PH 201: General Physics I
Linn Benton Community College: Winter 2020, 5 c.h.

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

Student 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 1:00pm – 2:20pm, F 1:00 pm – 1:50 pm, MH 113 (CRN 30889, 30968)

Laboratory:

Tuesday 8:00 am – 10:50 am, MH 114 (CRN 30889)
Tuesday 2:00 pm – 4:50 pm, MH 114 (CRN 30968)

Final: Monday, March 16, 1:00 pm - 2:50 pm

I am constantly striving to become a better teacher, and find ways to support you better in your learning. Therefore this document is subject to change.

Welcome to General Physics I. You decided to take another step towards understanding and explaining all the miracle and wonder in the universe around you with the eyes of the physicist in 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:

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.

Review the material from MTH 111 and MTH 112 at your earliest convenience.

Course Information Online: You find course materials for our class on the 'Moodle' website at http://elearning.linnbenton.edu. The course is entitled "PH201 General Physics". 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 hope that you come see me at last 3 times this term, one time in the first two weeks (check the grading page, one visit in student hours in the first two weeks is part of passing this class), once in the middle of the term, and once towards the end of the term. Even better check in regularly.

Me contacting you: Check your LBCC email – this is one path I use to contact and support you.

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 PH202 and PH203.

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. 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 name **PH201WINTER2020** 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.

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

Course Activities

Reading: Successful students familiarize themselves with the physics principles involved in the class activities by reading the relevant sections in the textbook and answering the questions in the reading guide before each class. The questions from the reading guide I will ask you in the very regular reading quizzes.

Class time will be spent practicing being a physicist. We use a variety of activities, including group work, discussions, problem-solving sessions, and demonstrations. Unless you make special arrangements with me, I expect your ***cell phone or PDA will be turned off during class***, I will collect your phone for the time of the class, if that is needed.

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. Yes, therefore we will work in groups a lot!

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 in which you write what you did in the lab, and what you learned. The rubric helps you writing your lab report.

Journal: Each week you will summarize and reflect on 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:

Mastering Physics assignments from the end of the chapters in our text book are to be completed online at www.masteringphysics.com. When you buy your textbook in the campus store website access comes with it: Enter **PH201WINTER2020** as the Course ID. Over the years students have asked to split the HW up into small sections. I have followed that wish and now post homework on Mastering Physics usually three times each week. I will post each assignment approximately one week before the HW is due.

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.

Exams: We will write 4 group exams and 4 individual Exams.

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 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**. We established a tutor assisted study session **(TASS)** specifically for PH201. When you start using this service we will continue this service through the year. 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 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.

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, new pharmaceuticals and cures for disease, and new insights into the universe that startle the imagination and made me hungry to learn more. How about you? This first term of the sequence we will focus on mechanical forces and how they might result in motion.

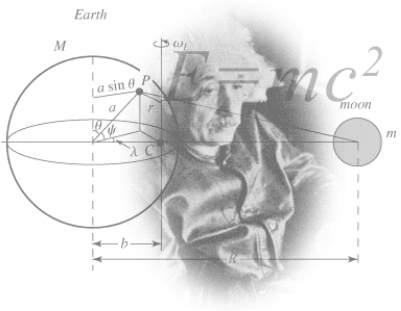
When developing the PH201 sequence we invited a variety of individuals from industry and academia to help determine what skills and knowledge you should gain during your year of physics in order to maximize your potential in your future career.

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

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

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

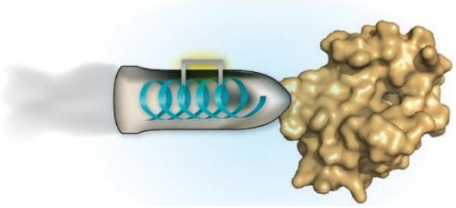
This year I am part of an initiative sponsored by HHMI (Howard Hughes Medical Institute) geared towards improving the inclusivity of classes in STEM (Science, Engineering, Technology, Mathematics) fields. I hope you will enjoy learning in this class. I might ask you at times for feedback about this physics class for your personal academic goals/major:



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, magnetism, and the fundamental origins of the formation of light. And I will do my best to support you being able to connect all this to your personal goals for going to school.



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 (MP)
- Hand-in-homework (HIP) including Enhancements (ENH)
- Reading quizzes
- A group project
- In class activities
- Labs, including Prelab, Postlab (**you need to participate in at least 9 labs to pass**)
- Exams and Final Exam

To receive 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 5 HIP/ENH ALL developing or better.
c) Have an average of at least 30% in the Exams and Final Exam.

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

a) See your instructor for 15min in the first 2 weeks of class.
b) Have an average of 50% in Reading quizzes.
c) Reach 60% of Mastering Physics score.
d) Hand in 8 HIP/ENH, 2 ALL accomplished or better, 4 more ALL developing or better.
e) Participate in a group project.
f) Have 2 labs ALL accomplished and another 2 labs ALL developing.
g) Have an average of at least 50% in the Exams and Final Exam.

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

a) See your instructor for 15min in the first 2 weeks of class.
b) Have an average of 60% in Reading quizzes.
c) Reach 70% of Mastering Physics score.
d) Hand in 8 HIP/ENH, 4 ALL accomplished or better, 2 more ALL developing or better.
e) Participate in a group project.
f) Have 4 labs ALL accomplished and another 2 labs ALL developing.
g) Have an average of at least 60% in the Exams and Final Exam.
h) You can also reach a B in the course by fulfilling a), e), f) and have an average of at least 80% in the Exams and the Final Exam.

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

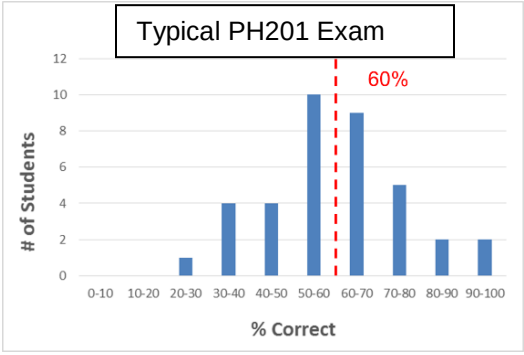
a) See your instructor for 15min in the first 2 weeks of class.
b) Have an average of 75% in Reading quizzes.
c) Reach 80% of Mastering Physics score.
d) Hand in 8 HIP/ENH, 6 ALL accomplished or better, 2 more ALL developing or better.
e) Participate in a group project.
f) Have 6 labs ALL accomplished, another 2 labs ALL developing,
g) Have an average of at least 75% in the Exams and Final Exam.
h) You can also reach an A in the course by fulfilling a), e), 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% of your exam grade.



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

1. 15/20 (15 points out of 20 points)
2. 12/20
3. 16/30
4. 5/25 (everybody can have a bad day (-:)

In the Final you have 78 out of 100 points.

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

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

This example would qualify you for a B in the class. Don't be fooled. Exams in physics courses have shown to be tricky. 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 supported by research about student learning and others 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. Will you be judged on a job 60% nicely done, or on a 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:

I do not recommend falling back in class, but I 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 your assignment. You can only defend one single assignment per office hour, and I will not extend official office hours for your late work. If you cannot schedule time during office hours, please make an appointment. 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.

PH201 **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 PH201 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:_____ 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. The 3 highest level math classes you took are (grade):

4. Help us to plan this sequence:
   Physics classes do you plan to take during this academic year? □ PH202 □ PH203

5. What other classes do you take this term?

6. Have you regularly scheduled time to study for this class each 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?
   List hear a time that would be convenient (3 hours)_____ □ Yes □ No

9. How often do you plan to see your instructor during student 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 – thank you it will help me learn your name!

PH201 WI2020, LBCC, Schedule (subject to change): (#'s in brackets are from 3rd edition text)

Week	Key Topics	New Tools	Monday	Tues Lab	Wednesday	Friday
1	Introduction, Physics, Position, Velocity, Displacement, Motion Diagrams, Units, Conversion, Sig. Figs, Vectors	Picture, Motion Diagram, Vectors, Scientific Notation, Prefixes	6.Jan Introduction *Reading Preface to Student* **MP HW0 Due**	Lab #1 **Intro and Uniform Motion Graphs**	8.Jan *Reading Ch. 1* **HW1A Due**	10.Jan *3.1-3.2(3)* **Lab1 Due** **HW1B Due** Mock-Exam
2	Average velocity and acceleration including plots, 1D- kinematics, Graphs	x-t graphs, v-t graphs, a-t graphs, use graphs to derive equations	13.Jan *Ch. 2.1-2.4* **HIP1 Due**	Lab #2 **Displacement, Velocity and Acceleration**	15.Jan *Ch. 2.5-2.7*	17.Jan *Ch. 3.3* **Lab2 Due** Group Exam 1 **Journal Due**
3	1D kinematics equations, 2D kinematics, Projectile Motion, Uniform Circular Motion	Vectors and Components Coordinate System Trigonometry	20.Jan MLK Day No School	Lab #3 *Ch. 3.4-3.6* **Projectile Motion** **HIP2 Due**	22.Jan *Ch. 3.7-3.8 (Ch. 3.8, 3.5)*	24.Jan **Lab3 Due** Exam 1
4	Forces, Newton's 1st, 2nd and 3rd laws	Identify Forces Force Diagram (also: Free-Body Diagram)	27.Jan *Ch. 4.1-4.4* **HIP3 Due**	Lab #4 *Ch. 4.5-4.6* **Force Table**	29.Jan *Ch. 4.7*	31.Jan **Lab4 Due** Group Exam 2
5	Free-body diagrams, Friction, Inclined planes, Force problem solving skills	Force diagrams for two objects Newton's Laws in components	3. Feb *Ch. 5.1-5.4* **HIP4 Due**	Lab #5 **Newton's Laws of Motion**	5. Feb *Ch. 5.5-5.8*	7. Feb **Lab5 Due** Exam 2 **Journal Due**
6	Forces and circular motion, Universal gravity, orbital motion, Circular and Rotational Motion,	Recognize centripetal force in Uniform circular motion	10. Feb *Ch. 6.1-6.4* **HIP5 Due**	Lab #6 *Ch. 6.5-6.6* **Uniform Circular Motion**	12. Feb *Ch. 7.1-7.7 (check reading guide)*	14. Feb **Lab6 Due** Group Exam 3
7	Torque, statics of rigid bodies, Rotational mechanics	Torque Diagram	17. Feb Presidents Day No School	Lab #7 **HIP6 Due** **Torque**	19. Feb *Ch 8.1-8.5*	21. Feb **Lab7 Due** Exam 3 **Journal Due**
8	Impulse-Momentum theorem, Conservation of momentum, Angular Momentum	Before and After Picture Conservation of momentum	24. Feb *Ch 9.1-9.3* **HIP7 Due**	Lab #8 **Impulse and Momentum**	26. Feb *Ch 9.4-9.5*	28. Feb *Ch 9.6-9.7* **Lab8 Due** Group Exam 4
9	Work-Energy theorem Application of Work ***Happy Turkey Day***	Before and After Picture, Energy bar charts, Conservation of energy	2.Mar *Ch.10.1-10.4* **HIP8 Due**	Lab #9 **Work & Power**	4.Mar *Ch.10.5-10.10*	6.Mar **Lab9 Due** Exam 4 **Journal Due**
10	Conservation of energy, Power, Energy and systems, forces from energy energy diagrams	Before and After Picture Conservation of energy	9.Mar *Ch. 11.1-11.4* **HIP9 Due** **Project Movies**	Lab #10 **Bungee Jump**	11.Mar *Ch. 11.5-11.8*	13.Mar Review
11	**Finals Week**		16.Mar **Final 1pm Class** **1pm-2:50pm**			

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.