**PHY204 General Physics Laboratory – Spring 2015**

**PHY204 (CRN 4736) – Section 203 – Tuesday 12:00 – 1:50 PM**

**PHY204 (CRN 4741) – Section 208 – Wednesday 4:00 – 5:50 PM**

**Location: S103**

**Instructor: Thomas Wilson, S153, 696-2752, wilsont@marshall.edu**

**Office hours: MWF 3:00-4:00 PM**

**Text: General Physics Laboratory Manual for PHY204 Marshall University**

**General Instructions:**

Most exercises in this laboratory course are to be done using the Pasco *SPARK Science Learning System*. Unlike in PHY202, a PC will be not be necessary. The purpose of these laboratory exercises is to provide the student with a good understanding of concepts involving electromagnetism and optics. 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 are listed under **Lab Schedule** below. 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. The pre- and post-lab questions are for one’s edification and will not be graded. 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 will need a USB thumb drive to store your data and/or graphs.**

**Grading:**

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

 **Laboratory report average 60%**

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

 **As per Departmental policy, you must pass one exam of the two lab exams in order to pass the course.** In the event of an excused absence (notification from the Dean of Student’s Office), arrangements can be made for a make-up exam. For unexcused absences, one will receive a 0%. The grading scale is very rigid at 90, 80, 70, and 60 percent, for A, B, C, and D respectively. 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. Laboratory (each scored 0-10 points) and Exam grades (as a %) will be posted on the Blackboard course website.

**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.

**Lab Schedule:**

Week: Experiment:

Jan. 12 – 16 Lab 1: Electric Charges & Electric Force

Jan. 19 – 23 Lab 2: Electric Field & Electric Potential

Jan. 26 – 30 Lab 3: Ohm’s Law

Feb. 2 – 6 Lab 4: Kirchhoff’s Laws

Feb. 9 – 13 Lab 5: The Magnetic Field & Force

Feb. 16 – 20 Lab 6: Faraday’s Induction Law

Feb. 23 – 27 Lab 7: AC Circuits Involving R, L, & C

*Mar. 2 – 6 Make-Up Labs/Review Sessions*

**Mar. 9 – 13 First Lab Exam: Labs 1 – 6**

*Mar. 16 – 20 Spring Break*

Mar. 23 – 27 Lab 8: Reflection & Refraction

Mar. 30 – Apr. 3 Lab 9: Thin Lenses

Apr. 6 – 10 Lab 10: The Telescope & The Microscope

Apr. 13 – 17 Lab 11: Diffraction & Interference

Apr. 20 – 24 Lab 12: The Atom

*Apr. 27 – May 1 Dead Week (Make-Up Labs/Review Sessions)*

**May 4 – 8 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!**