

Course Title/Number	PS for Teachers: Physics / PS 122					
Semester/Year	Spring 2017					
Days/Time	PS 122-201 (CRN: 4853): TR 9:00 am – 10:50 pm					
Location	Science Building Room 100					
Instructor	Dr. Howard L. Richards					
Office	Science Building Room 105					
Phone	304-696-6466 / Fax: 304-696-2494					
E-Mail	RichardsH@Marshall.edu					
Office/Hours		Monday	Tuesday	Wednesday	Thursday	Friday
	09:00					
	09:30		PS 122-201		PS 122-201	
	10:00					
	10:30			Office Hours	Office Hours	Office Hours
	11:00					
	11:30		PHY 101L-201		Office Hours	
	12:00	PHY 203-202		PHY 203-202	Lunch	PHY 203-202
	12:30					
	01:00			Lunch		
	01:30				Office Hours	
	02:00	Office Hours				
	02:30			Office Hours		
	03:00		PHY 203-203		PHY 203-203	
	03:30					
	04:00					
University Policies	By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802 Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment					
Consumer Information and Disclosures	To assist in locating federally mandated consumer information and disclosures, Marshall University has created a launching point at http://www.marshall.edu/disclosures/. Reports and information on a variety of specific areas, including financial aid, student privacy, student body diversity, the drug and alcohol abuse prevention program, employment and further education statistics for graduates, refund policies, and campus safety, are available from this website.					

Course Description: From Catalog:

PS 122 is part of a 3 course sequence of Physical Science for K-9 Education majors. Includes 2-hr, 1 credit lab. (3 hours)

Learning Outcomes:

Practice: Homework & Investigations

Assessment: Unit Exams & Final Exam

Outcomes:

- Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.
- Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a force.
- Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
- Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
- Support an argument that the gravitational force exerted by Earth on objects is directed down.
- Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
- Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
- Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
- Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
- Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
- Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
- Define a simple design problem that can be solved by applying scientific ideas about magnets.
- Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
- Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
- Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
- Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
- Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
- Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.
- Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
- Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

- Generate and compare multiple solutions that use patterns to transfer information.
- Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- Define a simple design problem reflecting a need or want that includes specified criteria for success and constraints on materials, time, or cost.
- Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Required Texts, Additional Reading, and Other Materials

1. *Conceptual Physics*, 12th ed., Hewitt (available from the front desk at Drinko Library)
2. Workbook for PS122

Course Requirements / Due Dates:

1. Exam 1 / Week 5
2. Exam 2 / Week 9
3. Exam 3 / Week 14
4. FINAL EXAM / Tuesday, May 2, 2017 8:00 am – 10:00 am

Grading Policy:

Homework	10%	A: 90 and above
Tests (3)	45%	B: 80-89
Investigations	15%	C: 70-79
Journal	10%	D: 60-69
Final Exam	20%	F: 59 and below

Policy for Students with Disabilities:

Marshall University is committed to equal opportunity in education for all students, including those with physical, learning and psychological disabilities. University policy states that it is the responsibility of students with disabilities to contact the Office of Disabled Student Services (DSS) in Prichard Hall 117, phone **304-696-2271**, to provide documentation of their disabilities. Following this, the DSS Coordinator will send a letter to each of the student's instructors outlining the academic accommodation he/she will need to ensure equality in classroom experiences, outside assignment, testing and grading. The instructor and student will meet to discuss how the accommodation(s) requested will be provided. For more information, please visit <http://www.marshall.edu/disabled> or contact Disabled Student Services Office at Prichard Hall 11, phone **304-696-2271**.

Students with Medical Conditions:

In addition to the above, students with medical conditions, temporary or permanent, that may require special attention or accommodation (such as epilepsy) should inform the instructor as soon as possible.

Your privacy will be respected.

Homework:

Homework will be conducted using the textbook publisher's online system, *Mastering Physics*. An access code should have been bundled with the textbook, otherwise, you may pay for an access code online. Please note that the access code is different from the course ID#: **PS122S17RICHARDS**. Technical issues should be taken up with the Mastering Physics customer support.

A Note on Homework: Please do the homework. Please allow enough time on the homework so that you can think about your responses and pay close attention to the questions. It is not intended to be mere busy work but is instead an important part of the learning experience. Believe it or not, education research has been conducted to show what may be obvious - students who do the homework for themselves (not copying off someone else or looking up the answers online) do much better in the class.

I can't make you do the homework. I can't make sure that you always do it for yourself. But I can guarantee that you will severely lower your chances of getting a good grade, or even passing, if you don't do the homework. So, please do the homework.

Investigations:

Part of the class will be devoted to hands-on, laboratory-style investigations; design or testing problems; and lecture tutorials. Many of these will be "open-ended" problems. The exact design and procedure of the investigation will be up to you. This is in keeping with both the letter and spirit of the NGSS, so you will have a chance in this course to practice what you will teach.

Journals:

All of your experimental work on the investigations will be kept in your science journal, as well as your conclusions on the results. In addition you will be asked periodically to reflect on the assignments and comment on your learning process. Journals will be kept in the classroom at all times. Although I will periodically review your journals and offer feedback, you are encouraged to discuss your writing with me at any time.

Exams:

A total of three (3) exams covering each unit will be conducted throughout the semester. Material from the investigations ***will*** be included on the exams.

The Final exam will be cumulative and is mandatory.

Attendance Policy:

Regularly attending class is crucial to your success, as many of the class activities are interactive. Being on time for class and attending all class meetings is expected. Period. Excessive absences - whether excused or unexcused - may affect your ability to earn a passing grade.

Excused Absences - Students who miss interactive activities with an excused absence will be provided with an alternative assignment that connects to the activities in the missed class session. Please seek a university excused absence if you meet the criteria. Understand that you will have to provide some form of documentation – usually a doctor's note.

Unexcused Absences

- If you miss two classes, expect an email/notification from your instructor.
- If you miss a third class, you will face:
 - Automatic one letter grade deduction in the course.
 - Mandatory meeting with instructor. At the instructors discretion, you may develop a plan of improvement, and if you meet its criteria, you may have the chance to potentially earn back the letter grade deduction. Keep in mind this option is at the instructor's discretion.
- If you miss a fourth class, the previous letter grade deduction stands. (Improvement plan will not change this grade.)
- Subsequent missed classes will result in additional letter grade deductions.

Other

- Any work handed in late will suffer a 20% penalty per week day. (That is, work that was supposed to be turned in on a Friday suffers a 20% deduction if it is turned in the following Monday.) This does not apply for any day for which there is an *excused* absence.
- Makeup work will NOT be allowed except for documented emergencies.
- If you must miss a class contact me immediately. Also, be sure to let me know at least a week ahead of time if a university activity will require an absence from class.

Course Schedule:

Mon, Jan 9, 17	First day of classes
Week 1	Chapters 2 & 3
Fri, Jan 13, 17	Last day to add a class
Week 2	Chapters 4 & 5
Week 3	Chapters 6 & 7
Week 4	Chapters 8, 9, & 10
Week 5	Test 1
Week 6	Chapters 11, 12, & 13
Week 7	Chapters 14 & 22
Week 8	Chapters 23, 24, & 25
Week 9	Test 2
Week 10	Chapters 15, 16, 17, & 18
Fri, Mar 17, 17	Last day to drop a full semester course
Mar 20 – Mar 25	Frühlingsferien
Week 11	Chapters 19, 20, & 21
Week 12	Chapters 26, 27, and 28
Week 13	Chapters 29 & 30
Week 14	Test 3
Week 15	Chapter 31
Fri, Apr 28, 17	Last day to completely withdraw
Tue, May 2, 17	8 am FINAL EXAM

For Additional Help:

- If you find yourself struggling, **let the instructor know**. Feel free to drop by during office hours – that's what they are there for!
- It may also be a good idea to study with other students taking the same course.
- A very good online tutorial for intro physics can be found at the HyperPhysics web page: <http://hyperphysics.phy-astr.gsu.edu/>.
- The Physics Department has a page of tutorial links at <http://www.marshall.edu/physics/tutoring-resources/>.
- There is also a tutoring center in Laidley Hall. See <http://www.marshall.edu/wpmu/uc/tutoring-services/> for details.
- Finally, a number of helpful explanations can be found at <http://www.nagt.org/nagt/jge/columns/compgeo.html>. That site is targeted at computational geology, but many of the ideas apply directly to physics.

Classroom Behavior:

Disorderly conduct that interferes with the normal classroom atmosphere will not be tolerated. The classroom instructor is the judge of such behavior and may instruct a disorderly student to leave the room with an unexcused absence. More serious misconduct may result in a complaint to the Office of Judicial Affairs. “Official University action will be taken when a student’s or student group’s behavior violates community standards, interferes either with the University’s educational purpose, or with its duty to protect and preserve individual health, welfare, and property. When the behavior is aggravated or presents a continuing danger to the University community, accused students are subject to separation from the institution.”¹

No food or drink is allowed in the classroom. **All cell phones must be turned off or set to vibrate only** before the beginning of class. Any student who takes a call must leave the classroom to do so. Phone calls may not be placed or received during quizzes or tests. No devices may be used to play games or watch videos unrelated to classroom discussions.

You may not use your phone as a calculator during tests, nor any other tablet or device capable of sending or receiving text, emails, video, or phone messages. You can get a very good scientific calculator (e.g., Casio *fx-300ES PLUS*) for less than \$20; I recommend choosing one with two-line display (so you can check for typos in your input) and at least 3 memory locations (usually named A, B, C, ...) in which you can store intermediate results to avoid rounding error. Of course, if some other department required you to buy an unnecessarily expensive graphing calculator, you can use that, too.

¹ *Student Handbook*, available at www.marshall.edu/student-affairs/sections/handbook/INDEX.HTML

Academic Dishonesty:

“Academic Dishonesty is something that will not be tolerated as these actions are fundamentally opposed to ‘assuring the integrity of the curriculum through the maintenance of rigorous standards and high expectations for student learning and performance’ as described in Marshall University’s Statement of Philosophy.”² Cheating and other forms of academic dishonesty will bring serious sanctions, including possible expulsion. **Cheating or any form of academic dishonesty will result at minimum in failing the entire course.**

Students are not allowed to use data they had no part in collecting.

You may work together on homework, but do not just copy someone else's answers. Make sure you understand how they solved the problem! Just copying is not only dishonest, it will make you more likely to do badly on the next test.

2 Ibid.