Course Syllabus – Spring 2020

Physics 161: University Physics Laboratory I **Wednesday, XX:XX - XX:XX pm**
Section XXX **Room 324 Planetary Hall**

Instructor:	***Prof. Rob Cressman***
Office:	***xxx-xxx-xxxx (cell) (lab)***
E-mail:	***xxx@gmu.edu*** ***Please note****: All communication via email to your instructor should be through your GMU email account.*
Office Hours:	***by appointment only****: available after 2:00 pm on day of class*
Course Material:	All lab class hand-outs are available in Blackboard
Co-requisites:	PHYS 160 and MATH 114 or its equivalent

Lab Schedule:

	Week	Lab Topic	Notes
1	1/21 - 1/24	Introduction to Capstone and Measuring	In class activities
2	1/28 - 1/31	(0) Introductory Exercises: data analysis and plots	In class activities
3	2/04 - 2/07	(1) Free Fall	
4	2/11 - 2/14	(2) Projectile Motion	
5	2/18 - 2/21	(3) Vectors and Newton's Laws I	
6	2/25 - 3/28	(4) Newton's Laws II	
7	3/03 - 3/06	(5) Work and Energy	
8	3/10-3/13	Spring Break	
9	3/17 - 3/20	(6) Conservation of Energy	
10	3/24 - 3/27	(7) Conservation of Momentum	
11	4/31 - 4/03	(8) Moment of Inertia	
12	4/07 - 4/10	(9) Rotational Motion and Angular Momentum	
13	4/14 - 4/17	(10) Static Equilibrium	
14	4/21 - 4/24	(11) Pendulum	
15	4/28 - 5/01	(Makeup Lab) Harmonic Motion	Last class
	Finals Week	**There are no final exams for this laboratory.**	

**** LAST DAY OF CLASSES IS May 4 ****

Grading:

Data analysis and plots (Introductory Exercises)	10 points
11 Lab Reports (10 points each)	110 points
Total	**120 points**

	Points	min %
A	108.00 -120.00	90.0
B+	103.80 -107.99	86.5
B	100.20 -103.79	83.5
B-	96.00 -100.19	80.0
C+	91.80 -95.99	76.5
C	88.20 -91.79	73.5
C-	84.00 -88.19	70.0
D	72.00 -83.99	60.0
F	Below 72.00	< 59

Goals and Requirements for the Course:

This course is designed to help students develop the ability to perform scientific experiments and to enhance their understanding of the theoretical material presented in PHYS160 (Mechanics) by performing experiments with emphasis on the presentation and interpretation of experimental data.

PHYS160 is a co-requisite to PHYS161. The student will be required to make extensive use of computer-generated graphs and tables for displaying and analyzing experimental data. This will be accomplished using Excel. Each laboratory station is equipped with a PC and necessary software. Additional computing facilities are available on campus for students who require more time, but do not have access to the software at home.

Lab Manual:

Each lab lecture and assignment is accessible through Blackboard or the course web page. The lab handout must be downloaded before each class. You are expected to be familiar with the handout material prior to coming to the lab. You may print the handout or download it to your personal computer or tablet. You must have access to each lab handout during the lab period.

☞ ***Students are NOT permitted to print the lab handouts using the lab printers.***

Pre-Lab Lecture:

There will be an introductory lecture at the beginning of each lab. It is expected that all students arrive on time and not miss any portion of this lecture. After the lecture, students will work in their groups and conduct the experiment scheduled for that day. Students who miss the entire pre-lab lecture **WILL NOT** be allowed into the lab, and they will be required to attend the makeup session at the end of the semester. If you are late by 10 minutes, the 2 points assigned to the prelab will be automatically deducted (see Table 1 below).

Lab Groups:

Students will work in groups. Each group will consist of 2-3 students. Instructors may assign lab groups at their discretion. All members of a group should be involved in conducting the lab experiments. Students should rotate the responsibilities so that each student gets experience on the software programs. Any use of computers is limited strictly to the purpose of the lab. At no time may they be used for reading e-mail or web surfing.

☞ ***After the lab, you must e-mail your results to your account or save the data on a memory stick.***

Lab Reports:

On the first day of class, you will be issued your lab notebook. This notebook has carbon copies. All your work will be conducted and recorded in this notebook. There is no exception to this. **You must be accountable for keeping your own notebook.** At the end of each lab session, you are required to hand in your work as recorded in this notebook. You will submit the original pages to the instructor and you will retain the 'carbon copies'. It is imperative that your recordings are written in legible handwriting. If your work is not legible, it will be returned to you ungraded and you will have to resubmit it in legible handwriting. The resubmission will be automatically penalized with up to a 20% deduction.

☞ ***Your lab report consists of three parts: the prelab, the results, and an abstract.***

Table 1: Point distribution of report components.

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

1) **Prelab**: you are required to be prepared prior to coming to the lab. This preparation includes becoming familiar the lab concept and equations. In your lab notebook, you must record:
    a. The title of the experiment, the date, and the names of all lab partners.
    b. A brief statement encompassing the purpose of the experiment, the key equipment/sensors to be used, the key constants and variables involved, and the estimates of uncertainty to be determined. This statement should include the units of the physical quantities and an outline of the approach to be performed.

    You are expected to show your lab notebook to your instructor at the start of class. If this prelab preparation is not in your notebook, an automatic deduction of up to 20% may be assessed.

2) **Results**: each student must submit to the instructor the following material at the end of each lab:
    a. Description(s) and/or 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.
    d. Summarized data, including correct units, tables.
    e. Calculations, with clear results; the results must have the appropriate significant figures, and units.
    f. A brief statement of the results and a conclusion summarizing what was done and the outcome.

    At the end of each lab, each student must submit the copies of the prelab and the results produced in your Student Lab Notebook to your instructor, ***and ensure supporting documentation (e.g., spreadsheet with data, tables, charts, snippings, etc.) is submitted into the appropriate Lab Group Results dropbox***.

3) **Abstract**: each student must independently submit, due before the beginning of the next class meeting, an abstract overview of the experiment completed the previous week from their own perspective.
    a. The abstract should be a brief, one- or two-paragraph statement summarizing what was done and the principal results. It should be self-explanatory.

    Due prior to the beginning of the next regularly scheduled lab, each student must submit their individually written report abstract into the appropriate Lab Individual Abstract dropbox.

Honor Code Policy:

Plagiarism is a violation of the honor code. Since students will work together, it is important to understand what permissible group work is and what must be done individually. You may not report on parts of an experiment that you did not actively participate in. Usually one person will enter data into the computer and all students may share computer calculations and graphs done in the lab. All work done outside of 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 reports that have significant instances of identical sentences and/or have paragraphs with identical structure will be subject to review as plagiarism.

General Course Policy:

Cell phones and other communicative devices are not allowed in this class. Please keep them stowed away and out of sight. Laptops or tablets (e.g., iPads) may be permitted for the purpose of taking notes only. All lab development and analyses must be performed using lab computers and devices using the software provided.

☞ ***Engaging in activities not related to the course (e.g., gaming, email, texting, etc.) will result in a significant reduction in your lab grade.***