Course Syllabus – Summer 2020

Physics 161: University Physics Laboratory I **Wednesday, XX:XX - XX:XX pm**
Section XXX **Online**

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:

	Days	Lab Topic	Notes
1	6/01 - 6/02	Introduction to Measurement (5pts extra credit)	Lab day activity
2	6/03 - 6/04	(0) Introductory Exercises: data analysis and plots	Lab day activity
3	6/05 - 6/06	(1) Free Fall	
4	6/08 - 6/09	(2) Projectile Motion	
5	6/10 - 6/11	(3) Vectors and Newton's Laws I	
6	6/12- 6/13	(4) Newton's Laws II	
7	6/15 - 6/16	(5) Work and Energy	
8	6/17 - 6/18	(6) Conservation of Energy	
10	6/08 - 6/10	(7) Conservation of Momentum	
11	6/19 - 6/20	(8) Moment of Inertia	
12	6/22 - 6/23	(9) Rotational Motion and Angular Momentum	
13	6/24 - 6/25	(10) Static Equilibrium	
14	6/26 - 6/27	(11) Pendulum	
15	6/29 - 6/30	(Makeup Lab) Harmonic Motion	Last class
	Finals Week	**There are no final exams for this laboratory.**	

**** LAST DAY OF CLASSES IS July 1 ****

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. Students will analyze data acquired at home, generated through simulations, or acquired by the instructors in the lab. At home experiments will require some rudimentary household objects including a ruler, a ball or similar object, and a device, such as a phone, to take movies for analysis. If a phone or similar device is not available accommodations can be made. 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, Pasco's Capstone software, or any available image analysis software.

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 must have access to each lab handout during the lab period.

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. 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 all aspects of the labs.

Lab Reports:

At the end of each lab session, you are required to submit your work as recorded in a lab notebook. Either handwritten in a journal (submitted as an image), or in the form of a document (converted to a pdf for submission) are acceptable. It

is imperative that your recordings are recorded in a legible manner. If your work is not legible, it will be returned to you ungraded and you will have to resubmit it. 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	3 points
Abstract	5 points
Total:	***10 points***

1) **Prelab**: you are required to be prepared prior to attending the lab. This preparation includes becoming familiar with the lab concepts and equations. In your lab notebook 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 submit your prelab before the start of class.

2) **Results**: each group 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. Plots produced during the lab.
    c. Summarized data, including correct units, tables.
    d. Calculations, with clear results; the results must have the appropriate significant figures, and units.
    e. A brief statement of the results and a conclusion summarizing what was done and the outcome.
    f. All students in the group should share the work load and help produce the results.
    g. The names of the group members that contributed to lab should be included in the submission.
3) **Abstract**: each student must independently submit an abstract of the experiment within a week.
    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.

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.