

Syllabus PH 212: General Physics with Calculus II (CRN 31235, 31236, 31237)

Linn Benton Community College: Winter 2018, 5 c.h.

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

Office Hours: MW 11:50 am – 1:00 pm
T 9:00 am – 10:50 am, and 11:50pm – 1:00pm

When and where this course meets:

Lecture: MTWF 8:00 am – 8:50 am, MH 113 (CRN 31235, 31236, 31237)

Laboratory: Wednesday 5:00 pm – 7:50 pm, MH 114 (CRN 31235)
Thursday 8:00 am – 10:50 am, MH 114 (CRN 31236)
Thursday 11:00 am – 1:50 pm, MH 114 (CRN 31237)

Final: Wednesday, March 21, 8:00 am - 9:50 am

Math requirements for this class and for physics in general

As you have seen last term 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 PH 211 General Physics with Calculus with a "C" grade or better.

Important note for next term: If you plan on taking PH213 in the Spring you need to complete MTH 254

- Corequisite for PH213: Completion of MTH 254 (Calculus) with a "C" grade or better.

Physics is a field that heavily relies upon mathematics. Mathematics is a compact language that allows physicists 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.

Required Materials:

Text (official book): 'Physics For Scientists and Engineers: A Strategic Approach' 4/E, by Randall D. Knight. Make good use of the workbook that accompanies this book. We will use some of the exercises in class. Check Moodle of this class for references. The text and Mastering Physics is what we used in PH211 and will use in PH213.

PH 212 Lab Manual available in the LBCC bookstore, and a Lab notebook (Computation Notebook).

Mastering Physics 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 M.P. website. Make sure you select the text ***Knight, Physics for Scientists & Engineers with Modern Physics, 3e*** when registering with M.P.

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 either a Casio fx-260, or HP 10s for use on exams and/or quizzes.

Course Information Online: You will find course materials for our class on the 'Moodle' website at elearning.linnbenton.edu, entitled "PH212_GR". Please make sure to check the Moodle page regularly.

Supplementary Websites: Most of all I recommend using our textbook and the workbook!

Math Review: [Purple Math](#), [Physics Phenomena](#), [GCSE Maths](#)

Kinematics: [PheT simulations](#)

Grading Scale for this course:

Final grades are determined from the below components of the course:

Basis for grading:		Grading Scale:		Other possible grades at LBCC:
Final Exam	20%	90%-100%	A	I -- Incomplete. An 'I' grade is assigned if for some reason a student cannot complete all components of the course by the end of the academic term. To receive an 'I' grade, the instructor and student must agree upon a contract that will spell out when uncompleted work will be turned in. The student has until the end of the next term to complete all unfinished work
Exams:	30%	80%-89%	B	
Reading Quizzes	5%	70%-79%	C	
Labs:	15%	60%-69%	D	
Physics Project	5%	< 60%	F	
MP Homework:	10%			
Hand-in HW:	10%			
HW Enhancement	5%			

If you need help calculating a weighted grade, use the formula:

$$FinalGrade = \sum_i (percent_weight) \cdot \frac{pts_earned_per_category}{total_pts_possible_per_category}$$

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. A large fraction of the Final will consist of conceptual questions similar to the questions discussed in class, and the conceptual questions at the end of each chapter in the textbook. Do all of them.

Exams: There will be two mid-term exams and one comprehensive final exam for the term.

Quizzes: This term we will regularly write short reading quizzes that are based on the Reading Guide you find on Moodle.

Labs: Much of the learning that goes on in physics happens in the lab. Laboratory work is consequently a large part of the grade. A significant part of each exam will consist of topics covered in the lab. Prelab and Postlab exercises support your learning in the laboratory environment. We will continue to support the physical experiments with modeling experiments using V-python. Each lab report includes a summary you write that summarizes shortly what you did in the lab, and what you learned or missed.

Computational Physics Assignment: We will continue to have every week a computational physics assignment in lab. VPython is the programming language we will be using, which allows for easy 3D visualization of physical situations. No prior computer programming experience is required as the learning curve for VPython is pretty quick – however, if you do find yourself needing help, make sure you use the Science Help Desk or your instructor early on. Download VPython at home for free at <http://www.vpython.org>.

Homework (MP) assignments are from the end of the chapters in our text book and are to be completed online at www.masteringphysics.com. Website access comes with your textbook. Enter **PH212WINTER2018** as the Course ID. HW support is available at the Moodle page for this class. Make sure that your current e-mail is listed at both sites so that you can receive e-mailed course information.

Hand-In Problem (HIP): Every week a homework problem will be due to be turned in in hard-copy format. The HIP's purpose is to insure you receiving instructor feedback on your work.

Hand-In Problem Enhancement: You will have the opportunity to develop your problem solving skills using your own applied physics problem based on the Hand-In Problem and your own life and interest. You will find each weeks HIP on Moodle. Also see further guidelines on HIP Enhancement on Moodle.

Journal: Last term you wrote a weekly Journal. This year we took this assessment out to create time for the Physics Project. If you like writing a Journal you are invited to write a paragraph summarizing your learning and struggles and hand it in on Fridays for review.

Physics Project: This term you will complete a physics project that will result in a poster like the ones you see in the hallway in Madrone Hall in the ground floor. For further instruction check our Moodle site.

Office hours: It has been shown that success of students correlates to the time they spend with their professor. I ask you to come at least three times to office hours, once within the first 3 weeks, once during weeks 4-6, and once between weeks 7-9. I hope you will show up with questions and feedback, and a smile on your face - no matter what we will talk about, I am looking forward to talking with you.

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, be persistent, and find me before you throw your physics book out of the window.

Class time will be spent on a variety of activities, including group work, discussions, lectures, problem-solving sessions, and demonstrations. I constantly work on making our classroom an interactive classroom for all of us. I rely on you to create that 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 turned off during class**.

Contacting me: The best way to contact me is in person during office hours or via email. I am usually available after class for any topic you would like to discuss. Usually when you see me, I am happy to talk to you.

Cheating: I do not tolerate cheats: I give zeros and will report incidents to the college administration. Remember that representing another's words or ideas as your own is plagiarism. 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*.

Students in need of accommodations: Students who may need accommodations due to documented disabilities, who have medical information which the instructor should know, or who need special arrangements in an emergency, should speak with the instructor during the first week of class. If you have not accessed services and think you may need them, please contact Disability Services, 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 2nd Monday of the term. The good news is that this change allows for financial aid to be disbursed a week earlier than in past years.

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.

Outcomes and Objectives:

As you discovered in PH211, physics is the study of nature. Last term we spent time discovering how objects moved and how we used quantities such as Forces, Momentum and finally Energy to discuss the motion of separate point like objects and point like object interacting with each other.

This term we are going to start out by uniting all the concepts of PH211 in order to understand a bit more about systems of larger numbers of particles. We will do this by investigating the impact of the distribution of mass on rotational motion. After that we will learn about universal gravitation, and then after we spent 15 weeks studying the particle nature of the universe, we will begin to focus on wave descriptions of how everything works.

This term will be a lot like last term in that the class will have homework assignments through masteringphysics.com, two midterm exams, a final, and a set of laboratory activities. We add one new activity that allows you to practice presenting your work to the science community. You will choose a topic upon which you will do a little extra research in a group of two or three students and present this work in a short presentation to the class, and at the end of the term you will present your groups work in a poster presentation.

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

- Describe and explain physical phenomena in the areas of: simple harmonic motion, rotational motion, traveling waves, and standing waves.
- Conduct experiments to investigate topics, such as simple harmonic motion or standing wave parameters.
- Use calculus to solve quantitative simple harmonic motion problems and wave phenomena.
- Solve physics problems involving superposition of waves.
- Select ray optics or wave optics methods to solve real world optics problems.
- Design an experiment, collect data, synthesize data, and report on results.

Of course, to me and most other physicists, the most important reason to study physics is because it is simply fun. As you have seen, studying the nuts and bolts of physics and how the world works takes a lot of work. But these nuts and bolts help bring together a bigger picture of how the universe works and with this a better understanding of the possibilities it affords us. I am curious to see how in the future you will use all this to improve the quality of life upon it (-:

As you continue on in Physics, Physics 213 focuses on electric charges and field, the origins of magnetism, and the fundamental origins of the formation of light. In Physics 314 you will get to learn about the shape of space, the nature of time, the unpredictable but very probable nature of the universe and the fundamental interconnectedness of everything.

Course Evaluation:

Just like last term there will be a student course evaluation. In the last third of class you will receive the opportunity to evaluate the course and your instructor. Your feedback is anonymous and will be accessible to your instructor after grades are posted. Your feedback supports us in further developing the class to the best of you and future students. Please take responsibility for your course and support us with your feedback.

PH212 Wi2018, LBCC, Schedule Ralph Tadday (subject to change):

Week	Reading Topics	Monday	Tuesday	Wednesday	W/Th Lab	Friday
	First Reading of complete chapter due before the chapter is started in class	HW PartB Due Labbook Due Vpy Due Sunday				HW PartA Due
1	Rotational motion, center of mass, rotational energy, moment of inertia, torque, static equilibrium, rolling motion	8. Jan Introduction	9. Jan Sect. 12.1-12.3	10. Jan Sect. 12.5-12.7	Lab #1 Torque Labbook due Mondays Project Kickoff	12. Jan Sect. 12.8 MP 1a due HIP1 Due
2	Rolling motion, Vector description of Rotational motion, angular momentum; Universal Gravity	15. Jan MLK Day No School	16. Jan Sect. 12.4	17. Jan Sect. 12.9-12.10 HIP2 Due	Lab #2 Torque and angular acceleration	19. Jan Sect. 12.11-1 MP 2a due
3	Newton's Law of gravity, G versus g, gravitational potential energy, satellite orbits and energy	22. Jan Sect.13.1-13.3 MP 2b due HIP3 Due	23. Jan Sect. 13.4 HW#2B Due	24. Jan Ch. 13.5	Lab #3 Universal Gravitation	26. Jan Ch. 13.6 MP 3a due
4	Simple Harmonic Motion – and circular motion, Oscillations, damped and driven Oscillations,	29. Jan Sect.14.1-14.3 MP 3b due HIP4 Due	30. Jan Sect. 14.4	31. Jan Sect. 14.5	Lab #4 Archimedes Principle	2. Feb Sect. 14.6 MP 4a due
5	Fluids, Measuring and using Pressure, Buoyancy, Fluid Dynamics, Elasticity	5. Feb Review 12-14 MP 4b due HIP5 Due	6. Feb Exam 1	7. Feb Sect.15.1-15.3	Lab #5 Simple Harmonic Motion	9. Feb Sect. 15.4-15.6 MP 5a due
6	Waves, traveling waves, sound and light waves, Power, Intensity, Decibels, Doppler Effect	12. Feb Sect.15.7-15.8 MP 5b due HIP6 Due	13. Feb Sect. 16.1-16.3	14. Feb Sect.16.5-16.7	Lab #6 Doppler Effect Sect. 16.9	16. Feb Sect. 16. MP 6a due Rasmussen Scholarship Aps Due
7	Superposition, Standing Waves, Interference, Beat frequency	19. Feb President's Day No School	20. Feb Sect. 17.1-17.3 MP 6b due HIP7 Due	21. Feb Sect.17.4-17.6	Lab #7 Standing Waves	23. Feb Sect. 17.7-17.8 MP 7a due
8	Wave Optics, Interference of light, Diffraction (single slit, double slit, circular aperture), Interferometer	26. Feb Rev. Ch.15-17 MP 7b due	27. Feb Exam 2	28. Feb Sect.33.1-33.3 NASA Internship Aps Due see https://intern.nasa.gov/	Lab #8 Sect. 33.4-33.6 Diffraction	2. Mar Sect. 33.7-33.8 MP 8a due
9	Ray Optics, Reflection, Refraction, Image formation, Color and Dispersion, Thin Lenses (Ray tracing)	5. Mar Sect. 33.7-33.8 MP 8b due HIP9 Due	6. Mar Old Ch. 25 Handout	7. Mar Old Ch. 25 Handout	Project evaluation PP10 Poster presentation	9. Mar Old Ch. 25 Handout MP 9a due
10	A view into modern physics ...	12. Mar Sect. 34.1-34.2 MP 9b due	13. Mar Sect. 34.3	14. Mar Sect. 34.5-34.6 HIP10 Due	Lab #9 Sect. 35.1-35.4 Telescopes	16. Mar Review MP10 Due EC MP Due
11		19. Mar 11am class Final 1011:50am		21. Mar 8am class Final 8-9:50am		Oregon Space Grant Scholarships Aps Due Week 1 of next term

Use this sheet to keep track of your overall score in the class. You can use this formula to find your total weighted grade.

$$FinalGrade = \sum_i (percent_weight) \cdot \frac{pts_earned_per_category}{total_pts_possible_per_category}$$

MP Homework: 10%

	MP a	Out Of	MP b	Out Of
HW0EC				
HW1				
HW2				
HW3				
HW4				
HW5				
HW6				
HW7				
HW8				
HW9				
HW10				
ECHW				

Prelab 2%, Labs 10%, Comp. Physics 3%

	Your Score	Pre-lab	Your Score	Out Of	C.P.	Out Of
Lab1		2		10		3
Lab2		2		10		3
Lab3		2		10		3
Lab4		2		10		3
Lab5		2		10		3
Lab6		2		10		3
Lab7		2		10		3
Lab8		2		10		3
Lab9		2		10		3

Hand-In-Problems: 10%

	Your Score	Out Of
HIP1		10
HIP2		10
HIP3		10
HIP4		10
HIP5		10
HIP6		10
HIP7		10
HIP8		10
HIP9		10

Physics Project: 5%

	Your Score	Out Of
Consultation		1
Presentation Draft		0.5
Presentation to Class		0.5
Poster Draft Submitted (in time)		1
Final Poster Presented and Submitted		2

Enhancements: 5%

	Your Score	Out Of
ENH1		10
ENH2		10
ENH3		10
ENH4		10
ENH5		10
ENH6		10
ENH7		10
ENH8		10
ENH9		10

Exams and Final: 30% and 20%

	Your Score	Out Of
Exam1		
Exam2		
Final		

Reading Quizzes, total: 5%

Week	1	2	3	4	5	6	7	8	9	10
Score										
Score										
Score										
Score										

PH212 (Ralph) Syllabus Reading Comprehension Name: _____

Class time: _____ Lab time _____

1. How often as a minimum will you see your instructor during office hours?
2. At what times/assessments are you not allowed to use a graphing calculator?
3. What are two of the outcomes of PH212 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 understood the syllabus and have listed above all questions I would like to clarify in class or during my first visit during office hours

Signature: _____

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 you background
What are the 3 highest level math classes you took?
4. Help us to plan this sequence:
Which physics classes do you plan to take during this academic year? PH213 PH265
5. What other classes do you take this term?
6. Have you regularly scheduled time to study for this class 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?
(Saturdays 1pm – 4pm) Yes No
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, and/or other things that are realities for you that might impact your efforts, or anything.
10. What can I do to make this class the best class you ever had?
11. Please attach a picture of yourself to this reflection – thank you it will help me learn your name!