am glad I did, finally the exams were much easier and I think I will write a good final.

And some suggestions from your instructor:

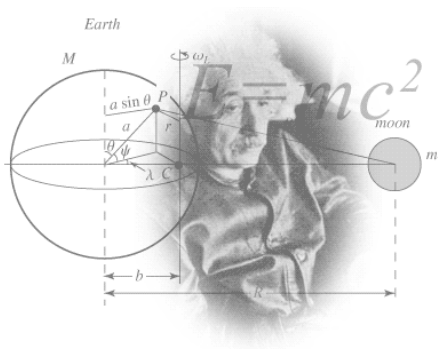
- Do additional practice homework problems in any areas where you are not satisfied with your understanding.
- Seek help whenever you realize you are struggling… after you struggled enough (-:
- …and if you read something that you do not agree with or that your prior experience tells you, you are probably in the middle of learning!
- If you do not ask I might assume you know!

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 I 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. I believe that a point based grading system fails in giving you good feedback on your outcome achievement, and that detailed feedback is an important part of our job. I 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!

I will have the following regular activities prepared for you:

- Mastering Physics Homework (MP)
- Hand-in-homework (HIP) including Enhancements (ENH)
- Journals
- Reading activities
- Labs (**you need to participate in at least 8 labs and the lab exam**)
- Exams and Final Exam

To reach 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 4 HIP/ENH ALL developing or better.
c) Have an average of at least 30% in the Exams and Final Exam.

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

a) Reach 60% of Mastering Physics score.
b) Hand in 6 HIP/ENH, 2 ALL accomplished or better, 4 more ALL developing or better.
c) Have 50% of the time all reading questions answered in your Journal.
d) Have 2 labs ALL accomplished and another 2 labs ALL developing.
e) Pass the lab exam with at least 50%
f) Have an average of at least 50% in the Exams and Final Exam.

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

a) Reach 70% of Mastering Physics score.
b) Hand in 8 HIP/ENH, 4 ALL accomplished or better, 2 more ALL developing or better.
c) Have 60% if the time all reading questions answered in your Journal.
d) Have 3 labs ALL accomplished and another 2 labs ALL developing.
e) Pass the lab exam with at least 60%
f) Have an average of at least 60% in the Exams and Final Exam.
g) You can also reach a B in the course by fulfilling e), and have an average of at least 80% in the Exams and the Final Exam.

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

a) Reach 80% of Mastering Physics score.
b) Hand in 8 HIP/ENH, 6 ALL accomplished or better, 2 more ALL developing or better.
c) Have 75% if the time all reading questions answered in your Journal.
d) Have 4 labs ALL accomplished and another 2 labs ALL developing.
e) Pass the lab exam with at least 75%
f) Have an average of at least 75% in the Exams and Final Exam.
g) You can also reach an A in the course by fulfilling e), 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 (-:

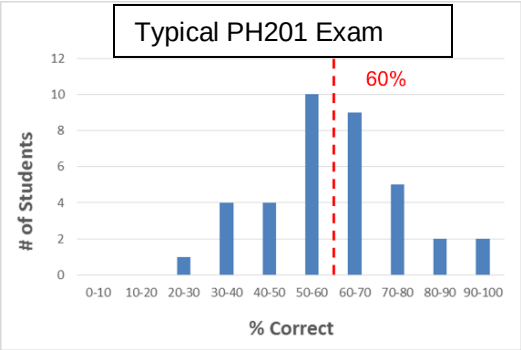
Calculation of the average of Exams and Final Exam:

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%.

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

1. 15/20 (15points 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?

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

If you check above you see that this qualifies you for a B in the class. Don’t be fooled. Exams in physics courses have shown to be tricky. They are not based on memorization and have shown to be challenging. They will not test if you memorized equations and if you can plug in numbers, but assess if you understand and be able to derive, analyze and even evaluate your solutions. 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 why we think this happens some of which are supported by research about student learning and others are 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. You will probably not be judged on a job 60% nicely done, but simply if you did get the 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:

Due to the remote structure of the class, I will not accept any late work. I will accept corrections to the HIPs and Labs. You can correct each of them within 3 days after the work was returned to you after the due date.

Because the grade penalty in this class is less abrupt in most activities I 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.

Why asking more WHY? Physics is all about making observation and then making predictions. If we understand why things are the way they are we can build a model ourselves, and do what this class tries to support: Thinking like a scientist and making informed decisions. We also hope and try to motivate you to reflect on HOW you learn instead of merely stuffing facts. This process is called metacognition and is a tremendous tool for improving your long term learning. See where your thoughts take you. Enjoy asking ever more complex questions and try to figure out what it would take to answer them. Use your journal for the pleasure of learning and the joy of feeling lots of AHA-moments.

If you follow the rubrics provided you know the grade you will have in every activity of this class. I hope you enjoy having choices about your work. Keep in mind that because it is easier to meet particular grade expectations I can ask more of you and push you harder in various directions without feeling guilty. I want to take each of you as far as you can go with the material we are studying. How far that is will be different for each of you, and I hope you will let me know.

PH202: Syllabus Reading Comprehension Name:_____

Class time:_____ Lab time_____

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 during Zoom time?

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

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:_____

Your name and class:_____ Waitlist? □ Yes □ No Ralph Tadday

A Little Reflection

1. Why are you here? What is your program?

2. What are your personal outcomes / expectations for this class? Be specific! (3 minimum)

3. Help me to understand your background: The 3 highest level math classes you took are (in brackets include the grade):

4. Help us to plan this sequence: Do you plan to take PH203 this year? □ Yes □ No

5. What other classes do you take this term?

6. Have you regularly scheduled time to study for PH202 during the week? □ Yes □ No
   How many hours? When?
7. Do you plan regularly meeting other students to study for this class? □ Yes □ No
8. Do you plan regularly coming to TASS (Tutor Assisted Study Session) for this class?
   (Time to be determined) □ Yes □ No
9. How often do you plan to see your instructor during office hours?
10. Describe any foreseeable events that may hinder you to be successful in this course, or any specific requirements that may be necessary/helpful for you to perform the tasks for this class successfully. This is a good place to mention a balky car, a long commute, or anything...

11. What can I do to make this class the best class you ever had?

Please attach a picture of yourself – this will help me learn your name!

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

Week	Key Topics	Monday	Tues Lab	Wednesday	Friday
1	Introduction, Using and transforming Energy, Heat and Temperature, Entropy, 1st and 2nd Law of Thermodynamics	6.April Introduction *Reading due* *Ch. 11.1-11.4**	Lab #1 Lab: *Safety*, Conservation of Energy	8. April *Reading due* *Ch. 11.5-11.6*	10. April *Reading due* *Ch. 11.7-11.8* **Lab1 Due**
2	The atomic model of matter, Ideal Gas Law, Specific Heat	13. April *Ch. 12.1-12.3* **HIP1 Due**	Lab #2 Ideal Gas Law	15. April *Ch. 12.4-12.6*	17. April *Ch. 12.8-12.9* **Lab2 Due**
3	Heat Transfer Fluids, Density, Pressure	20. April *Ch.11-12* *Review*	Lab #3 Heat Transport **HIP2 Due**	22. April Exam1	24. April *Ch. 13.1-13.2* **Lab3 Due**
4	Buoyancy, Fluid Dynamics Equilibrium&Oscillations	27. April *Reading due* *Ch. 13.3* **HIP3 Due**	Lab #4 Archimedes Principle	29. April *Reading due* *Ch. 13.4-13.7*	1. May *Reading due* *Ch. 14.1-14.2* **Lab4 Due**
5	Linear Restoring Force and Simple Harmonic Motion (SHM), Energy in SHM, Damped and Driven Oscillations.	4. May *Ch. 14.3-14.5* **HIP4 Due**	Lab #5 Oscillations& Harmonic Motion	6. May *Ch. 14.6-14.7*	8. May Exam2 **Lab5 Due**
6	Traveling Waves, the wave model, Graphical and Mathematical Description of Waves, Sound and Light, Doppler Effect	11. May *Ch. 15.1-15.4* **HIP5 Due**	Lab #6 Nature of Waves	13. May *Ch. 15.5-15.7*	15. May *Ch. 16.1-16.4* **Lab6 Due**
7	The principal of Superposition, Standing Waves on a String and of Sound. Interference	18. May *Ch. 16.1-16.4* **HIP6 Due**	Lab #7 Standing Waves	20. May *Ch. 16.5-16.7*	22. May Exam3 **Lab7 Due**
8	Wave Optics, What is Light?, Interference, Diffraction, Thin Films	25. May **HIP7 Due** Memorial Day No School	Lab #8 *Ch. 17.1-17.3* Optical Interference	27. May *Ch. 17.1-17.4*	29. May **Lab8 Due** *Ch. 17.4-17.6*
9	Ray Optics, Reflection, Refraction, Image Formation by Refraction, Ray Tracing (Thin Lenses)	1. June *Ch. 18.1-18.2*	Lab #9 *Ch. 18.3-18.4* Refraction **HIP8 Due**	3. June *Ch. 18.5-18.7*	3. June Exam4 **Lab9 Due**
10	Optical Instruments, Camera, Human Eye, Magnifier, Microscope, Telescope	8. June *Ch. 19.1-19.2* **HIP9 Due**	Lab #10 *Lenses and Eye* Lab Exam	10. June *Ch. 19.6* *Review*	12. June **Final** **1-2:50pm**

** These are the chapters discussed in the Zoom meeting that day.*
Answers to all reading questions are due in your Journal by 11am that day.

Mastering Physics due dates please see course PH202SPRING2020