Syllabus: College Physics I Lab – Spring 2020 (combined)

(Revised w/Annotations)

Section ID:	**202, 203, 204**
Instructor:	**D Faxon**
Office:	**Rm 328a (lab & equipment room)**
Email:	**dfaxon@gmu.edu 571-437-7696 (cell)(lab)** ***Please note:*** *All communication via email to your instructor must be through your GMU email account. Your instructor may send information to you via Blackboard email. Make sure you check your email account regularly.*
Office Hours:	**Monday, 12:00 - 1:00 pm (or by appointment)**
Course Material:	The lab manual is made available on Blackboard as a set of handouts.
Meeting Room:	**Planetary Hall, Room 228A**
Meeting Time:	**Monday, 1:30 - 4:10 pm (202), 4:30 - 7:10 pm (203), 7:20 - 10:00 pm (204)**

Course Description:

Physics 244 is a laboratory course intended to provide students with practical experience in physics. It is a core course related to biological systems for life sciences. The goals and learning outcomes are listed below.

Course Goals:

1. To enhance material covered in the main lecture course by exposing students to the actual modeling of the theories and equations discussed in lecture and applying these concepts to biological topics when possible.
2. To teach students the basic techniques of computerized data acquisition and data analysis which includes proper usage of uncertainties, proper graphing and tabular creation techniques, and finally proper analysis of data.

Learning Outcomes:

1. Understand how scientific inquiry is based on investigation of evidence from the natural world, and that scientific knowledge and understanding-
    a. evolves based on new evidence
    b. differs from personal and cultural beliefs.
2. Recognize the scope and limits of science.

3. Evaluate scientific information (e.g., assess credibility and validity of information).
4. Participate in scientific inquiry and communicate the elements of the process, including:
    a. making careful and systematic observations,
    b. developing and testing a hypothesis,
    c. analyzing evidence, and
    d. interpreting results

Tentative Schedule:

Week	Date	Lab Activity
1	01/27	Introduction & Statistics **(Mandatory Attendance)**
2	02/03	Measurement & Analysis: *Amoeba Motion*
3	02/10	1-D motion
4	02/17	Free Fall
5	02/24	Projectile Motion
6	03/02	Newton's Laws
7	03/09	Spring Break (no classes)
8	03/16	Conservation of Energy
9	03/23	Conservation of Momentum
10	03/30	Statics & Torque
11	04/06	Simple Harmonic Motion
12	04/13	Archimedes Principle: *Bouyancy*
13	04/20	Venturi Apparatus: *Flow Rate*
14	04/27	Make-up Lab (Students will work on the lab they missed)
15	05/04	Snow day make-up lab

Note: May 4th is Last Day of Classes. No work accepted after EOD, 11:59 PM.

Grading: *[A+ must imply consistently outstanding performance]*

A+	***96.7%---100%***	***A***	***93.3%---96.7%***	A-	90%---93.3%
B+	86.7%---90%	B	83.3%---86.7%	B-	80%---83.3%
C+	76.7%---80%	C	73.3%---76.7%	C-	70%---73.3%
D	60%---70%				
F	Below 60%				

Grade Determination:

Assignment	Points	Total
12 Assignments (10 points each)	120	100%

General Information:

Experiments will be performed as shown on the lab syllabus but it may be necessary to modify the schedule. Lab handouts will be made available on a weekly basis. All labs will include an introductory lecture followed by completion of the laboratory assignment.

Assignments:

On the first day of the course, you will receive your lab notebook. This notebook consists of 50 duplicate carbonless sets. You will record all your work in this notebook. There is no exception to this requirement. You are responsible for your notebook. If you lose it, you must buy your own notebook. You will submit the original pages to your instructor and retain the copies. It is important that your report is legible. If your report is not legible, it will be returned to you ungraded and you will have to resubmit it in legible handwriting. The resubmission will be penalized with a 20% deduction of grade points. Your lab report consists of three parts, the prelab, the results, and an abstract.

1) ***Prelab:*** You are required to come prepared to the lab session. This preparation includes becoming familiar with the concepts of the lab and the equations used. In your lab notebook, you must record:
   a) Title of the experiment, date, and names of all lab partners … ***class & section***.
   b) A brief statement encompassing the purpose of the experiment. This statement should include units of all physical quantities related to the experiment, equations ***& key variables***, and an outline of the approach to be performed.
   c) You are expected to submit your prelab to your instructor prior to the lecture.

2) ***Results:*** Each group must submit to the instructor the original pages of the following material at the end of each lab:
   a) Sketch(es) of the apparatus with parts labeled.
   b) Sketches of graphs indicating that the data have been checked for obvious mistakes.
   c) Plots produced during the lab should be attached to the lab notebook pages that you turn in.
   d) Summarized data, including correct units, tables.
   e) Calculations with clear results; the results must have the appropriate significant figures, and units. ***Generated graphics must be appropriately annotated.***
   f) A brief statement of the results and a conclusion summarizing what was done in the experiment as well as its outcome. In the conclusion, a comparison of the results to the theory is required.

g) At the end of each lab, each student must submit the original copies of the prelab and each group should submit the original copies of the results. ***Groups must submit spreadsheet showing calculations & generated graphics into the appropriate drop box.***

3) ***Abstract:*** Each student must submit, before the beginning of the next class meeting, an overview of the experiment completed the previous week ***with the header information corresponding to that given on the group report.***

This abstract should be a brief, two –paragraph statement summarizing what was done in the experiment and the principal results. It should be self-explanatory. It must be typed. Hand written and late abstract will not be accepted. Do not type the text into the submission box on Blackboard. Only MS Word or Pdf files will be accepted. You can electronically submit your abstract and upload it to the ***appropriate individual*** assignment drop box.

The prelab and the abstract require individual work, while the results require group work.

Prelab	2 points
Results	4 points
Abstract	4 points
Total:	**10 points**

Table 1: *point distribution for each assignment*

Lab Manual:
Each assignment is accessible through Blackboard. The lab handout must be downloaded before each class. You are expected to read the handout **prior** to coming to class and you must have access to each lab handout during the lab period. Students are not permitted to print the lab handouts using the printers in the laboratory.

Lab Groups:
Students will usually work in groups consisting of 2-3 students. All members of a group should be involved in conducting each lab experiment. Computers will be used for data acquisition and analysis in most experiments. Students should take turns working on the computer so that everyone gains the same experience working with Excel and the data acquisition system. Students will be randomly seated. This means that they will change lab partners each lab session.

Pre-Lab Lecture:
There will be an introductory lecture at the beginning of each lab but there is not sufficient time to teach the complete basic physical concepts. The instructor will only discuss the application of these basic physical concepts relevant to the experiment. **It is expected that all students arrive on time and not miss any portion of this lecture, *nor be permitted to work on the experiment during the lecture*.**

After the lecture, students work in their groups and conduct the experiment scheduled for that day. Since the introductory lecture is a necessary part of the lab session, **students who miss the entire lecture WILL NOT be permitted to do the experiment. If you are late by 10 minutes, the 2 points assigned to the pre-lab will be automatically deducted** (see Table 1 in the assignment section of the syllabus).

Attendance:

Lab attendance is mandatory. No laboratory can be turned in for grading if the student did not attend the lab session where the data was collected. Students will not leave the lab room other than to go to the restroom without permission from the instructor.

Make-Up Laboratory: If a student misses a lab and is excused by the instructor, this student may attend the make-up session.

If a student misses more than three labs he/she cannot pass this course.

Other Course Policies:

Academic Integrity:

GMU is an Honor Code university; please see the university catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Plagiarism is a violation of the honor code. All work done outside the lab must be completed individually. Students may discuss their work with their lab partners but the work must be done individually and copying is strictly forbidden. Any two abstracts/pre-labs that have identical sentences or have paragraphs with identical structure will be considered plagiarism.

Students are required to comply with all university policies. For more information go to https://universitypolicy.gmu.edu/all-policies/

Lab Safety: Students must comply with lab safety rules. The lab safety handout is posted on blackboard in the "Introduction" content folder. Students are required to print it out, read it carefully, then sign it and bring it to the first day of class.

Cell phones: Cell phones must be turned off ***(silenced)*** and **stored away from the lab table**. Students who are caught texting, emailing, or checking emails on their cell phone during class time, will be asked to leave the laboratory room and will receive a grade of "zero" ***or reduction of grade from the group's*** for the lab.

Computer use: The computers in the lab room are to be used for class work only. Computers may not be used to work on assignments for other classes. To be able to access all software installed for this course, students must log on with the given username and password. Students should never use their Mason Net ID. You may use your laptop or tablet for note taking **only if the instructor gives permission to do so.**

Lab-computers may not be used for any purpose until the lecture is over. At no time may they be used for reading e-mail or web surfing. After the lab session, you may email your results to your account or save them on a memory stick.

Classroom courtesy: Use the lab time to work on physics only. Students who disrupt the classroom with loud, inappropriate, or off-topic conversations may be asked to leave the lab after a warning. Show courtesy to your fellow students and to your instructor by giving whole-hearted attention to the topic at hand.

Food and drink: Food and drink are not permitted in the lab room.

Visitors: You may **not** bring visitors to the lab with you, even if they are students enrolled in other sections of the course. Students may not complete their work or make up missed labs in other sections. You must attend the section in which you are enrolled in order to get credit for the class.

Withdrawal: If you need to withdraw from this course you must do it within the University established time frame. For spring 2020 the last day to withdraw with no tuition penalty is February 5. From then on tuition penalties apply. See the GMU academic calendar https://registrar.gmu.edu/calendars/spring-2020/ for other important dates.

Other Important Information

Office of Disability Services:
If you are a student and you need academic accommodations, please see me and contact the Office of disability Services (ODS) at 993-2474. All academic accommodations must be arranged though the ODS. https://ds.gmu.edu/

Other Useful Campus Resources:
Learning services Department helps students with time management and study skills. Use this resource for short classes, videos to watch, or counseling toward becoming a master of your own time. https://ulife.gmu.edu/

Writing Center:
A114 Robinson Hall; (703)993-1200 https://writingcenter.gmu.edu/

Counseling and Psychological Services (CAPS):
(703)993-2380; https://caps.gmu.edu/