PH 202: General Physics II (CRN 40680)

Linn Benton Community College: Spring 2022, 5 c.h.

Instructor: Ralph Tadday, taddayr@linnbenton.edu

Student Hours: MW 11am –11pm, F 10:30am –11:30am, by appointment (https://linnbenton.zoom.us/j/97753573755)

When and where this course meets:

Class: MW 2:00pm – 3:20pm, F 2:00 pm – 2:50 pm (We meet synchronously on ZOOM)

ZOOM: https://linnbenton.zoom.us/j/93028803412 **(passcode: PH202**)

Laboratory: Tuesday 2:00 pm – 4:50 pm (Face to Face, MH-114)

It seems we are moving towards a new normal.
You can read more details about LBCC's Covid policies here:
https://www.linnbenton.edu/about-lbcc/college-services/safety/covid19/index.php

Final: Wednesday, June 8, 3:00 pm - 4:50 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.

Internet requirements for this class: This class is taught synchronously online. We meet and talk about the material each class through the internet. You will need fast/broadband connection, and a computer with microphone and camera. Research has shown that you learn more when 1) your camera is on whenever you are in a zoom meeting and 2) when you participate actively. When joining the class you agree to have your camera turned on, to participate – and to learn lots.

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.

Course Information Online: Course materials for our class are on 'Moodle' at http://elearning.linnbenton.edu, course name: "PH202-202104 - GENERAL PHYSICS".

Contacting me: The best way to contact me is during Student Hours (via ZOOM) or via email. You can also make an appointment. I hope we will talk several times this term. Check in regularly and discuss your work or any other issues.

Me contacting you: ***Check your LBCC email*** – this is how I support you. When you are in this class, you will receive important information on 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. 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 ***https://pearsonmylabandmastering.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 the website. Make sure you select the course ID **tadday44459** when registering with MP. The course is connected to the text ***Knight/Jones/Field, College Physics, 4edition***. You still need to purchase a copy of the workbook.

If you do not have a textbook check the information on Moodle for ways to save money.

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 before you come to class. The course schedule includes the required readings – you are asked to familiarize yourself with the material and study ahead. Your reading ensures that you are prepared for activities in class. You will regularly be quizzed on the reading questions. Much of your homework at Mastering Physics is 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!

Class time will be spent on a variety of activities, including group work, discussions, problem-solving sessions, and demonstrations. We found this works well in the remote environment actually similar to face to face classes. Education and learning research show that very little learning happens 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. Participate enthusiastically, if you do we will all have more fun, and you benefit the most. Unless you make special arrangements with me, I expect your **cell phone or PDA will be turned off during class**.

It has been shown that the video camera on during ZOOM meetings creates community and supports your learning. **Please turn on your camera while in class.**

Group Work: Physics education research has shown that group discussions with peers support physics learning. Particularly students explaining a topic to a second person have significant learning gains. You will work in groups on ZOOM – ask each other questions!

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 exam will consist of topics covered in the lab. **Prelab** and **Postlab** exercises support your learning in the laboratory environment.

Homework (HW): This class includes two kinds of homework: 1) Mastering Physics and 2) Hand-In Problem and Enhancement (HIP & ENH)

Mastering Physics assignments from the end of the chapters in our text book are to be completed online at pearsonmylabandmastering.com/. When you buy your textbook in the campus store website access comes with it. 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. 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.

Feedback to your submitted work: Assignment grading turnaround time is typically no more than 7 days. I hope to spoil you with work graded promptly.

Tests: We will write 8 tests. You need to participate in at least 7 of them. The best 5 tests will be part of your Exam grade.

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): 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, 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 I will report incidents to the college administration. If you have questions about what does and does not constitute cheating, talk to me *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 I will treat it as mentioned above.

Calculator Policy: Students will be required to use a non-graphing/non-programmable scientific calculator for tests 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 physics notebook 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!

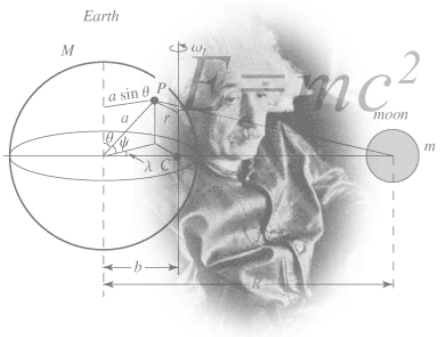
Outcomes:

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 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. It has been shown that detailed feedback supports student learning and is therefore an important part of my job. 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 [in brackets you find self-reported hours spent by students finishing class with exceptional success = 19hours/week total or 12 h/week outside of class]

- Actively reading textbook and answering reading questions [5hours/week, working worked examples and answering "Stop to Think" questions]. We will have short reading presentations and might have short timed quizzes.
- Workbook [30 min, 3x per week, directly after covering the material = 1.5 h/week] (recommended, not graded)
- Mastering Physics Homework (MP) – [45min, 3 times a week = 2h 15min/week. Necessary, this contains introductory material for each class.
- Hand-in-homework (HIP) including Enhancements (ENH) [1h/week]
- A group project [3h, once a term, 15min/week] (**participate to pass with C or better**)
- In class activities [4h], in lab activities [3h] (**participate in 9 labs to pass, D or better**)
- Labs, including Prelab, Postlab [for each lab 3h in lab 2h outside of lab time]
- Oral Exams and Final Exam

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

a) Reach 30% of Mastering Physics score.
b) Submit at least 4 HIP/ENH ALL developing or better.
c) Participate in 3 oral exams (Week 2-5, Week 6-7, Week 8-9)
d) Covered 3 outcomes in the Final Exam. Completed D-level final exam..

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

a) Correctly answer 50% of reading questions (Moodle based quiz)
b) Reach 50% of Mastering Physics score.*
c) Submit 6 HIP/ENH, 2 accomplished, 4 developing.*
d) 3 accomplished labs: including prelabs in time, accomplished postlabs.*
e) Complete a Group Project.
f) 3 accomplished oral exams (1 in each of Week 2-5, Week 6-7, Week 8-9)
g) Covered 5 outcomes in Final Exam. Completed C-level final exam.

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

a) Correctly answer 60% of reading questions (Moodle based quiz).
b) Reach 70% of Mastering Physics score.*
c) Submit 6 HIP/ENH, 4 accomplished, 2 developing.*
d) 5 accomplished labs: including prelabs in time, accomplished postlabs.*
e) Complete a group project.
f) 4 accomplished oral exams (including 1 in Week 2-5, 1 in Week 6-7, 1 in Week 8-9)
g) Covered 5 outcomes in the Final Exam. Completed B-level final exam.

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

a) Correctly answer 75% of reading questions (Moodle based quiz).
b) Reach 90% of Mastering Physics score.*
c) Submit 6 HIP/ENH, 6 accomplished, 2 developing.*
d) 7 accomplished labs: including prelabs in time, accomplished postlabs.*
e) Complete a group project.
f) 5 accomplished oral exams (including 1 in Week 2-5, 1 in Week 6-7, 1 in Week 8-9)
g) Covered 5 outcomes in the Final Exam. Completed B-level final exam.

**The weakest of these categories will not be considered for your final grade.*

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 (-:

Oral Exams

Instead of writing tests we will meet for oral assessments this term during student hours. It that does not work, please talk to me, I am very accommodating to seeing students at a time that works with out schedules. For details and a rubric see guidelines on Moodle

Using oral exams we practice to communicate our work to others who are on a similar level of physics education. I will always start the discussion with a question from the material that we have covered during the two weeks before the time of the scheduled exam.

Final Exam:

For your final exam I ask you to write a story around physics problems that showcase your mastering of the PH202 course outcomes. Your story will include one or several quantitative problems that prove to me that you have achieved each of the 5 outcomes listed above. Guidelines for the final exam including the rubric are posted on Moodle.

Timing:

I do not recommend falling back in class, but I will accept late work twice this term. You have two “gone fishing” in the term: If you are “gone fishing” you let me know before the due date and hand in your late activity within a week of the due date.

Corrections:

In this class you can correct your work. Within one week after your work has been returned, you schedule time in student hours to submit and discuss your corrected work. Each 15min student-hour appointment you can defend one single assignment. You cannot be late for the final exam.

Benefits:

So what are the benefits I 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. Here are some reasons supported by research about student learning and reasons based on student feedback. Most of what we do is about your engagement with your learning. You always are responsible for your learning and this grading scheme makes these connection more direct.

Do you agree with the following? You want to do your jobs well, and you want to have choices about your life in general, and what particular jobs you have to complete. I have created opportunities for you to rise up to a high standard of 100% accomplished work. In your future in a professional environment, will you be judged on a job 60% nicely done, or on a job correctly and well done in time allotted. During the learning process in this physics course we support you learning to get the job done.

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.

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 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:_____

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. What makes you feel included in a course?

8. 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...

9. What can I do to make this class the best class you ever had? What are your expectations on your instructor?

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

PH202 Spring 2021, LBCC, Schedule Ralph Tadday (subject to change):

Week	Key Topics	New Tools	Sunday	Monday	Tues Lab	Wednesday	Friday
1	Introduction, Using and transforming Energy, Heat and Temperature, Entropy, 1st and 2nd Law of Thermodynamics	Before and after picture; Energy transfer diagram		28.March Introduction *Reading Ch. 11.1-11.4*	Lab #1 Conservation of Energy	30.March *Ch. 11.5-11.6* **Lab1 Due**	1. April **LBCC closed No Class**
2	The atomic model of matter, Ideal Gas Law, Specific Heat	Diagrams for ideal gas law; particularly p-V diagram.	**HIP1 Due**	4. April *Ch. 11.7-11.8 Ch. 12.1-12.2* **HIP1 Due**	Lab #2 *Ch. 12.3* Ideal Gas Law	6. April *Ch. 12.4-12.6* **Lab2 Due**	8. April *Ch. 12.8-12.9*
3	Heat Transfer Fluids, Density, Pressure	Free Body Diagrams revisited; Stream lines	**HIP2 Due**	11. April *Ch. 12.5-12.6*	Lab #3 Specific Heat of Metal	13. April *Ch. 13.1-13.2* **Lab3 Due**	15. April *Ch. 13.3*
4	Buoyancy, Fluid Dynamics Equilibrium & Oscillations	Review Identify Forces Free-Body Diagram	**HIP3 Due**	18. April *Ch. 13.4-13.7*	Lab #4 Archimedes Principle	20. April *Ch. 14.1-14.2* **Lab4 Due**	22. April *Ch. 14.3-14.4*
5	Linear Restoring Force and Simple Harmonic Motion (SHM), Energy in SHM, Damped and Driven Oscillations.	Linear restoring force visualized in Force versus displacement diagram	**HIP4 Due**	25. April *Ch. 14.5-14.6*	Lab #5 Oscillations &Harmonic Motion	27. April *Ch. 14.7* **Lab5 Due**	29. April *Ch. 15.1-15.2*
6	Traveling Waves, the wave model, Graphical and Mathematical Description of Waves, Sound and Light, Doppler Effect	Position versus time diagram of waves	**HIP5 Due**	2. May *Ch. 15.3-15.4*	Lab #6 Nature of Waves	4. May *Ch. 15.5-15.7* **Lab6 Due**	6. May *Ch. 16.1-16.2*
7	The principal of Superposition, Standing Waves on a String and of Sound. Interference	Standing wave representation of displacement and pressure	**HIP6 Due**	9. May *Ch. 16.3-16.4*	Lab #7 Standing Waves	11. May *Ch. 16.5-16.7* **Lab7 Due**	13. May *Ch. 17.1-17.2*
8	Wave Optics, What is Light?, Interference, Diffraction, Thin Films	Visualizing the path difference of two waves resulting in interference	**HIP7 Due**	16. May *Ch. 17.3-17.5*	Lab #8 Optical Interference	18. May *Ch. 17.4* **Lab8 Due**	20. May *Ch.18.1-18.2*
9	Ray Optics, Reflection, Refraction, Image Formation by Refraction, Ray Tracing (Thin Lenses)	Ray Diagram	**HIP8 Due**	23. May *Ch. 18.3-18.4*	Lab #9 Refraction	25. May *Ch. 18.5-18.7* **Lab9 Due**	27. May *Ch. 19.1-19.2*
10	Optical Instruments, Camera, Human Eye, Magnifier, Microscope, Telescope		**HIP9 Due**	30. May **Memorial Day No School**	Lab #10 *Ch. 19.3-19.5* Lenses and Telescopes	1. June *Ch. 19.3-19.5* **Project Movies**	3. June *Review*
11	**Finals Week**					8. June **Final 3pm-4:50pm**	

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.