

PH 203: General Physics III

Linn Benton Community College: Spring 2019, CRN 40786 & 41279, 5 c.h.

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

Office Hours: MW 11 am – 11:45 am and 2:30pm-3:30pm, F 10:30am – 11:30am

When and where this course meets:

Lecture:

MW 9:30am – 10:50am, F 9:30 am – 10:20 am, MH 113

Laboratory:

Tuesday 8:00 am – 10:50 am, MH 106
11:00 am – 1:50 pm, MH 106

Final: Monday, June 10, 10:00 am - 11:50 am

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 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 PH 202 General Physics II with a "C" grade or better.

Physicists rely heavily upon the compact language of mathematics to speak to one another regardless of what part of the world they might come from. 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.

Just like last term **you are advised to review the material from PH201, MTH 111 and MTH 112 at your earliest convenience. The course relies heavily on PH201.**

Course Information Online: You will find course materials for our class on the 'Moodle' website at <http://elearning.linnbenton.edu>.

The course is entitled "PH203 -General Physics (Spring)", short course name **PH203 Spring**. Check the Moodle page regularly.

Contacting me: The best way to contact me is in person during office hours or via email. Also, usually whenever you see me, I am happy to talk to you. I recommend that you see me 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. 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 M.P. Our Course ID is **PH203SPRING2019**.

PH 203 Lab Manual and Lab notebook (**Computation Notebook**) in LBCC bookstore.

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. 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 therefore create opportunities for every student to explain the course materials to other students and the instructor. Yes, we will work in groups a lot!

Class time will be spent on a variety of activities, including group work, discussions, problem-solving sessions, and demonstrations. I constantly work on making our classroom an interactive classroom for all of us to learn together. 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**. I will support you and collect your phone if you struggle to keep it turned off.

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 you write that summarizes shortly what you did in the lab, and what you learned.

Lab Project: This year you will become the expert of the class in one topic of your choice. You will practice creating a demonstration and presenting your work to the public.

Journal: Each week you will summarize 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:

Assignments from the end of the chapters in our text book are online at www.masteringphysics.com. Website access comes with your textbook, enter **PH203SPRING2019** as the Course ID. Each assignment must be completed by the due date listed in your schedule and in Mastering Physics respectively. 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 one HW assignment every week (HIP) that will often wrap up the learning of the week and 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 (ENH). I hope you will enjoy this part. It is always fun for me to learn how students make use of the physics they learn, and I am curious to read what you will dig into. See further guidelines on homework on Moodle.

Reading Quizzes: We will write regular Reading Quizzes each week. Questions will be taken from the Reading Guide.

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

The Final: One aspect of physics is that every week builds upon what was learned in the weeks previously. As a consequence, by nature, the final exam is comprehensive. The Final will contain conceptual questions similar to the workbook questions and the problems we discuss in class and the problems that are in the textbook or on Moodle.

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 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*. 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.

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**. If there is interest we will establish a tutor assisted study session (**TASS**) specifically for PH203. 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 often assume you know! Please excuse me for that.

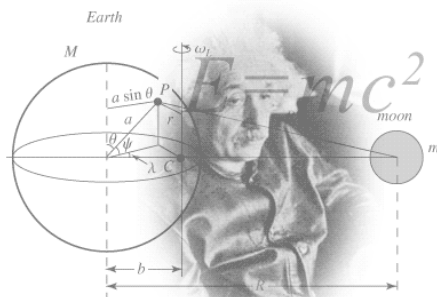
Objectives:

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 the material through the glasses of a physicist.

Upon successful 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 a 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” – 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.

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
- Hand-in-homework (HIP) including Enhancements (ENH)
- Your Journal
- Reading quizzes
- In class activities
- Labs, including Prelab and Postlab: **You need to participate in at least 9 labs.**
- A lab project
- 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 3 HIP/ENH ALL developing or better.
- c) Have an average of at least 30% in the RAA 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 8 HIP/ENH, 2 ALL accomplished or better, 4 more developing or better.
- c) Have an average of 30% in Reading quizzes.
- d) Have 2 labs ALL accomplished and another 4 labs ALL developing.
- e) Finish your lab project with 2 all developing milestones, a poster and your final report.
- 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 an average of 50% in Reading quizzes.
- d) Have 3 labs ALL accomplished and another 5 labs ALL developing.
- e) Finish your lab project with all developing milestones and accomplished poster and final report.
- 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 d), e), and f), 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, 7 ALL accomplished or better.
- c) Have an average of 75% in Reading quizzes.
- d) Have 5 labs ALL accomplished and another 3 labs ALL developing.
- e) Finish a lab project with 2 all accomplished milestones all other milestones developing and accomplished presentation and final report.
- 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 d), e), and 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 (-:

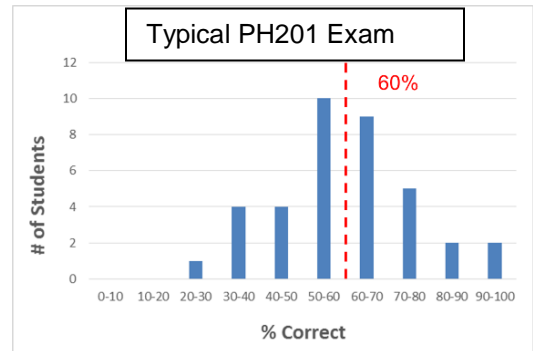
Calculation of the average of Exams and Final Exam:

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%.

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?

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

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:

In particular we will always accept late work, if you schedule 20min during office hours for each late activity. In that case in office hours you explain what you did and learned when you hand in the assignment. You can only defend one single assignment per office hour, and we will not extend official office hours for your late work. If you cannot schedule time during office hours, please see me to adjust office hours or find other times to meet with me. You cannot be late for an exam or the final exam.

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.

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?

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. What other classes do you take this term?
- 5.
6. Have you regularly scheduled time to study for PH203 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!

PH203 SP2019, LBCC, Schedule (subject to change):

Week	Key Topics	Monday	Tues Lab	Wednesday	Friday
1	Electric Charges, Forces and Fields	1. Apr. <i>No School</i> <i>No Service</i>	Lab #1 (no joke) Introduction Ch. 20.1-3 Lab Safety Electrostatics	3. Apr Ch. 20.1-3 Workbook 20	5. Apr Ch. 20.4-20.7 Lab1 Due
2	Electric Potential, Electric Potential, Electric Potential. Electric Potential Energy	8. Apr Ch. 21.1-4 Workbook 21 HIP1 Due	Lab #2 Electric Field Project (P) Introduction	10. Apr Ch. 21.4-8 Workbook 21	12. Apr Group Exam1 Lab2 Due
3	Current and Resistance, Simple Circuits, Ohm's Law	15. Apr Ch. 22.1-4 Workbook 22 HIP2 Due	Lab #3 Current and Ohm's Law P selection	17. Apr Ch. 22.5-6 Workbook 22	19. Apr Ch. 23.1-2 Exam1 Lab3 Due
4	Circuits, Kirchoff's Laws, Parallel and Series Resistors, RC Circuits	22. Apr Ch. 23.1-4 HIP3 Due	Lab #4 Ch. 23.1-4 Circuit Analysis P workplan	24. Apr Ch. 23.6-8 Workbook 23	26. Apr Lab4 Due Group Exam2
5	Magnetic Fields and Forces	29. April Ch. 24.1-4 Workbook 24 HIP4 Due	Lab #5 Magnetic Phenomena P Discussion	1. May Ch. 24.5-8 Workbook 24	3. May Exam2 Lab5 Due
6	Electromagnetic Induction and Electomagnetic Waves	6. May Ch. 25.1-4 Workbook 25 HIP5 Due	Lab #6 Magnetic Field of Current	8. May Ch. 25.5-8 Workbook 25	10. May Group Exam3 Lab6 Due
7	AC Electricity	13. May Ch. 26.1-4 Workbook 26 HIP6 Due	Lab #7 Electric Motors P work	15. May Ch. 26.5-7 Workbook 26	17. May Exam3 Lab7 Due
8	Quantum Physics	20. May Ch. 28.1-4 Workbook 28 HIP7 Due	Lab #8 Energy use in your home P work	22. May Ch. 28.5,7-8 Workbook 28	24. May Ch. 30.1-4 Group Exam4 Workbook 30 Lab8 Due
9	Nuclear Physics	27. Mar Memorial Day <i>No School</i>	Lab #9 HIP8 Due P Practice Radiation and Radioactive Decay	29. Mar Ch. 30.5-6 Workbook 30	31. May Exam4
10	Relativity:	3. June Ch. 27.1-3 HIP9 Due	Lab #10 Ch. 27.4-7, We will have class today! Lab tomorrow	5. June P Presentation Project Final Report Due	7. June Review
11		10. June Final 10-11:50pm			

Mastering Physics due dates please see course PH203SPRING2019