PHYS1111L: Introductory Physics-1 LABORATORY, Spring-2018
Course Syllabus (updated 01/02/18)

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TUES: 8:00-9:50 AM (A), 10:00-11:50 AM (B), and 1:00-2:50 PM (C)
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General Learning Outcomes

- Learn to employ high scientific standards in written work (Lab reports and Lab practical).
- Demonstrate appropriate academic engagement (preparation for class, attendance, timeliness, etc.)
- Learn to demonstrate the ability to work affectively as part of a team in your lab groups.
- Practice clearly and concisely articulate scientific ideas and arguments through written works.
- Construct logical arguments based on the interpretation of scientific data.
- Demonstrate knowledge of physics related to mechanics.

Specific Course Objectives

1. Gain hands-on experience with concepts presented in the lecture portion of the course.
2. Gain an introductory level familiarity with measurement equipment.
3. Present data and results in a clear and logical manner.
4. Analyze data and draw conclusions.
5. Describe and compute uncertainty in physical measurements.

Laboratory Components:

There are seven components as follows:

1. Pre-Labs: For most of the laboratory experiments there will be a pre-lab exercise due at the beginning of the lab period. The purpose of each pre-lab exercise is to prepare you for the lab, not to stump you. You are welcome to ask for help before lab from the lab instructor or from a physics tutor. Late pre-labs will receive zero credit.

2. Lab Quizzes: Several short quizzes will be given during the semester. These quizzes are intended to make the student study and understand the completed labs and the lab to be performed. In general, these quizzes can primarily be multiple choices, True or False questions, and fill in the blank type questions.

3. Experiment: Generally at the beginning of each lab period, the lab instructor will give a brief description of the lab procedures and objectives. This will often include instruction on proper lab techniques and will provide information about laboratory equipment, supplies and safety procedures.

As this discussion occurs at the beginning of the lab period, it is important that you arrive to lab on time. You should be prepared with your lab handouts and pre-lab assignments.

During the lab period you will need to record your data and observations in your lab notebook. You will also want to "push your numbers through" so that you know your final result is reasonable. There's nothing worse than taking faulty (or incomplete) data only to discover your error days later when you begin writing your report. It is your responsibility to check your results with your lab instructor before putting your setup away.

4. <u>Two Formal Lab Reports</u>: You are required to hand in two formal lab reports during the semester. Make sure to follow the given *instruction* when you write your *full formal lab reports*. Your report will be graded based on *completeness*, *correctness* and *originality*. It will also be graded based on how easy it is to read and how well it flows. Difficult to read reports or reports with major flaws will be given lower grades.

5. <u>Lab Notebook</u>: Physics is an experimental science. Experiments are done, observations are made, recorded and interpreted, and new experiments are designed based on those results. Without a carefully written lab notebook, we wouldn't know what we have done or where we are going. A perfect lab notebook would provide all of the information to a person with a physics background to reproduce your work without referring to any other written resources. Here are some suggestions and "rules" which follow from this basic idea. These are in no particular order of importance, but should be followed when using any lab notebook.

- Your notebook should be permanently bound (not spiral bound or loose leaf; search "National Brand 43648" on Amazon to see my personal choice!). You should label this book as Notebook #1 since you may eventually need more than that! No pages should ever be removed. Each page should be numbered starting at 1 (the National Brand 43648 comes already numbered!).
- Leave a few pages blank at the beginning of the notebook so you can include a table of contents which you should update when starting each new experiment.
- Add the date to each new topic in your lab notebook.
- Electronically printed data tables or plots should be cut and taped into your lab notebook. You may also need to cut and tape electronic component data sheets into your notebook.
- Record the title and objective of each experiment at the beginning of each new experiment.
- Include sample calculations in your laboratory notebook.
- Diagrams and pictures are necessary in a good lab notebook. This must include component values, pin diagrams and so on.
- Also include procedures and observations you make. Include units where necessary. Don't try to save paper…start a new page for each new experiment you perform.
- Don't fall behind keeping your lab notebook up to date.
- Since your lab notebook is a permanent record you should only write in pen. Black pen is preferred, but blue is OK.
- Never use white-out. Cross out any mistakes using a single line through it. Don't completely obscure your mistake as it might come in handy later. You may want to include a brief text note indicating what you believe the error was.

6. Short Lab Write Ups: For some labs, you will be given a lab template with your lab instruction sheet. You are required to complete these short templates after you record all data/details on your lab notebook.

7. Laboratory Exams/Practical: There will be final laboratory examination (see schedule below) which will test the practical and analysis skills you will learn during lab periods. During the laboratory exams you will access to your laboratory notebook so complete and carefully written work will be of great value to you.

Final Laboratory Grade Determination:

- Pre-lab Assignments and Quizzes: 30%
- Short Lab Write Ups and/or Lab Notebook: 30%
- Two Full Lab Reports: 20%
- Laboratory Exams: 20%

Final Grades will be as follows:

A $\geq$ 90% B $\geq$ 80% C $\geq$ 70% D $\geq$ 60% F $<$ 60%

NOTE: Any additional work will be counted under one of the four categories above in an appropriate manner.

What to Bring to Lab:

- Pre-lab assignment
- Laboratory notebook
- Pen
- Calculator (cell phones don't count)
- Your PHYS-1111 Textbook

Expectations:

1. **General**
   - Be proactive in understanding what is needed to do well in lab. Ask questions when you don't understand something.
   - Bring all needed materials to each lab: text, writing materials, calculator, and lab handout.
   - Pay close attention to the introductory comments and instructions provided by your lab instructor. Recorded any necessary information needed.
   - Report broken equipment to your lab instructor.
   - Leave your area neat, clean and organized.
   - Arrive on-time with a can-do attitude. There will be times when things don't work the first time (this is the real world of lab so get used to it); keeping a positive outlook and avoiding frustration are important for a good lab experience.

2. **Experiments**
   - Read all lab handouts before coming to lab. You must consider the physical principles involved with each lab experiment. In some cases, you will see concepts in lab before lecture. In many cases, this is intentional and useful for your learning.

- Submit your pre-lab at the beginning of the lab period.
- In many lab experiments you will form teams of two students. Each student must participate in all aspects of the experiment. It is not acceptable to break an experiment into sub-tasks to be performed separately.

Physics Home Page:

The website for our PHYS-1111L course is located at https://lms.augusta.edu (Disire2learn). The home page includes items such as: (1) Course syllabus (2) Lab instructions (3) Lab Schedule, and (4) Announcements etc. Check course page on D2L regularly for announcements and new materials.

Office Hours:

My office hours are on Mondays, Wednesdays, and Friday as follows.

MWF: 10:00am – 11:00am

If you need to see me some other times, you can email me and make an appointment or simply stop by my office to see whether I am available to talk to you. When you have a question or feel confused, or need to discuss anything, please see me.

Use of Electronic Devices:

You are not allowed to use any electronic devices during the lecture unless you use them for educational purposes. If I notice that you are surfing web or texting while I am engaging with you, I will ask you to *LEAVE* the classroom.

Students with disabilities:

If you are a student entitled to an accommodation, you must see me before the accommodation can be made for you. You must bring an appropriate letter from the students with disabilities office along with you.

Students in Intercollegiate Sports:

It is the responsibility of students participating in intercollegiate sports to make up any assigned work. You must make appropriate arrangements with me in advance.

Attendance Policy:

You are expected to prepare for, arrive on time, and attend all scheduled classes and lab sessions. A student who misses more than 10% of class time may be subjected to withdrawal from the class. In the event of illness or emergency, you are expected to inform me the reason and valid documentations.

If you miss a scheduled class session without an excused absence is not entitled to any special consideration to make up missed work. These students will be treated in accordance with the Augusta University standard attendance policies. If you are late to the class, it is your responsibility to pick up any handouts distributed at the beginning of the class.

Academic Honesty and Integrity:

Each student in this course is expected to abide by the Augusta University Code of Academic Honesty and Integrity. You are encouraged to work together and discuss concepts with other students. You can give "consulting" help or receive 'consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of the work done by someone else.

Disorderly Conduct:

Augusta University prohibits behavior that disrupts the academic, research or service mission or activities of the University, or disrupts any activity or event of the University community. Some examples of disorderly conduct include, but are not limited to, the following: conduct which causes a breach of the peace; lewd, obscene or indecent conduct; conduct which interferes with or disrupts activities or functions sponsored or participated in by the University or by members of the University community; conduct that is disruptive to a classroom lecture, lab, or other teaching or research entity of the University, interfering with or obstructing pedestrian or vehicular traffic; obstructing or interfering with ingress or egress of campus buildings or facilities; conduct which interferes with the rights of others; unauthorized use of electronic or other devices to make an audio or video record of any person without his or her expressed or implied consent when such recording is likely to cause injury or distress.

In addition to the above-mentioned policy, you are also obligated to follow the Student Manual guidelines which are available at gru.edu/students/conduct/documents/fy15_student_manual.pdf.

Other Policies:

Standard Augusta University policies will be followed for all others (such as attendance policy, grade change policy, etc.). These policies are available at http://www.augusta.edu/compliance/policyinfo/.

Disclaimer:

I reserve the right to alter conditions and items found in this document at any time during the course of the semester through an announcement made in a scheduled lab session.

Copyright Statement:

All materials related to this course are copyrighted and owned by me, no any reproduction and/or distribution are allowed!

MASTER LAB SCHEDULE: PHYSICS 1111L-SPRING 2018

WEEK	DAY	LAB
Week 1 (Jan 4-10)	R	L1: Uncertainty Analysis
	M	Lab L1: Uncertainty Analysis
	T	L1: Uncertainty Analysis
	W	L1: Uncertainty Analysis
Week 2 (Jan 11-17)	R	L2: Determining Uncertainty
	M	No Lab
	T	L2: Determining Uncertainty
	W	L2: Determining Uncertainty
Week 3 (Jan 18-24)	R	L3: Acceleration of a Cart on Incline
	M	L2: Determining Uncertainty
	T	L3: Acceleration of a Cart on Incline
	W	L3: Acceleration of a Cart on Incline
Week 4 (Jan 25-31)	R	L4: Projectile Motion
	M	L3: Acceleration of a Cart on Incline
	T	L4: Projectile Motion
	W	L4: Projectile Motion
Week 5 (Feb 01-07)	R	L5: Hook's Law (Need Full Report)
	M	L4: Projectile Motion
	T	L5: Hook's Law (Need Full Report)
	W	L5: Hook's Law (Need Full Report)
Week 6 (Feb 08-14)	R	L6: Atwood Machine
	M	L5: Hook's Law (Need Full Report)
	T	L6: Atwood Machine
	W	L6: Atwood Machine
Week 7 (Feb 15-21)	R	L7: Drag Force
	M	L6: Atwood Machine
	T	L7: Drag Force
	W	L7: Drag Force
Week 8 (Feb 22-28)	R	L8: Conical Pendulum
	M	L7: Drag Force

	T	L8: Conical Pendulum
	W	L8: Conical Pendulum
Week 9 (Mar 01-07)	R	L9: Torque
	M	L8: Conical Pendulum
	T	L9: Torque
	W	L9: Torque
Week 10 (Mar 12-16)	M	L9: Torque
	T	L10: Mechanical Energy (Full Report)
	W	L10: Mechanical Energy (Full Report)
	R	L10: Mechanical Energy (Full Report)
Week 11 (Mar 19-23)	M	L10: Mechanical Energy (Full Report)
	T	L11: Ballistic Pendulum
	W	L11: Ballistic Pendulum
	R	L11: Ballistic Pendulum
Week 12 (Mar 26-30)	M	L11: Ballistic Pendulum
	T	L12: Oscillations
	W	L12: Oscillations
	R	L12: Oscillations
Week 13 (Apr 09-13)	M	L12: Oscillations
	T	L13: Resonance
	W	L13: Resonance
	R	L13: Resonance
Week 14 (Apr 16-20)	M	L13: Resonance
	T	Open Lab
	W	Open Lab
	R	Open Lab
Week 15 (Apr 23-27)	M	Open Lab
	T	Lab Practical
	W	Lab Practical
	R	Lab Practical
Last Day (Apr 30)	M	Lab Practical

LAB SCHEDULE: PHYSICS 1111L-SPRING 2018

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WEEK	PRE-LAB	HANDOUT
Jan 09		L1: Uncertainty Analysis
Jan 16	PL2: Work Sheet	L2: Determining Uncertainty
Jan 23	PL3: Work Sheet	L3: Acceleration of a Cart on Incline
Jan 30	PL4: Work Sheet	L4: Projectile Motion
Feb 06	PL5: Work Sheet	L5: Hook's Law (Full Report)
Feb 13	PL6:Work Sheet Video Link A Video Link B Video Link C	L6: Atwood Machine
Feb 20	PL7: Work Sheet Video Link A Video Link B	L7: Drag Force
Feb 27	PL8: Work Sheet Video Link A Video Link B Video Link C Video Link D Video Link E	L8: Conical Pendulum
Mar 06	PL9: Work Sheet Video Link A Video Link B	L9: Torque
Mar 13	PL10: Work Sheet Video Link A Video Link B	L10: Mechanical Energy (Full Report)

Mar 20	PL11: Work Sheet Video Link A Video Link B	L11: Ballistic Pendulum
Mar 27	PL12: Work Sheet Video Link	L12: Oscillations
Apr 10	PL13: Work Sheet	L13: Resonance
Apr 17		Open lab
Apr 24		Lab Practical

Details for a Formal Lab Report

You are required to hand in two full formal lab reports during the semester. These two labs are listed in your syllabus and lab schedule. For these two lab reports, you will earn 30% of your final lab grades. Follow the following structure for your report. Your report will be graded based on *completeness*, *correctness* and *originality*. It will also be graded based on how easy it is to read and how well it flows. Difficult to read reports or reports with major flaws will be given lower grades.

Here is the basics structure of formal lab report

Header
Name (First AND Last)
Partner (if applicable)
Lab Number/Title

Abstract
- Include your abstract here. Include the purpose and major results of your lab.

Background/Introduction/Goals
- State purpose of the lab (i.e. "We will measure the speed of light.")
- Describe what you will use to make the measurement (i.e. "We will measure the speed of light using a cat, a goat, some cheese, and a jar of peanut butter.")
- Include important equations here

Measurements/Data/Setup
- Present your major data and results
- It is useful to include a drawing/photo of your experimental setup

Calculations

- Show your all calculations with all equations clearly.

Conclusion
- Restate purpose of lab
- Restate your major result (i.e. "We measured the speed of light to be 14 cats/jar of peanut butter.")
- Describe what you learned

Short Lab Write Ups and Lab Notebook

During the lab, record all your data in your lab notebook. Follow the direction given in the class syllabus. When you are provided a lab template with the instruction, transfer your lab notebook details to the template before the next lab. Do not attach your instruction sheet to the template. You will earn 20% of your final grade from your properly maintained notebook and short lab write-ups. I will collect your notebook or/and completed template regularly for grading.