Point Loma Nazarene University PHY 141 -- University Physics I 4 Units Fall 2017

PLNU Mission Statement
To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Professor: Dr. Heide Doss
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E-mail: plnuPhysicsDoss@gmail.com or hdoss@pointloma.edu (response time faster for first email)
Office Hours: T 9:30AM– 1:30 PM or by appointment. NOTE if you really need to see me I will also be around MF from about 9:30 to 10:45 but this is also around Chapel time – so you'll have to make up Chapel one evening. I hope to have more scheduled hours MWF mornings sometime in October.

Regular meeting times Aug 29, 2017 – December 8, 2017 (NOTE: T 8/29 is a M schedule**)**
Lecture: MWF 10:55 am – 12:05 pm (T 106)
Labs:
Section 1: M 2:45 – 4:35 (RS 213 Prof. Gabler)
Section 2: T 7:25 – 9:20 (RS 213 Prof. Gabler)
Section 3: T 12:30 – 2:25 (RS 213 Prof. Gabler)
Final Exam: Friday, Dec 15, 10:30 AM to 1:00 PM

Textbook: Physics by Douglas Giancoli, 7th edition, Prentice Hall 2014
Access to Mastering Physics, Course ID: MPDOSS59633, Course Name: PHY 141 Fall 2017
A scientific calculator (not a phone app) is also needed for this course.

Course Description: A general introduction to physics including mechanics, thermodynamics, waves and sound. The course is taught primarily at the algebra/trigonometry level but does require limited use of calculus. Meets the professional requirements of life and medical science majors. Lecture and laboratory. Not repeatable. Letter grading.

This course is one of the components of the General Education Program at Point Loma Nazarene University, in support of the general education learning outcome: *Quantitative Reasoning: Students will be able to solve problems that are quantitative in nature*. The purpose of general education is to provide a common educational experience, to develop essential skills, and to provide a broad cultural background for personal and professional growth.

Student Learning Outcomes: In this course there are a number of specific goals for you to meet from each chapter. These smaller goals fit into the following overall course learning objectives. Once you complete this course, you should be able to:

1. translate the description of physics problems into the mathematical equations required to solve them using relevant physical principles;
2. calculate solutions to physics problems once appropriate equations or techniques are identified;
3. predict reasonable answers in appropriate problems, and assess the reasonableness of calculated answers;

4. explain the physical meaning of the parameters in introductory physics equations;
5. create and interpret graphical representations of physical quantities; and
6. gather and interpret data in a lab setting.

Labs: Weekly lab meetings will provide you the opportunity for hands-on experience of topics from class meetings, improve lab technique, and data analysis. Labs will be preformed in small groups, but each individual is responsible for submitting their own results. Labs are due at the end of the lab period. Labs are worth 20% of your overall grade with the additional requirement that *you must pass the lab portion of the class to pass the class*.

Pre-class Assignments: Reading and pre-class questions are due by 8:00 AM, except for the first class. The pre-class questions are in Mastering Physics at www.masteringphysics.com. These usually consist of 3 items (questions and simple problems) based on the reading assignment. Late submissions will not be accepted. Pre-class assignments are 5% of the overall grade. Some pre-class assignments have extra-credit points.

Homework: Weekly assignments include reading, pre-class questions found in Mastering Physics at www.masteringphysics.com, and end-of chapter problems in Mastering Physics at www.masteringphysics.com. The end-of-chapter problems along with any graded classwork comprise the 10% of your overall grade labeled as "Homework" and are due by 11:59 PM on the due date listed in the syllabus. Points earned during class and class projects that might come up during the semester will also be included in the homework grade. Classwork cannot be made up.

Late Work: Late work will not be accepted unless there is a documented emergency. Assignments are due as noted on the syllabus, in class, and on Mastering Physics. Incompletes are only assigned in extremely unusual circumstances.

Exams: There will be five in-class exams during the semester (each worth 9% of your overall grade) and one comprehensive final exam (worth 20% of your overall grade). Partial credit for non-multiple choice problems will be given for correct reasoning at any step of a problem, but only if it is communicated clearly enough for me to understand. For problems that call for solution or explanation, no credit will be given for an answer alone; the method or reasoning must also be shown. No make-up exams are allowed except for warranted circumstances.

***You must take ALL the exams and the final in order to pass the class*.**

Missed Exam Policy: No make-up exams are allowed except for warranted circumstances. Arrangements must be made with me as soon as possible.

Final Exam: Date and Time: Friday December 15, 2017, 10:30 AM – 1:00 PM
The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in th course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

Final Grade: The points you receive during the course are weighted accordingly:

Component	Weight
Pre-Class	5%
Homework	10%
Lab	20%
Exams (5)	45% (equally weighted)
Final Exam	20%

The grade you earn in this course is based on the following scale:

A	A-	B+	B	B-	C+	C	C-	D+	D	D-
S≥ 91.5	91.5 >S≥ 89.5	89.5 >S≥ 86.5	86.5 >S ≥ 82.5	82.5 >S≥ 79.5	79.5 >S≥ 76.5	76.5 >S≥ 72.5	72.5 >S≥ 69.5	69.5 >S≥ 66.5	66.5 >S≥ 62.5	62.5 >S≥ 59.5

Department Mission:
The Physics and Engineering Department at PLNU provides strong programs of study in the fields of Physics and Engineering. Our students are well prepared for graduate studies and careers in scientific and engineering fields. We emphasize a collaborative learning environment, which allows students to thrive academically, build personal confidence, and develop interpersonal skills. We provide a Christian environment for students to learn values and judgment, and pursue integration of modern scientific knowledge and Christian faith.

PLNU Attendance and Participation Policy:
Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report, which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class_Attendance in the Undergraduate Academic Catalog.

Class Enrollment:
It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

Academic Accommodations:

If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See Disability Resource Center for additional information. For more details see the PLNU catalog:
http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Accommodations

Students with learning disabilities who may need accommodations should discuss options with the instructor during the first two weeks of class.

Credit Hour:
In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for any 4 unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

Copyright Protected Materials:
Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

PLNU Academic Honesty Policy:
Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Honesty for definitions of kinds of academic dishonesty and for further policy information.

FERPA Policy: In compliance with federal law, neither PLNU student ID nor social security number should be used in publicly posted grades or returned sets of assignments without student written permission. This class will meet the federal requirements by distributing grades and papers individually. Also, in compliance with FERPA, you will be the only person given information about your progress in this class unless you have designated others to receive it in the "Information Release" section of the student portal. See Policy Statements in the undergrad academic catalog.

Tentative Syllabus – subject to updates
Pre-class assignments due by 8:00 am on day of class. Homework assignments due by 11:59 pm.

Date	**Topics**	**Assignments**	**Labs (1M, 2T, 3T)**
8/29/17 T = **Monday schedule**	The nature of science, physics and its relationship to other fields, models, theories, and laws, measurement and uncertainty, significant figures	1.1-1.4 pre-class 1 due 8/30/17 MP ch 1 HW Intro MP due 9/1	Lab 1 (8/29/17): Measurements and Estimation for Monday classes
8/30/17 W	Units, standards, SI system, converting units, order of magnitude, estimating, dimensions and dimensional analysis. Reference Frames and Displacement, average velocity, instantaneous velocity	1.5-1.8, 2.1-2.3 pre-class1 & 2 due HW ch 1 HW ch 2	
9/1/17 F	Acceleration, motion at constant acceleration, solving problems, freely falling objects	2.4-2.7 pre-class 3 due HW ch 1 due HW ch 2	
9/4/17 M	**NO CLASSES – LABOR DAY**		Lab 1 (8/29/17): Measurements and Estimation for T classes
9/6/17 W	Graphical analysis of linear motion. Vectors and scalars, addition of vectors, graphical methods, subtraction of vectors, and multiplication of a vector by a scalar, adding vectors by components	2.8, 3.1-4 pre-class 4 due HW ch 2 due HW ch 3	
9/8/17 F	Projectile motion, solving projectile motion problems, projectile motion is parabolic, relative velocity.	3.5-3.8 pre-class 5 due HW ch 3	
9/11/17 M	Force, Newton's first law of motion, mass. Test 1 Review Chapters 1-3.	4.1-4.3 pre-class 6 due HW ch 3 due STUDY FOR TEST 1	Lab 2: Introduction to Motion
9/13/17 W	**TEST 1 Chapters 1, 2, 3**	pre-class 7 due MP 4	
9/15/17 F	Newton's second law, Newton's third law, force of gravity, normal force, solving problems, free body diagrams	4.4-4.7 pre-class 8 due HW ch 4	
9/18/17 M	Problems involving friction and inclines. Uniform circular motion, banked and unbanked curves, nonuniform circular motion.	4.8, 5.1-5.4 pre-class 9 due HW ch 4 HW ch 5	Lab 3: Freefall and Intro to Vectors
9/20/17 W	Newton's law of universal gravitation, gravity near Earth's surface, satellites, weightlessness, planets, Kepler's laws, Newton's synthesis	5.5-5.8 pre-class 10 due HW ch 4 due HW Ch 5	

Date	Topics	Assignments	Labs (1M, 2T, 3T)
9/22/17 F	Moon rises, types of forces in nature Work done by constant and varying force	5.9-5.10, 6.1-6.2 pre-class 11 due HW ch 5 HW ch 6	
9/25/17 M	KE and the work energy principle, potential energy, conservative and nonconservative forces, mechanical energy and its conservation, problem solving using conservation of mechanical energy	6.3-6.7 Pre-class 12 due HW ch 5 due HW ch 6	Lab 4: Basic Forces
9/27/17 W	Other forms of energy and energy transformations; the law of conservation of energy, energy conservation with dissipative forces: solving problems. Review	6.8-6.10 pre-class 13 due HW ch 6 STUDY for test 2	
9/29/17 F	Review Chapters 4, 5, 6	pre-class 14 due HW ch 6 due STUDY for test 2	
10/2/17 M	**Test 2 Chapters 4, 5, 6**	pre-class 15 due HW Ch 7	Lab 5: Circular Motion
10/4/17 W	Momentum and its relation to force, conservation of momentum, collisions and impulse, conservation of energy and momentum in collisions	7.1-7.4 pre-class 16 due HW ch 7	
10/6/17 F	Elastic collisions in 1D, inelastic collisions, collisions in 2D, center of mass, center of mass for humans, cm and translational motion	7.5-7.10 pre-class 17 due HW ch 7	
10/9/17 M	Angular quantities, constant angular acceleration, rolling motion (no slipping)	8.1-8.3 pre-class 18 due HW ch 7 due HW ch 8	Lab 6: Energy
10/11/17 W	Torque, rotational dynamics; torque and rotational inertia, solving problems in rotational dynamics	8.4-8.6 pre-class 19 due HW ch 8	
10/13/17 F	Rotational KE, angular momentum and its conservation, vector nature of angular quantities	8.7-8.9 pre-class 20 due HW ch 8	
10/16/17 M	Equilibrium, statics, muscles and joints, stability and balance	9.1-9.4 pre-class 21 due HW ch 8 due HW ch 9	Lab 7: Momentum

Date	Topics	Assignments	Labs (1M, 2T, 3T)
10/18/17 W	Elasticity; stress & strain, fracture, spanning a space: arches and domes	9.5-9.7 pre-class 22 due HW ch 9 STUDY	
10/20/17 F	**Fall Break Day, No Classes**	HW ch 9 STUDY	
10/23/17 M	REVIEW 7, 8, 9	pre-class 23 due HW ch 9 due STUDY	Lab 8: Rotation
10/25/17 W	**TEST 3 CH 7, 8, 9**	pre-class 24 due CH 10	
10/27/17 F	Phases of matter, density and specific gravity, pressure in fluids, atmospheric pressure and gauge pressure, Pascal's principle	10.1-10.5 pre-class 25 due HW ch 10	
10/30/17 M	Measurement of pressure, buoyancy and Archimedes' principle, fluids in motion; equation of continuity, Bernoulli's equation, applications of Bernoulli's equation	10.6 – 10.10 pre-class 26 HW ch 10	Lab 9: Equilibrium
11/1/17 W	Viscosity, flow in tubes, blood flow, surface tension, capillarity, pumps and heart	10.11 – 10.14 pre-class 27 HW ch 10	
11/3/17 F	Simple harmonic motion, energy, period, sinusoidal nature, simple pendulum, damped harmonic motion, forced oscillations and resonance	11.1-11.6 pre-class 28 HW ch 10 due HW ch 11	(Last day to drop classes)
11/6/17 M	Wave motion, types of waves, reflection and transmission, interference and superposition principle, standing waves resonance	11.7-11.12 pre-class 29 HW ch 11	Lab10: Buoyancy and Fluids
11/8/17 W	Characteristics of sound, intensity of sound, the ear, sources of sound, quality of sound, noise, superposition	12.1-12.5 pre-class 30 HW ch 11 due HW ch 12	
11/10/17 F	Interference, beats, Doppler effect, Shock waves, sonic booms, applications REVIEW	12.6-12.9 pre-class 31 HW ch 12 STUDY	
11/13/17 M	**TEST 4 CH 10, 11, 12**	pre-class 32 HW ch 12 due	Lab 11: Simple Harmonic Oscillator
11/15/17 W	Atomic theory of matter, temperature, thermometers, thermal equilibrium, Zeroth law, thermal expansion, gas law, absolute temperature	13.1-13.5 pre-class 33 HW ch 13	

Date	Topics	Assignments	Labs (1M, 2T, 3T)
11/17/17 F	Ideal gas law, problems with ideal gas law, Avogadro's number & ideal gas law, kinetic theory and molecular interpretation of temperature, distribution of molecular speeds	13.6-13.10 pre-class 34 HW ch 13	
11/20/17 M	Real gases and changes of phase, vapor pressure and humidity, diffusion. Heat as energy transfer, internal energy	13.11-13.13, 14.1-14.2 pre-class 35 **HW ch 13 due on 11/25** HW ch 14	Lab 12: Straw Music
11/22/17 W	**No Classes 11/22-24** **Thanksgiving recess**		
11/24/17 F	**No Classes 11/22-24** **Thanksgiving recess**		
11/27/17 M	Specific heat, calorimetry, latent heat, heat transfer: conduction, convection, radiation	14.3-14.8 pre-class 36 HW ch 14	Lab 13: Ideal Gas Law
11/29/17 W	First law of thermodynamics, thermodynamic processes and first law, human metabolism and first law	15.1- 15.3 pre-class 37 HW ch 14 due HW ch 15	
12/1/17 F	Second law of thermodynamics, heat engines, refrigerators, entropy and second law, order to disorder	15.4-15.8 pre-class 38 HW ch 15	
12/4/17 M	Unavailable energy and heat death, statistical interpretation of entropy and 2nd law, thermal pollution, global warming, energy resources REVIEW for test 4B	15.9-15.11 pre-class 39 HW ch 15 STUDY	Lab 14: Thermo
12/6/17 W	**TEST 5 CH 13, 14, 15**	pre-class 40 HW ch 15 due STUDY	
12/8/17 F	Review for final	pre-class 41 **STUDY for final**	
12/15/17 F	**FINAL EXAM 10:30 am - 1:00 pm**		
	Grades turned in by Dec 26		