

**Instructor:**

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Office Hrs: MF 2 – 4 pm, W 2-3 pm or by appointment.

**Textbook:**

Laboratory Manual for General Physics 204 (Purchase available in campus bookstore)

**Prerequisites:**

Math 120 or Math 121 or Math 123 or equivalent and Physics 203 concurrent

**Objectives:**

Students are 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 procedure, calculation and questions involving problem solving. One-page equation sheet is allowed for exams. Students are encouraged to ask questions during and/or after class on concepts and techniques. Science is a process of asking questions to understand nature around us.

**General Instructions:**

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 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 help you to understand the material being presented and it will help you to ask more intelligent questions when something do not work.

The experiments cover several concepts in electricity, some concepts in optics, and a single concept in radiation. In most cases you must set up apparatus, test to see if it works, and then take data. You will normally work in pairs, except when lack of equipment demands that larger groups work together. You are encouraged to talk over any part of the experiment with your laboratory partner, or with people from other laboratory tables within the classroom. You can often discover mistakes by simple communication. At the end of the laboratory period you are to have the instructor *initial* your data sheets as a consistent part of the procedure. The laboratory reports are due at the *beginning* of the next laboratory period following the completion of the experiment. This is not a course where you can come in later in the week to finish an experiment. You are expected to complete data collection within the two-hour class period. Actual experimental data may vary from group to group. Even a piece of wire can change some results but not much. You can finish calculations, answer the questions, and write a conclusion after class and before the next class. If the calculations give you problems, ask questions during the laboratory or during office hours.

Your completed laboratory report should be typed on A4 papers and include:

1. Your name and lab partner names
2. Lab Title
3. Lab Objective

4. Brief lab procedure
5. Data sheets (from lab manual with data entered) and graphs if requested
6. Sample calculations
7. Questions answered
8. Conclusion

**Notes:**

Brief lab procedure should also include experimental apparatus setup and procedure summary that you can find from lab manual. Sample calculations should be done for each type of calculation no matter how simple or complex. A proper sample calculation for a given step should have the formula, one set of numbers appropriate to that calculation, and the result for the chosen set of numbers. This will allow the grader to determine if you have used the numbers correctly. Do not show every piece of arithmetic used in the calculations, but show one example of each type. Conclusion is one of the most important parts of your lab report. Conclusion for every experiment should make a statement about what you have achieved by doing the experiment. Be specific, discuss numbers and graphs and how they prove, or do not prove, the object of the experiment. 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 is a part of each conclusion. The discussion could represent up to 20% of a grade for a specific report. 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%

Total points: 100

**Grade Scale:**

**90 ≤ A, 80 ≤ B ≤ 89, 70 ≤ C ≤ 79, 60 ≤ D < 69, F < 60**

You must pass one exam in order to pass the course! The scale is very rigid at 90, 80, etc. 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 about a make-up time as soon as possible. Working out data collected by someone else in the laboratory is not acceptable laboratory practice.

**Deadlines:**

Each experiment report is due at the **beginning** of the next class meeting. If you are absent, the report will be accepted only if the absence is excused. **Lab reports handed in up to 24 hours late will have 20% automatically deducted. Lab reports will not be accepted after that time and will get a score of zero.**

**Attendance:**

A laboratory experience is a hands-on experience! You are expected to be in the laboratory every scheduled day. You can only use data collected by yourself in an experiment. You are not allowed to use data from other group. Any absence must notify the instructor ahead of the scheduled laboratory. Excused absences must have a prompt make-up date scheduled as soon as possible. A copy of the University's absence policy is posted on S 254. Any discussion about absences will be referred to that policy.

**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 disability. 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.

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

**1 credit hour****Experiment "Schedule**

<b>Week:</b>	<b>Experiment:</b>
Jan. 9 – 13	Lab 1: Electric Charges & Electric Force
Jan. 17 – 20	Lab 2: Electric Field & Electric Potential
Jan. 23 – 27	Lab 3: Ohm's Law
Jan. 30 – Feb. 3	Lab 4: Kirchhoff's Laws
Feb. 6 – 10	Lab 5: The Magnetic Field & Force
Feb. 13 – 17	Lab 6: Faraday's Induction Law
Feb. 20 – 24	Lab 7: The LRC Circuit
<i>Feb. 27 – Mar. 3</i>	<i>Make-Up Labs/Review Sessions</i>
<b>Mar. 6 – 10</b>	<b>First Lab Exam: Labs 1 – 6</b>
Mar. 13 – 17	Lab 8: Reflection & Refraction
<i>Mar. 20 – 24</i>	<i>Spring Break</i>
Mar. 27 – 31	Lab 9: Thin Lenses
Apr. 3 – 7	Lab 10: The Telescope & The Microscope
Apr. 10 – 14	Lab 11: Diffraction & Interference
Apr. 17 – 21	Lab 12: The Atom
<i>Apr. 24 – 28</i>	<i>Dead Week (Make-Up Labs/Review Sessions)</i>
<b>May 1 – 5</b>	<b>Second Lab Exam: Labs 7 – 12</b>