PH 203: General Physics III

Linn Benton Community College: Spring 2022, CRN 40786, 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, by appointment (https://linnbenton.zoom.us/j/97753573755)

When and where this course meets: (ZOOM passcode: PH203)
https://linnbenton.zoom.us/j/94880771313

Class: MW 9:30am – 10:50am, F 9:30 am – 10:20 am, ZOOM

Laboratory: Tuesday 11:00 am – 1:50 pm, Madrone Hall 114

Final: Wednesday, June 8, 10:00 am - 11:50 am

For updates about LBCC's Covid policies please check here:
https://www.linnbenton.edu/about-lbcc/college-services/safety/covid19/index.php

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 III. 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 and PH202 we use symbolic language for a large part of what we do in physics. You do use your math skills! To be successful in Physics, we've created the following prerequisites for this class:

- Completion of PH201 and PH 202 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 are on the 'Moodle' website at http://elearning.linnbenton.edu. The course is entitled "PH203-SPRING 2022 - 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.

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 Mastering Physics. Make sure you select the course ID **tadday61642** 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 intro letter to the student 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 shows 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 The Roadrunner Resource Center (T-112): Resources@linnbenton.edu, ph: 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 Class Feedback:

- 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 Group Tutoring 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:

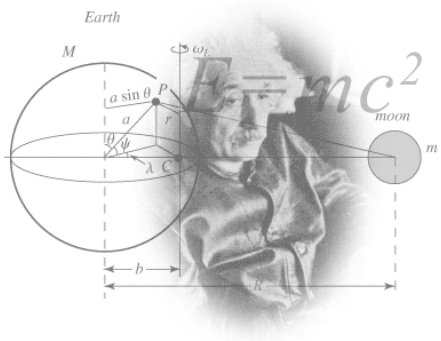
- Do additional practice homework problems in any areas where you are not satisfied with your understanding.
- Seek help whenever you realize you are struggling… after you struggled enough (-:
- …and if you read something that you do not agree with or that your prior experience tells you, you are probably 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 third term of the sequence concludes our journey by closely looking at charges and how charges interact with each other. We will look at electricity, magnetism and conclude the journey with a look into modern physics, particularly special relativity, quantum physics and nuclear physics with a taste of applications in the medical world.

PH203 rounds up the physics we investigated in PH201 and PH202. Charge-charge interactions are at the center of chemistry and biology. It might seem stunning to you, that you had to wait for 6 month to finally discuss the material that allows to fundamentally understand what you already feel familiar with from other classes. I hope you will enjoy looking at this material through the glasses of a physicist.

Upon completion of this course with a "C" or better, students will be able to:

- Describe and explain charged physical objects moving in electric fields.
- Determine the electric field and potential of multiple charges.
- Solve problems in serial and parallel circuits.
- Relate the induced current in circuits to the motion of magnets.
- Relate simple harmonic motion to the frequency of AC current.



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" (German for "thought experiments") – experiments that previous generations couldn't even imagine.

We will continue building our understanding of the universe on everyday observations. During this term we will focus on electric charges and fields, the origins of magnetism, and the fundamental origins of the formation of light. How come that diamond is so hard, but wax can be cut with a knife? How are thoughts transported and how does your brain know to make your hand pull back, when you hold it on a hot or cold body? We have already talked about electromagnetic waves, but how can we make these waves in the first place? And while we walk this last part of our journey together, you will be able to connect all this to your personal goals … at least that is my goal.

And while you study these last topics of the series of general physics I hope you are regularly reminded that everything around you are applications of the more fundamental principles that we study in this class. And while you are thinking about the fundamental problems posed to you in class, we hope that you gain more and more confidence in recognizing and solving (physics) problems of real life situations – situations in YOUR real life.

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 much 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 8 labs to pass**)
- Labs, including Prelab, Postlab [for each lab 3h in lab 2h outside of lab time]
- Tests and Final Exam [**participate in 7 individual tests to pass**]

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

a) Reach 30% of Mastering Physics score.
b) Hand in at least 4 HIP ALL developing or better.
c) Have an average of at least 30% in the tests and 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) HIP: 5 completed and submitted, 2 accomplished.**
*d) 3 accomplished labs: prelabs in time, summarized labs, accomplished postlabs.**
*e) Have an average of at least 50% in the tests and 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.
*a) HIP: 6 completed and submitted, 4 accomplished.**
*c) 5 accomplished labs: prelabs in time, summarized labs, accomplished postlabs.**
*d) Have an average of at least 60% in the tests and 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) HIP: 7 completed and submitted, 6 accomplished.**
*d) 7 accomplished labs: prelabs in time, summarized labs, accomplished postlabs.**
*e) Have an average of at least 75% in the tests and Final Exam.**

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

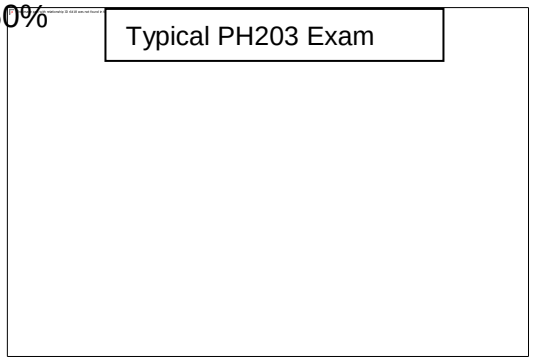
***BUT NEW**: Your final grade cannot be more than 1 letter grade better than the grade equivalent you achieved in your tests and Final Exam.*

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 Tests and Final Exam:

Tests support your learning and prepare you for the final. The tests together will be worth as much as the final. I ask you to take 8 Tests, the best 5 of them will be part of your total exam grade. Each test is worth 10%, the final is worth 50% of the exam grade.



As an example, assume you have the following 5 best test results:

1. 38/50 (38 points out of 50 points)
2. 30/50
3. 26/50
4. 10/50 (everybody can have a bad day (-:)
5. 32/50

In the Final you have 156 out of 200 points.

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

% Exams, Final = 10%*[(38/50) + (30/50) + (26/50) + (10/50) + (32/50)] + 50% * (156/200) = 66%

This example would qualify you for a B in the class. You can even qualify for an A if HIP/ENH, Mastering Physics, and Lab grades qualify for an A.

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.

PH203: 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 PH203 listed in the syllabus?
   a.
   b.

4. What do you do with your cell phone during Zoom time?

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

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

7. **This is a remotely taught class. For all work I hand in for PH203 I agree to the following statement:**
   All work handed in for PH 203 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 and my course grade will possibly be dropped by one letter grade.
   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.

I have read and understood the syllabus entirely. 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. What other classes do you take this term?

5. Have you regularly scheduled time to study for PH203 during the week? □ Yes □ No
   How many hours? When?
6. Do you plan regularly meeting other students to study for this class? □ Yes □ No
7. Do you plan regularly coming to TASS (Tutor Assisted Study Session) for this class?
   (Time to be determined) □ Yes □ No
8. How often do you plan to see your instructor during office hours?
9. 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...

PH203 Spring 2022, LBCC, Schedule Ralph Tadday (subject to change):

Week	Key Topics	Monday	Tues Lab	Wednesday	Friday
1	Electric Charges, Forces and Fields	28.March Introduction *Reading due** *Ch. 20.1-2*	Lab #1 *Ch. 20.3-4* Electrostatics, Electric Field	30.March *Ch. 20.5-7* **Lab1 Due**	1. April No School In Service
2	Electric Potential, Electric Potential, Electric Potential. Electric Potential Energy	4. April *Ch. 21.1-3* **HIP1 Due**	Lab #2 Test 1 Electric Potential	6. April *Ch. 21.4-6* **Lab2 Due**	8. April *Ch. 21.7-8*
3	Current and Resistance, Simple Circuits, Ohm's Law	11. April *Ch. 22.1-4* **HIP2 Due**	Lab #3 Test 2 Current and Ohm's Law	13. April *Ch. 22.5* **Lab3 Due**	15. April *Ch. 22.6*
4	Circuits, Kirchhoff's Laws, Parallel and Series Resistors, RC Circuits	17. April *Ch. 23.1-5* **HIP3 Due**	Lab #4 Test 3 Circuit Analysis	20. April *Ch. 23.6-8* **Lab4 Due**	22. April *Ch. 23.7-8*
5	Magnetic Fields and Forces	25. April *Ch. 24.1-4* **HIP4 Due**	Lab #5 Test 4 Magnetic Phenomena	27. April *Ch. 24.5-6* **Lab5 Due**	29. April *Ch. 24.7-8*
6	Electromagnetic Induction and Electomagnetic Waves	2. May *Ch. 25.1-4* **HIP5 Due**	Lab #6 Test 5 Magnetic Field of Current	4. May *Ch. 25.5* **Lab6 Due**	6. May *Ch. 25.6-7*
7	AC Electricity	9. May *Ch. 26.1-4* **HIP6 Due**	Lab #7 Test 6 Electric Motors	11. May *Ch. 26.5* **Lab7 Due**	13. May *Ch. 26.6-7* **15. May, last day to withdraw**
8	Quantum Physics	16. May *Ch. 28.1-4* **HIP7 Due**	Lab #8 Test 7 Energy use in your home	18. May *Ch. 28.5,7-8* **Lab8 Due**	20. May *Ch. 28.7-8*
9	Nuclear Physics	23. May *Ch. 30.1-4* **HIP8 Due**	Lab #9 Test 8 Radioactive Decay	25. May *Ch. 30.5-6* **Lab9 Due**	27. May *Finish Ch. 30*
10	Relativity:	30. May Memorial Day No School **HIP9 Due**	Lab #10 *Ch. 27.1-3* Relativity Kickoff	1. June *Ch. 27.4-7*	3. June Group project movies
11				8. June **Final** **10am-11:50am**	

** These are the chapters discussed in the Zoom meeting that day.*

Labs are due Wednesday 7pm, I will accept and check also Thursday 7pm.
Mastering Physics due dates please see course PH203SPRING2022