**PHY204 General Physics Laboratory – Spring 2018**

**PHY204-206 (CRN 4588) – 5:00 pm – 6:50 pm R**

**Location: S103**

**Instructor: Thomas Wilson, S153**

**Email:** [**wilsont@marshall.edu**](mailto:wilsont@marshall.edu) **(may not reply promptly)**

**Office hours: HERD Hours (1-5 MF)**

**Lab Manual: Available at MU bookstore**

**General Instructions:**

The purpose of these laboratory exercises in mechanics is to provide the student with a good understanding of concepts involving motion, forces, work, waves and energy (including thermal). You are to work through the exercises thoroughly in the handouts provided 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)

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 report should also include any graphs that are requested or relevant to the data.

**Grading:**

**Grade components are as follows:**

**Laboratory Report average 60%**

**Exam I: 5:00-6:50 pm March 15 20%**

**Final Exam: 5:00-6:50 pm, April 26**

**(dead week) 20%**

**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.

**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!**

LAB SCHEDULE:

Week: Experiment:

Jan. 8 – 12 Introduction/Syllabus

Jan. 16 – 19 Lab 1: Electric Charges & Electric Force

Jan. 22 – 26 Lab 2: Electric Field & Electric Potential

Jan. 29 – Feb. 2 Lab 3: Ohm’s Law

Feb. 5 – 9 Lab 4: Kirchhoff’s Laws

Feb. 12 – 16 Lab 5: The Magnetic Field & Force

Feb. 19 – 23 Lab 6: Faraday’s Induction Law

Feb. 26 – Mar. 2Lab 7: The LRC Circuit

Mar. 5 – 9Lab 8: Reflection & Refraction

**Mar. 12 – 16** **First Lab Exam: Labs 1 – 6**

*Mar. 19 – 23 Spring Break*

Mar. 26 – 30 Lab 9: Thin Lenses

Apr. 2 – 6 Lab 10: The Telescope & The Microscope

Apr. 9 – 13 Lab 11: Diffraction & Interference

Apr. 16 – 20 Lab 12: The Atom

*Apr. 23 – 27 Dead Week (Make-Up Labs/Review Sessions)*

**Apr. 30 – May 4 Second Lab Exam: Labs 7 – 12**



**HERD Hours**

I will also be participating in the Physics Department’s ***‘Herd Hours’***, (developed by Professor McBride) a place where students can come individually, or especially in groups, to *Science 179 from 1-5pm on Mondays* (by me) and 1-5 pm Fridays (Dr. McBride) and work on homework/laboratory questions together in a non-classroom and non-typical-professor-office-hour setting. Simply come by and ask some questions. The philosophy of Herd Hours is described by Professor McBride:

“At ***‘HERD Hours’***, I will always be around to help you at any time if you get stuck, but what I really want to see at ***‘HERD Hours’*** is students helping fellow students, leading each other through peer instruction. Struggling, discussing, conquering the problems, and celebrating with your friends and peers is better than being frustrated by yourself and not making progress on the homework. I encourage you all to work together. When working in groups there are more people around the table with different skill sets and different approaches and ideas to attack the problems. Working together in groups often results in getting the homework done faster with a better understanding of the material and is overall a more memorable experience than spending long frustrated isolated hours struggling on your own. Attendance will be taken during ***‘HERD Hours’*** for recording keeping purposes only, not for extra credit.

For your homework (both online and written), always try it yourself first; however, you are encouraged (but not required) to discuss it with your peers for help (‘***HERD Hours’*** provides a great place to accomplish this feat). I encourage students to discuss homework with each other if you arrive at different answers. If you think the answer you got is correct and you are confident in your solution, try and explain it to your fellow students, see what they think. Maybe they solved the problem a different way, arriving at a different answer, encouraging you to review and rethink how you solved the problem. Hopefully this encourages discussion of physics among you and your fellow students and builds your confidence in problem solving and improves your ability to explain your work to others. If you cannot get the required help from your peers, or simply have a question, come see me during office hours, drop by anytime, or make an appointment with me, and/or apply for a tutor. Remember, the number of your peers (N) can vary each semester for your class (N = 20 - 60) and significantly outnumber the number of the professors for your course (N = 1) and they may be more available than your professor to help you outside of normal office hours and ***‘HERD Hours’***.

If office hours, or ‘***HERD Hours’***, is not something you think you will benefit from, there ***are free university tutors available for almost all intro level physics classes***. In fall 2017, there were 3 students supplying a total of 40 hours per week of tutoring services for PHY 211 alone. In fall 2017, a total of 4 students supplied over 65 hours per week of tutoring services for PHY 211 alone. These same students, in almost all cases, also tutor for 201, 202, 203, 204, and some even tutor for PHY 213. See current tutoring schedule available at: <http://www.marshall.edu/uc/tutoring-services/>. If you seek an individual tutor, stop by the Communications Building, Room 211 and submit a “[Request a Tutor](http://www.marshall.edu/uc/files/2011/04/NeedATutorForm1.pdf)” form (available at: <http://www.marshall.edu/uc/tutoring-services/>). If you have not heard from the tutoring office staff within one week of submitting your form, please call 304-696-6622 or email [tutoring@marshall.edu](mailto:tutoring@marshall.edu). Currently, I have not met these university tutors, so I cannot vouch for them (I am sure they are great); however, I also provide a list of “Dr. SPM Approved Tutors” on my Teaching Homepage that I will vouch for.

Hope to see you at ***‘HERD Hours’***!!!”