**Instructor:**

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Office Hrs: TWR 11 – 12 AM & 2 – 3 PM or by appointment.

**Textbook:**

General Physics PHY 202 Laboratory Manual, 7th Edition, by Marshall University & Van-Griner, LLC.

**Prerequisites:**

Math 120 or Math 121 or Math 123 or equivalent and Physics 201 concurrent

**Objectives:**

Each student is expected to learn concepts, experimental procedure and computation steps for each experiment. This process should enhance the learning that takes place in the lecture class.

This is algebra and trigonometry based course in which students are expected to think in logical and quantitative ways. Exams will consist of relevant conceptual questions, questions about procedures, and questions involving problem solving ability.

Students are encouraged to review physics concepts and principles associated to lab class before class. Students are also encouraged to ask questions during class or after class on any questions that bother them. Science is a process of asking questions to understand nature around us.

**General Instructions**

Most exercises in this laboratory course are to be done using a computer and interface apparatus to display and collect data. The purpose of these laboratory exercises is to provide students with good understanding of physics concepts and principles involving motion, force, momentum, energy, heat, temperature, vibrations and resonance. You are to work through the exercises thoroughly and make predictions whenever asked. In doing this you should collaborate closely with your laboratory partners. Be prepared to work intensely for the full period of the laboratory if you expect to complete your laboratory work. *Thoroughness is important!*

If you have not had a lot of experience with computers, this class will provide you the opportunity to feel comfortable using them. Do not allow a laboratory partner with more computer experience to take over your group. No-one should take the mouse out of your hands. If you are the laboratory partner with more experience, resist the temptation to take over. We all learn more by doing than by observing, so your laboratory partners will learn nothing by watching you demonstrate your computer skills. However, your laboratory partners will quickly gain the skills needed in this course if they are given the opportunity to practice.

The lab schedule follows lectures in most time. Unfortunately, it is not possible to always time an experiment with the presentation of similar material in the lecture course. You are expected to read over the theory and procedure for each laboratory before you come to the laboratory class. This will greatly help you to understand the material being presented and it will also help you to ask more intelligent questions when something do not work.

The experiments cover general physics concepts. In most cases you must set up apparatus, test to see if it works, and then take data. You will normally work three to a table. You are encouraged to talk over any part of the experiment with your laboratory partners, or with students from other laboratory tables in the classroom. You can often discover mistakes by simple communications to lab partners or instructor. If the calculations give you problems, please ask questions while you are working on the experiment.

This is algebra and trigonometry based course in which students are expected to think in logical and quantitative ways. Exams will consist of relevant conceptual questions, quantitative questions, and questions involving problem solving.

You will need to finish a lab report after each experiment. Your completed laboratory report should include all lab manual pages on which there is data entered, sample calculations done, questions answered, graphs, conclusion, etc. The report should also include any graphs that are requested or relevant to the data. The conclusion for every experiment should make a statement about what you have achieved by doing the experiment, what results you have obtained, how the experiment supports the involved physics laws, concepts, and principles. Be specific, discuss numbers and graphs and how they prove, or do not prove, the objectives of the experiment. **Lab report is due at next lab meeting class**.

As you do experiments try to visualize where error arises and how it can change your results? Evaluating your data and results in an effort to understand whether the results are meaningful is a valuable part of experimental science, and a very hard part. Discussion of error in conclusion is a plus. The conclusion would typically be from one-half to one-page long.

**Grading:**

Your laboratory grade will be determined by:

Laboratory Report Average 60%

Two Laboratory Exams (20% each) 40%

**Grade Scale:**

**90≤ A**

**80≤ B ≤89**

**70≤ C ≤79**

**60≤ D ≤69**

**F <60**

You must pass at least one exam in order to pass the course! The scale is very rigid at 90, 80, etc. Each student at a laboratory table is expected to contribute to all parts of each experiment. If one laboratory partner is observed to be consistently letting his/her laboratory partners do all or most of the work that person can lose points from the total at the end of the course. If you miss a class with a valid reason you must see the instructor arrange a make-up time as soon as possible. Working out data collected by someone else in the laboratory is not acceptable. Late hand-in reports will be penalized by as much as twenty percent at the discretion of the instructor.

**Attendance and absence:**

A laboratory experience is a hands-on experience! You are expected to be in the laboratory every scheduled day and time. You are to always use data collected by you in an experiment. You are not to use data from someone else. An excused absence or valid reason for absence generally requires a written excuse from another source (physician, school, police, etc.). Unexcused absence will course zero credit for attendance and exams. Any absence must be discussed with the instructor as soon as you can. Please try to discuss with the instructor ahead of your absence of class or exam to schedule a make-up upon a valid reason. This is the student's responsibility, not the instructors. A copy of the University's absence policy is posted on S 254. Any discussion about absences will be referred to that policy.

\*\*Other Labs Each Week where make-ups should be done.

**Important Dates:**

Last day to drop the 1st 8 week courses with a grade of W is Friday, September 21, 2018. If you drop a course after this date you will need to do a complete withdrawal from the entire semester of classes in order to get out of one class.

**Policy for Students with Disabilities:**Marshall University is committed to equal opportunity 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 Disability Services (ODS) in Prichard Hall 117 (304.696.2467) to provide documentation of their disability. Following this, the ODS 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, access the website for the Office of Disabled Student Services: http://www.marshall.edu/disabled

**Cell phones, pagers, and other electronic communication devices should be turned off during class time. This is especially true on exam days.**

**Experiment Schedule: (next page)**

Date: Experiment:

Aug. 20 – 24 Lab 1: Static Force Vectors

Aug. 27 – 31 Lab 2: Introduction to Motion

Sept. 4 – 7 Lab 3: Accelerated Motion

Sept. 10 – 14 Lab 4: Mathematical Description of Motion

Sept. 17 – 21 Lab 5: Projectile Motion

Sept. 24 – 28 Lab 6: Force and Motion

Oct. 1 – 5 Lab 7: Circular Motion

Oct. 8 – 12 Lab 8: Work and Energy

**Oct. 15 – 19**  **First Lab Exam: Labs 1 – 6**

Oct. 22 – 26 Lab 9: Collisions

Oct. 29 – Nov. 2 Lab 10: Simple Harmonic Motion

Nov. 5 – 9 Lab 11: Periodic Motion of a Pendulum

Nov. 12 – 16 Lab 12: Longitudinal Waves and Sound

**Nov. 19 – 23** **Thanksgiving Break – No Class**

Nov. 26 – 30 Make-Up Labs/Review Sessions

Dec. 3 – 7 Dead Week

**Dec. 10 – 14** **Second Lab Exam: Labs 7 – 12**