

**PH 201: General Physics I**  
**Linn Benton Community College: Winter 2018 (CRN:30889)**

**Instructor:** Robert Duffin, Ph.D., duffinr@linnbenton.edu, MH-111, (541) 917-4368

**Office hours: MW 12 to 1pm, and Thursday 12:45 to 1:45 pm (or by appointment)**  
**Science Help Desk hours: Friday 10 am – 12noon**  
**Office: MH 111**

**When and where this course meets:**

**Lecture:**

MW 3 pm – 4:20 pm and Friday 3 pm – 3:50 pm, MH 113

**Laboratory:** Tuesday 2:00 pm – 4:50 pm, MH 114

**Final:** Monday, March 19, 3:00 pm - 4:50 pm, MH 113

Welcome to General Physics I. One more step you take in our universe with wide open eyes trying to explain all the miracle and wonder around you. Here you find the information to keep you walking that path. Please read carefully. Your understanding these guidelines is crucial for the success in this class.

**Math requirements for this class and for physics in general**

Math is the language of a large part of what we do in physics. To be able to do well in Physics, we've created the following prerequisites for this class:

- Completion of MTH 111 (College Algebra) with a "C" grade or better.
- Completion of MTH 112 (Trigonometry) 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 is about you've been studying.

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

**You are advised to review the material from MTH 111 and MTH 112 at your earliest convenience.**

**Required Materials**

**Text:** *College Physics: A Strategic Approach*, 3/E, by Randall D. Knight, Brain Jones, and Stuart Field; Pearson Publishing, with Mastering Physics. Make sure you also buy and make use of the workbooks that accompanies this book. We will use the workbook in class. The text, the workbooks, and Mastering Physics will also be used in PH202 and PH203. Optional: Student Study Guide, there even is a student solutions manual, unfortunately (mis)using it hurt student's final grades...come to discuss.

**PH 201 Lab Manual** available in the LBCC bookstore, and a Lab notebook (Computation Notebook).

**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 buy a used text you can purchase an access code through the MP website. Make sure you select the text ***Knight/Jones/Field, College Physics, 3edition*** when registering with MP. The course name is **PH201WINTER2018**

**Course Information Online:** You will find course materials for our class on the 'Moodle' website at [elearning.linnbenton.edu](http://elearning.linnbenton.edu), entitled "General Physics 201 (FA17)". The short course name is **PH201\_RD**. 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 would recommend you to 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.

### Course Activities

**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. Would you think it is fair that in a college physics class the physics professor should be the person learning the most physics? We therefore create opportunities for every student to listen to the instructor and to other students and to explain the course materials to other students and the instructor. Yes, we will work in groups a lot! When you work in groups your peers are usually your only and most ideal help.

**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. My goal is to set up the Monday HW at Mastering Physics in such a way that you will be able to answer the question without further instruction. Please let me know how well I am doing!

**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 pretty much 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 physics instead of watching me doing it. I rely on you, together we create the desired learning environment. It will benefit you to participate enthusiastically, which will also make it more fun for all of us. Unless you make special arrangements with me, I expect your **cell phone or PDA will be off during class**.

**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 your 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.

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

Assignments from the end of the chapters in our text book are to be completed online at [www.masteringphysics.com](http://www.masteringphysics.com). Website access comes with your textbook, enter **PH201WINTER2018** as the Course ID. HW solutions and other useful materials are available at <http://elearning.linnbenton.edu>. Make sure that your current e-mail is listed at both sites so that you can receive e-mailed course information. 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. I will post each assignment approximately one week before the HW is due. Late work will not receive credit.

**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 HW and portfolio on Moodle.

**Journal:** Each week you will write a paragraph summarizing your learning and struggles and hand it in on Fridays for review. To make sure you will focus on physics you will include and explain A) one key picture, B) one key diagram or graph and C) one key equation. Ideally all these are related.

**Exams:** You will ask yourself how much you learned in class. To make sure you know where you stand, we will write short Exams 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 A) conceptual questions similar to the workbook questions and conceptual questions at the end of each chapter and B) problems similar to the ones we discuss in class, problems that are at the end of each chapter in the textbook or HIP 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 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 either a Casio fx-260, or HP 10s 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 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, and find me before you develop the desire to throw your physics book out of the window.

**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](http://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.

**Other important information:** The Add/Drop date and date for payment is the 2<sup>nd</sup> Monday of the term.

### **Suggestions for success:**

Physics can be both challenging and rewarding. In order to succeed, plan to:

- Arrive at class on time, prepared to participate, contribute to discussions, and treat your classmates with respect.
- Check our Moodle page regularly, and stay aware of current assignments.
- Complete readings before class, and review your class notes later the same day.
- Work through the conceptual problems at the end of each chapter and the accompanying workbook before you start doing the Mastering Physics HW.
- Start homework the day it is assigned, and break the work into small pieces. Your understanding will be much greater if you complete homework on a daily basis.
- Find help when you have not successfully answered a question in the first or second try. Do not fall into try and error.
- Do additional practice homework problems in any areas where you are not satisfied with your understanding.
- Work responsibly with other students in and out of class.
- Seek help whenever you realize you are struggling.

*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.*

### **Objectives:**

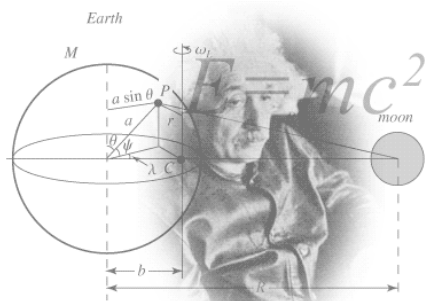
Physics is the study of nature and therefore searches to explain pretty much everything that you see around you. It is the study of how rainbows are formed. It is the study of why the sky is blue, why the stars twinkle, and how the planets move through the heavens. Applications of physics have given 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 first term of the sequence we will focus on mechanical forces and how they might result in motion.

When developing the PH201 sequence we invited a variety of individuals from industry and academia to help determine what skills and knowledge you should gain during your year of physics in order to maximize your potential in your future career.

These discussions resulted in the following **outcomes**:

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

- Describe and explain physical objects in motion.
- Design and conduct experiments to determine critical motion parameters (velocity, acceleration).
- Solve motion problems using algebra and graphical methods.
- Solve physics problems involving forces and energy.
- Select between force and conservation concepts (energy or impulse) to solve Newtonian mechanics problems.

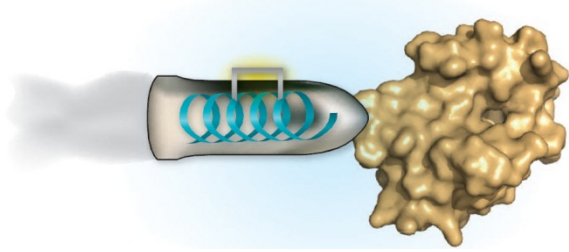


Of course, to me, the most important reason to study physics is because it is simply fun. Physics is about understanding everything around you. Physicists have the neatest toys—many of which I hope to share with you—and we get to do “Gedanken Experiments” – thought experiments that previous generations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

In this adventure we will start by making everyday observations about how things move—by the end of the term we will end up having learned some pretty neat things about motion, forces, and various forms of energy – physics that contribute to building a model towards understanding the universe in which we live.

As you continue on in Physics, in Physics 202 we get to deal about fluids, pressure, waves, light and sound. Physics 203 focuses 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.



*Physics is the study of the underlying forces of nature and the search for the understanding of the fundamental building blocks of the universe. The concept of the 'magic bullet' is a wonderful example for the connection of physics, chemistry, and biology to solve a medical problem. A 'magic bullet' is a drug formulation that has no side effects, and gives feedback to the user or doctor about the status of the disease under treatment.*

### 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)
- Journals
- Reading quizzes
- In class activities
- Labs, including Pre-lab and Post-lab (**you need to participate in at least 9 labs**)
- 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) Hand in 3 Journals.
- d) 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 8 HIP/ENH, 2 ALL accomplished or better, 2 more ALL developing or better.
- c) Hand in at least 3 ALL accomplished Journals.
- d) Have 2 labs ALL accomplished and another 4 labs ALL developing.
- e) 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) Hand in at least 5 ALL accomplished Journals.
- d) Have an average of 50% in Reading quizzes.
- e) Have 3 labs ALL accomplished and another 3 labs ALL developing.

- 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 f), and have an average of at least 80% in 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) Hand in at least 7 ALL accomplished Journals.
- d) Have an average of 75% in Reading quizzes.
- e) Have 5 labs ALL accomplished and another 3 labs ALL developing.
- 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 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, Journals, 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%.

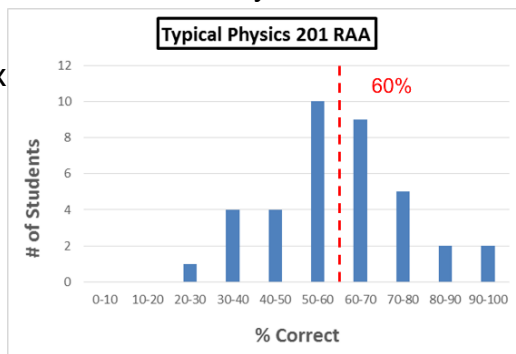
As an example assume you have the following 4 ex results:

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 get jobs you do done 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 well done in time. 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 thinking and observing 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. 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.

**PH201 WINTER 2018, LBCC, Schedule (subject to change):**

Week	Key Topics	Monday	Tues Lab	Wednesday	Friday
1	Introduction, Physics, Position, Velocity, Displacement, Motion Diagrams, Units, Conversion, Sig. Figs, Vectors	8. Jan Introduction Reading Preface to Student	Lab #1 Intro and Uniform Motion <b>*The first MP HW's are due today by 11:59pm</b>	10. Jan Reading Ch. 1	12. Jan 3.1-3.3 Lab1 Due Journal-1 Due
2	Average velocity and acceleration including plots, 1D- kinematics <b>*Note: Mastering physics homework is usually due on Sunday, Tuesday and Thursday @11:59pm</b>	15. Jan Martin Luther King Jr. LBCC Closed	16. Jan Ch. 2.1-2.3 HIP1 Due Lab #2 Displacement, Velocity and Acceleration	17. Jan Ch. 2.4-2.6	19. Jan Lab2 Due Journal-2 Due Exam 1
3	1D kinematics equations, 2D kinematics, Projectile Motion, Uniform Circular Motion	22. Jan Ch. 2.7, Ch. 3.4-3.5 HIP2 Due	Lab #3 Projectile Motion	24. Jan Ch. 3.6-3.7	26. Jan Ch. 3.8 Lab3 Due Journal-3 Due
4	Forces, Newton's 1 <sup>st</sup> , 2 <sup>nd</sup> and 3 <sup>rd</sup> laws	29. Jan Ch. 4.1-4.4 HIP3 Due	Lab #4 Ch. 4.5-4.6 Force Table	31. Jan Ch. 4.7	2. Feb Lab4 Due Journal-4 Due Exam 2
5	Free-body diagrams, Friction, Inclined planes, Force problem solving skills	5. Feb Ch. 5.1-5.3 HIP4 Due	Lab #5 Newton's Laws of Motion	7. Feb Ch. 5.5-5.7	9. Feb Ch. 5.8 Lab5 Due Journal-5 Due
6	Forces and circular motion, Universal gravity, orbital motion, Circular and Rotational Motion,	12. Feb Ch. 6.1-6.2 HIP5 Due	Lab #6 Ch. 6.3-6.6 Uniform Circular Motion	14. Feb Ch. 7.1-7.4	16. Feb Lab6 Due Journal-6 Due Exam 3
7	Torque, statics of rigid bodies, Rotational mechanics	19. Feb Presidents Day LBCC Closed	Lab #7 Ch. 7.5-7.7 HIP6 Due Torque	21. Feb Ch 8.1-8.2	23. Feb Ch 8.3-8.4 Lab7 Due Journal-7 Due
8	Impulse-Momentum theorem, Conservation of momentum, Angular Momentum	26. Feb Ch 9.1-9.5 HIP7 Due	Lab #8 Impulse and Momentum	28. Feb Ch 9.6-9.7	2. Mar Lab8 Due Journal-8 Due Exam 4

Week	Key Topics	Monday	Tues Lab	Wednesday	Friday
9	Work-Energy theorem Application of Work	5.Mar Ch.10.1-10.4 HIP8 Due	Lab #9 Ch.10.5-10.8 Work & Power	7.Mar	9 Mar Lab9 Due Journal-9 Due
10	Conservation of energy, Power, Energy and systems, forces from energy, energy diagrams	12.Mar Ch. 11.1-11.4 HIP9 Due	Lab #10 Bungee Lab	14.Mar Ch. 11.5-11.8	16.Mar Review Lab10 Due Journal-10 Due *The last MP HW is due on Mar 17
11	<b>Finals Week</b>	19.Mar 3pm-4:50pm MH 113			

\*For Due Dates of Mastering Physics please check the Mastering Physics Web-site