**General Physics Laboratory – Fall 2015**

**Physics 202 (CRN 3586) – Section 105 – TR 8:00-9:50 AM**

**Location: S100**

**Instructor: Thomas Wilson, S153**

**Office hours: MWF 4:00-5:00 PM**

**Text: General Physics Laboratory Manual for PHY202 Marshall University**

**General Instructions:**

Most exercises in this laboratory course are to be done using the PC-based software and interface, Pasco *DataStudio* in conjunction with an array of sensors, to collect and display data. The purpose of these laboratory exercises is to provide the student with a good understanding of concepts involving, motion, force, momentum, energy, heat, temperature, vibrations and resonance. You are to work through the exercises thoroughly and make predictions whenever asked. Your work will be checked to see that you have made predictions where appropriate, discussed results, and answered questions as you worked through the laboratory exercises. 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!*

Since the emphasis is on gaining understanding of concepts you should make sure that you understand the reasoning involved in a prediction or conclusion. Discuss the reasoning with your laboratory partners until it is clear to all. Your grade will depend largely on your response to conceptual and quantitative questions associated with the lab reports, and on the two exams (see Grading below)

If you have not had a lot of experience with computers, this laboratory will give you the opportunity to feel comfortable using them. 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 purpose of these laboratory exercises is to provide you with practical experiences that compliment the material that you are introduced to in the lecture course. Unfortunately, it is not possible to always synchronize 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 help you to understand the material being presented and help you to ask more intelligent questions when stymied.

The experiments cover several concepts in motion, Newton’s laws, momentum, energy, vibrations, resonance, and heat. 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 communication. The **laboratory reports** are due at the beginning of the next laboratory period along with the associated laboratory **homework (found at the end of the lab report**. If the calculations give you problems ask questions while you are working on the experiment.

Your completed laboratory report should include all laboratory manual pages on which there is data entered, calculations done, questions answered, etc. The report should also include any graphs that are requested or relevant to the data. You are also to turn in the homework problems following the laboratory exercise in the manual as mentioned above.

**Grading:**

**Your laboratory grade will be determined by:**

 **Laboratory report average 30%**

 **Laboratory homework average 30%**

 **Two laboratory exams (20% each) 40%**

 **You must pass one exam in order to pass the course!** The grading scale is very rigid at 90, 80, 70, and 60 percent. The schedule of exercises is given below. 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 as soon as possible about a make-up lab. Using data collected by someone else is not acceptable laboratory practice. Laboratory report grades and homework grades for such cases will be zero.

**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.

The mathematical basis for the course is algebra and trigonometry. Students are expected to think in logical and quantitative ways. Exams will consist of relevant conceptual questions, questions about procedure, and questions involving problem solving. Measurements must always include the appropriate units. In some cases, a discussion of the sources of error and a value of the standard deviation for a set of measurements taken under identical experimental arrangement may be required.

Students are encouraged to ask questions during class or after class on concepts and techniques that bother them. Science is a process of asking questions to understand nature around us.

**Schedule:**

Date: Experiment:

Aug. 24 – 28 Lab 1: Introduction to Motion

Aug. 31 – Sept. 4 Lab 2: Accelerated Motion

Sept. 8 – 11 Lab 3: Mathematical Description of Motion

Sept. 14 – 18 Lab 4: Projectile Motion

Sept. 21 – 25 Lab 5: Force and Motion

Sept. 28 – Oct. 2 Lab 6: Circular Motion

Oct. 5 – 9 Lab 7: Work and Energy

Oct. 12 – 16 Lab 8: Collisions

**Oct. 19 – 23**  **First Lab Exam: Labs 1 – 6**

Oct. 26 – 30 Lab 9: Simple Harmonic Motion

Nov. 2 – 6 Lab 10: Periodic Motion of a Pendulum

Nov. 9 – 13 Lab 11: Longitudinal Waves and Sound

Nov. 16 – 20 Lab 12: Temperature and Heat

**Nov. 23 – 27** **Thanksgiving Break – No Class**

Nov. 30 – Dec. 4 Dead Week

**Dec. 7 – 11** **Second Lab Exam: Labs 7 – 12**

**Note that the laboratory period is to be used for performing the experiment of the day. Cell phones, pagers, and other electronic communication devices should be turned off during all laboratory time!**