# General Physics I Laboratory (PHY 202 – Section 103 & 107) – Fall 2018

**Sec. 103: Science Building, Room 100 - Tuesday, 4:00-5:50pm**

**Sec. 105: Science Building, Room 100 - Thursday, 9:00-10:50am**

***Course Description:*** This is a 1-credit hour, algebra, and trigonometry based laboratory style class. This course is designed to enhance your understanding of basic concepts discussed in your PHY 201 or PHY 211 lecture sections via hands-on experiments that cover several fundamental concepts in physics such as kinematics, dynamics, work and energy, periodic motion, waves, and heat; these are all key aspects of science that form some of the fundamental foundations of the physical world that surrounds us every day. PHY 202 is a "laboratory to accompany PHY 201 or PHY 211, focusing on mechanics, concepts, and applications" ~ 2018 – 2019 undergraduate course catalog.

***Laboratory Manual:*** General Physics Laboratory Manual, PHY 202, Marshall University, 7th Ed, Van-Griner

***Co-requisite Courses:*** PHY 201 – College Physics I or PHY 211 – University Physics I, you must have had, or be enrolled in one of these, unless exempt by special permission.

***Prerequisite Courses:*** Those satisfied for enrollment in PHY201 or PHY211
(see http://www.marshall.edu/catalog/files/UG_18-19_published_08-09-18.pdf)

***Course Instructor Info:*** Dr. Sachiko Toda McBride, Science Building 101, (304) 696-5755, mcbridesa@marshall.edu
Office Hours: (**M&W** 10am-12pm), (**Tu** 10-11am), & (**F** 10am-2pm Herd Hours) or by appointment
†Mailbox located in the Physics Department main office, Science Building, Room 251/252

***Objectives:*** The purpose of this laboratory is to provide you with a hands-on, computer aided data collection experience, that links the concepts and demos discussed and observed in your corresponding physics lecture classes. Your goal for the successful completion of each lab will be to set-up and run the experiment as described in the laboratory manual, test and trouble shoot the set-up for each experiment to see if it is working properly (this includes any software/computer interfaces with equipment), collect trustworthy and possibly repeatable data, answer all questions in your lab manual, and learn how to write/type out an intelligently written, legible, lab report that conveys what you have done and achieved by doing the individual lab experiment.

***Learning Outcomes:*** You will learn how to successfully function in a group learning atmosphere and learn how to think in logical quantitative ways to accomplish the given experiments. In the process of learning the fundamentals of physics as described above via this hands-on laboratory, **the overarching goal**, independent of your major, is to help hone your critical thinking, analysis, problem solving, quantitative reasoning skills, and lab report writing abilities. In order to accomplish this goal successfully, you will be given lots of **practice** via writing laboratory reports that will be due weekly. Your individual success in achieving this goal will be **assessed** by your individual performance on 2 in class examinations.

***Pre-lab Lectures:*** At the start of each lab I will provide a brief introduction to each lab reviewing the concepts and highlight any pitfalls with the equipment or misconceptions before we begin the lab. Sometimes experiments maybe conducted before you have gotten a chance to discuss them in your corresponding lecture course; thus, information presented in this 5-15-minute brief introduction maybe the missing link between understanding and completing a lab versus being lost and struggling for the entire 2 hours. Remember, please be on time so you don't miss important information.

***Required Reading:*** The lab manual is vital and will guide you through each lab. It is required that you read the related sections of your lab manual prior to coming to lab; the topics are outlined in the tentative course schedule at the end of this syllabus. This prior reading will help you to understand the material being presented in lab and it will also help you ask the appropriate questions when something does not work. Remember, sometimes experiments maybe conducted before you have gotten a chance to discuss them in your corresponding lecture course; if this is the case, you must read ahead in your lecture textbook along with the laboratory manual, and come ask questions ahead of time, prior to the start of lab (Office Hours: (**M&W** 10am-12pm), (**Tu** 10-11am), & (**F** 10am-2pm Herd Hours) or by appointment).

***Before Leaving Lab for the day:*** At the end of lab you must get my approval to leave and you must get your data sets *initialed* by me (this is an extra step so I know you have all the data required to write a successful lab report). All data must be collected during the assigned lab time, coming back to complete the lab at a later time is NOT permitted. Also, using someone else's data is NOT permitted and will result in zero for that particular lab, for all group members.

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| ***Determination of Final Grade*:*** | 90% or above: | A |
| | 80% or above: | B |
| | 70% or above: | C |
| | 60% or above: | D |
| | 59.9% or lower: | F |

**** I reserve the right to adjust these values based on the overall class performance, thus stay above the average grade of the class to ensure an above average grade in the class.***

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| ***Grading‡:*** | Laboratory Report Average: | 60% |
| | Laboratory Exams (2, 20% each) | 40% |

***‡ You must pass one of the laboratory exams to pass the course independent of your laboratory report average.***

***Attendance:*** If you know well in advance you will miss for an excused absence, notify me immediately. Also, notify me immediately when you realize a conflict exists (check the tentative exam schedule at the end of this document for lab and exam times) so we can come up with an alternative plan. All students are responsible for all material that occurs in the laboratory course. A new MU policy requires, or will require, keeping attendance records for freshmen; thus, to be fair, all students will be required to sign an attendance sheet for every class period. That being said, I view all university level students as adults who can do adult things such as drive a car, vote, pay taxes, and who can be sentenced to jail as an adult. Thus, as adults, I expect you to be responsible and in class at all scheduled meeting times.

- For an unexcused absence, you **cannot** come in at a different time during the week to collect the data due to the limited resources. Unfortunately, all unexcused absences will count as a zero; these laboratory exercises are hands-on, group oriented experiences, which under typical circumstances cannot be made up. If you miss, you cannot use someone else's data, this results in a zero. All your data needs to be collected in the two-hour time frame, which you must be present for. Frequent unexcused absentees will be reported to the Dean of the College of Science and the Dean of Student Affairs.

- For an excused absence, it is the student's responsibility to see what arrangements, if any, can be made to attend a different lab section earlier/later in that week prior to the excused absence (students should email the other instructors if and only if I give you permission to attend a different section, you must make me aware of your absence first, before emailing other instructors). Simply showing up to a different lab section without permission from me first and the other instructor's permission second, is not acceptable; you will receive a zero for the lab.

- **You are expected to be in the laboratory at every scheduled day on time. If you are late, your lab report grade for that lab will be reduced by an equivalent percentage of possible points equal to the minutes late, up until 20 minutes (20 minutes late = 20% reduction). If you are more than 20 minutes late you get a zero for that lab (you are welcome to stay and learn the material; however, you will receive a zero for the lab).**

***How to Set-up a Successful Experiment Efficiently?*** Number one, always follow the lab manual and try it with the members of your own group first. Number two, always ask questions; if your group runs into difficulties, you are encouraged (but not required) to discuss with your peers in other groups for help. Your peers (N ~ 25) significantly outnumber the number of the professors for this course (N = 1) and they may be more available than your professor, who might be helping another group at the same time when you need help. I encourage students to discuss their results with each other, especially if drastically different data sets are obtained between different groups (try to figure why they are different and which set is correct). If you think your data is correct and you are confident you have the experiment set-up correctly, try and explain it to your fellow students, see what they think. Maybe they did something different in the experiment, encouraging you to review and rethink how you set-up the experiment. This communication is a great way to discover mistakes. Hopefully this encourages discussion of physics among you and your fellow students, builds your confidence in experimentation, 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, raise your hand, or let me know you need help. Keep in mind, you may not use another groups data in your laboratory report, this is not acceptable behavior and will result in a zero. Actual values may vary slightly from table to table, so no worries there; the big thing is to make sure that you believe your data and that it is correct (and maybe even repeatable) before leaving the lab.

***This is a group oriented activity:*** You will normally work in no less than groups of three unless equipment is limited and forces larger groups. Each person is expected to contribute equally to the experiments (if you feel this is not the case in your assigned group, please make me aware of this as soon as possible, students not pulling their own weight could potentially lose points for each lab). Groups will be rearranged/reassigned at selected intervals during the semester. If you have strong computer skills and have had similar computerized lab experiences in other courses, try and teach the others in your group how to use the software early instead of always doing it all yourself (having more people in your group and the class that know how to use the software will be beneficial to you later when the labs get harder and more time consuming). In many instances, inside and outside of academia, you will find that you are required to work in a group and function as a team to complete projects; this course will also help you develop the required skills to work in such an environment.

***Advice:*** Keep in mind that acing the lab reports with a 100% average, though lab reports are a significant portion of your grade (60% of the total grade) this will not be enough to allow you to pass the class with a decent grade if you do poorly on the exams; thus, it is not beneficial to 'copy' the lab reports each week from your peers (copying will be considered academic dishonesty). Independent of your laboratory report average, your performance and your performance alone is the determining factor that will allow you to pass the individual in-class exams (exams total 40% of the overall class grade). I expect everyone to put the time and effort in on the lab reports and to do very well on them (this is your grade padding), what will separate out the A, B, C, D, F, and W students will be individual exam performance. Thus, it is ill advised to continually ask your peers for help on the lab reports and then simply reiterate what they say without understanding the concepts or the detailed math/physics behind the experiment; you might get credit on the laboratory reports, but this is a surefire way to fail the exams if you do not understand the concepts, math, and physics. Continually ask questions either in lab or during office hours until you understand the concepts, math, and physics.

***Lab Reports:*** Lab reports are due at the beginning of the next lab. Your completed laboratory report should include all the laboratory manual pages from your manual on which there is data entered, calculations performed, questions answered, graphs drawn, etc. Sample calculations should be performed for each type of calculation no matter how simple or complex. The sample calculation should contain a formula (and any algebra needed to get to that formula from a basic equation), then numbers associated with the given variables (names of the variables in the equation), and the result for the given numbers (always include proper units and significant figures when reporting final answers). The discussion or 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/or make graphs and show how each result proves or does not prove the objective of the experiment. As you do experiments try to visualize where errors could arise and how these errors contributed to 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 often a very difficult part. Discussion of error should be a part of each conclusion/discussion. The conclusion/discussion could represent twenty percent or more of a grade for a specific report. The conclusion/discussion would typically be from one-half to one-page long. If your group is running short on time during the lab, you can finish calculations, answer the questions in the manual, and write the discussion/conclusion after class and before the next class; remember, the big thing is to make sure that you believe your data and that it is correct (and maybe even repeatable) before leaving the lab (you need me to sign off on it before leaving the lab). Lab reports are due the following week at the beginning of the next class following the completion of the experiment in class.

***Lab report Extensions:*** Late lab reports for unexcused absences are not accepted. Lab reports will be due every week at the same time, beginning of lab, plan accordingly. Extensions are only given in very rare circumstances, requiring documentation and must be a qualifying event (see Emergencies Section regarding excused absences).

***Exams:*** Any exam conflicts need to be brought to my attention at least 2 weeks before each exam (check the tentative schedule at the end of this document for all exam dates now, if you have known conflicts report them early). Exams will cover relevant conceptual questions and problems, questions about procedures, and problem solving (basically any part of the experiments performed in the course or concept/problem/experimental set-up is fair game for testing on the exams). Exams may be a mix of multiple-choice, true & false, require a small amount of written work/calculations to match with multiple choice answers, or be longer written problems which will require you to show ALL your work for full and partial credit. Remember, physics is some tough stuff. If you're getting 75% of the lab report points and getting 50% on the exams, you are only pulling a 65% for the course (seek immediate help). Class averages/medians and possibly grade distributions will be presented after each exam and periodically to let you know exactly how you are doing relative to the rest of the class. You must pass one exam to pass the course! **The exams are closed-book, closed-note, and more details about exams will be provided as the semester progresses.**

***Physics Is Not Easy:*** Physics is a subject where **memorization techniques will NOT work**; this is why it is often perceived as a difficult subject by many. To be successful in this class, understand the individual concepts and how they relate to your favorite example; then be able to apply that concept to many other different problems and situations (the circumstances and required math for each problem may be different, but for each, the concept and approach leading to the answer is the same). To do well in this class, you will have to spend at least 3-5 quality hours per week dedicated to this class. Your understanding is proven by your individual lab report and exam performance. You must be able to do and understand the concepts from lab. If you do not understand a particular concept and the class moves on to a new topic, it is your responsibility to learn how to do that concept correctly; I am mostly always available if you need help.

***Electronic Devices & Computer Requirements:*** All cell phones, headphones, pagers, laptops, I-pads, & other communication devices, etc., should be turned off/silenced and should not be visible during lab and exam time; if out during an exam, you earn a zero for the exam. Access to MU Online and a @marshall.edu email are required. You are expected to check both frequently. I use MU Online to distribute any additional notes, supplementary material, and class performance information; sign in at www.marshall.edu in the upper right corner using your unique MU username and password. I also send notices to your Marshall e-mail account. All electronic course communication must be through your Marshall email account (not gmail, yahoo, etc).

***Calculators:*** No programmable/graphing calculators are allowed during exams (No TI-83 through TI-Nspire CX for example). Get a simple TI-30 or TI-35 for example (model numbers and brands may vary, but you get the idea). My best advice is to learn how to use your simple calculator early and stick with the same one for all the labs and exams. Don't do all the labs with a TI-89 or a TI-Nspire CX and then try to switch to a TI-35 for the exams, guaranteed this will not go well for you. **Cell Phones are NOT allowed to be out and must be turned off or put in silent mode during exams, therefore, calculator cell phone apps are NOT allowed.**

***Emergencies/Unexpectedly Missed an Exam or Unable to Turn in a Lab Report:*** Unexpected emergencies & accidents happen. Make email contact with me as soon as possible; you must give your reason for missing the exam or lab in the email. A missed exam or lab, with no prior email & no legitimate supporting documentation before or immediately after an exam/lab, counts as a zero and cannot be made up. Makeups will be given only in very rare circumstances, which require legitimate documentation and may need approval from the Provost, or Sr. VP or Dean of Student Affairs, and/or the Dean of the College of Science. The Provost, Sr. VP, or Dean of Student Affairs determines what is defined as an "excused absence"- a qualified event for missing exams/lab and unexpectedly not being able to turn in lab reports on the provided due date. Examples include: extreme personal emergencies (house fires, serious crimes, and grave emergencies), university-sponsored activities, medical circumstances, death or critical illness of an immediate family member, short-term military obligations, jury duty, subpoenas for court appearance, etc. If an exam or lab is missed, and one of the above is the reason, I will need immediate legitimate documentation to verify the event in order to schedule a make-up exam/lab.

***Authorized vs Unauthorized Aid in Academic Work:*** In this course, you are permitted to talk with other lab groups about your lab experiments and of course are encouraged to work together in groups on collecting the data, but you may not copy lab reports, data, or answers verbatim from each other or from any other source. You must work the problems out and write out the lab reports for yourself and understand them. Remember, 40% of your final grade is based on how you, and only you, can answer questions on the individual exams. Copying something and not understanding it does you no good now or later. If you have any questions about what constitutes authorized vs. unauthorized aid, contact me immediately.

***The 1-Week Rule:*** Any grading dispute or mistake needs to be brought to my attention within one week of when the assignment was distributed or made available to the entire class. After 1-week from this date, regardless if you did not attend class to receive your graded assignment, grades are permanent. Any attempt to alter a previously graded assignment in any way, such as adding information to it, removing information from it, or simply altering the previously presented work for a better grade is considered academic dishonesty and will be treated as such.

***Statement Regarding Students Requiring Special Accommodations & Students with Disabilities:*** If you have any condition (physical, learning, or psychological) which will require any sort of special accommodations of any kind, such as testing accommodations, as soon as possible, please notify me immediately and contact the Office of Disability Services Program (www.marshall.edu/disability) or call 304-696-2467 to register and complete required documentation. Unfortunately, before accommodations can be given, I must receive official documentation; therefore, take care of this the first week of classes.

***Statement for Copyright Notification:*** Copyright (2018) - Dr. Sachiko Toda McBride, as to this syllabus and all lecture material. During this course, students are prohibited from selling notes to or being paid for taking notes by any person or commercial firm without the express written permission of the professor teaching this course. ***"All materials used in this class (in any form, electronic, printed, or verbal), including, but not limited to, exams, quizzes, handouts, lectures, homework assignments, and all material on the university's learning management system (currently Blackboard) and its peripherals, are copyright protected works under US Code Title 17. (1) Unauthorized copying, distribution, recording, selling, or posting of any portion of class materials, in any form, in any way, is a violation of federal law; this specifically includes posting any portion of the class materials to the World Wide Web through the Internet, and/or via any other means of electronic communication. (2) Unauthorized sharing of class materials in any form, specifically including, but not limited to, uploading class materials to websites for the purpose of seeking/providing solutions or sharing those materials with current or future students is a violation of the Academic Dishonesty Policy set forth in Marshall University's Student Code of Conduct. 'Unauthorized' means without explicit permission from the instructor. Violation of (1) or (2) will result in all necessary disciplinary actions taken against the student."*** *~ Marshall University Copyright Statement, updated fall 2016.*

***Statement Defining Expectations for Student Conduct:*** I will expect everyone in all portions of this class, including, but not limited to lab times, exam times, outside of class time when discussing the labs in groups, and office hours to act in a professional and courteous manner. Students are expected to conduct themselves in a manner that creates a productive learning environment for all members of the class. To this end, disruptive, abusive, or offensive behavior directed at anyone involved in the class will not be tolerated, and offenders may be asked to leave the classroom and forfeit any associated grades. Disruptive behavior is any behavior that interferes with the normal conduct of lab/pre-lectures/exams or behavior that inhibits a productive learning environment (this includes sleeping in lab and using any unapproved electronic devices such as phones and other communication devices). If you are experiencing, disruptive, abusive, or offensive behavior directed towards you from others in the class (this includes when working together in groups outside of class if desired), please make me aware of the problem as soon as possible. In addition to acting professional and courteous in class, I only respond to emails that are written with professionalism and courtesy.

***University Policies:*** By having the privilege of being enrolled in higher education and this course, you agree to all the University Policies and codes listed below. It is the student's responsibility to read the full text of each policy and code by going to www.marshall.edu/academic-affairs and clicking on "Marshall University Policies" or, you can access the policies directly by going to www.marshall.edu/academic-affairs/policies/. The individual policies and codes are: Academic Dishonesty/Excused Absence Policy for Undergraduates/Computing Services Acceptable Use/Inclement Weather/Dead Week/Students with Disabilities/Academic Dismal/Academic Forgiveness/Academic Probation and Suspension/Affirmative Action/Sexual Harassment/Code of Student Rights and Responsibilities - also referred to as the Student Code of Conduct (http://www.marshall.edu/student-conduct/files/2300_Student_Conduct.pdf).

| Date | Experiment |
|---|---|
| Aug. 20 - 24 | Lab 1: Static Force Vectors |
| Aug. 27 - 31 | Lab 2: Introduction to Motion |
| Sep. 4 - 7 | Lab 3: Accelerated Motion |
| Sep. 10 - 14 | Lab 4: Mathematical Description of Motion |
| Sep. 17 - 21 | Lab 5: Projectile Motion |
| Sep. 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 Session |
| Dec. 3 - 7 | Dead Week |
| **Dec. 10 - 14** | **Second Lab Exam (Labs 7 - 12)** |

This is a tentative schedule and syllabus; guidelines, rules, policies, and due dates can be subject to change at any time throughout the semester. We will try to stick as close to the policies and schedule presented here. The most up to date schedule with up to date policies and topics can be found on MU Online. Ideally, all the aforementioned topics will be covered. Some topics might have to be omitted due to unexpected and unforeseen circumstance that may arise throughout the semester.

**Version 1.0: 08/13/2018**