

## Tentative Syllabus for Physics Lab 241: Fall 2012

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To access the Physics Gateway: <http://hutton.lyon.edu>

### During class periods, cell phones are to be switched off.

#### Office Hours

I will schedule several office hour blocks. I will be very close to my office during these times. Otherwise, I will usually be close to my office or research lab. If you want to find me outside of office hours, make an appointment so that you will be sure to find me. My schedule is located on the physics home page which you may review to determine office hours.

#### Grading

**As a general guide to grades, grades will be assigned as follows:**

100-90]	(90-80]	(80-70]	(70-60]	<(60
A	B	C	D	F

There are 10 labs this semester: each lab provides 10 points in your final grade. The particular grade in each individual lab is awarded as follows: 70% of the grade (or 7 points) is awarded for successful completion of the lab. The other 30% (or 3 points) is awarded for submission of an acceptable report following the guidelines on the lab website. Each student team is to submit an individual and independent report for each experiment completed in order to obtain credit with **each student in the team submitting an electronic lab report**. You will have the opportunity during lab to respond to comments from the received electronic labs and then revise and resubmit your reports.

**Note: If you miss one of the labs and it is not made up, your lab grade will be lowered by one letter grade for each missed lab which is not made up.**

A portion of your lab grade from any particular experiment may come from oral answers to questions when you turn in your lab report or lab quizzes. Thus, it is important that you understand what you did during the lab before turning the lab report in to your professor however during the revision process you will have the opportunity to refine your understanding. Your work on lab write-ups will be graded for correctness, clarity and completeness. **Failure to supply details leading to a result will result in very little credit for a lab.** If you want full credit for a lab, **you must** supply the logical steps that led to the result and the result **must include proper units**. You should supply sample calculations where appropriate. Diagrams and graphs should be included where appropriate. Aside from data tables and graphs, the components required for the proper lab write-up should take about 3 - 4 pages maximum for any given lab. Be sure that each lab starts with a cover page as indicated in the lab write-up guidelines. Make sure that your lab write-up is in the form of paragraphs with correct English grammar as indicated on the lab write-up guidelines. Failure to follow the guidelines will negatively impact your grade.

**This course grade is completely separate from Phy210 and Phy240.**

In this course, your grade will depend upon successful completion of lab experiments and reports. **You are also expected to have read the lab before coming to class.** You should bring your text, a calculator, and paper to lab. Labs will be completed and submitted during lab. In order to do this, you will need to come to lab on time. **You can not show up late for lab. Labs start at 13:00 promptly. Simply said, do not come late.** Making up the lab for such absences is normally not permitted: it is thus in your interest to show up to lab on time. Additionally, you should **never plan** other activities during the lab period since labs normally will occupy the entire period.

## Lab report formats

If you miss a lab for an excused reason, you must make up the lab as soon as possible. If you hand in a lab report late for an unexcused reason, you will lose a minimum of 10% of your grade. Labs must be submitted in pdf format electronically. **When including spreadsheets in your reports, be sure to format tables so they fit on the page. I should be able to read your lab (as a single document in pdf format) without having to change anything. This means, check your pdfs before you send them to make sure you can read them.**

**If you miss a lab for an excusable reason, you must make up the lab for credit. If you schedule a makeup lab and fail to show up for the makeup, no future makeup labs will be permitted. If you miss 3 or more labs (unexcused), you will fail the course. If you miss one of the labs and it is not made up, your lab grade will be lowered by one letter grade for each missed lab which is not made up.**

## Course Description

In this course you will be exposed to the experimental side of physics. Among the topics that we will investigate are mechanics, waves and thermodynamics.

## Course Objectives

As a consequence of this course, you should obtain an enhanced understanding of the experimental nature of physics. In addition, you should come away from this course with an ability to interpret data in a scientifically valid manner and to have increased experience with writing brief technical reports.

## Course Prerequisites

In order to be taking the physics lab, you must be currently enrolled in either physics 210 or physics 240 and therefore you must satisfy the prerequisites for those courses.

## Text

The text will consist of handouts in electronic format obtained via the physics gateway at:

<http://www.compchem.org/~shutton/index.html>.

## Attendance

### **The Lyon College Catalogue for 2012-2013 states:**

Students are expected to attend all class periods for the courses in which they are enrolled. They are responsible for conferring with individual professors regarding any missed assignments. Faculty members are to notify the Registrar when a student misses the equivalent of one, two, three, and four weeks of class periods in a single course. Under this policy, there is no distinction between “excused” and “unexcused” absences, except that a student may make up work missed during an excused absence. A reminder of the college’s attendance policy will be issued to the student at one week, a second reminder at two weeks, a warning at three weeks, and notification of administrative withdrawal and the assigning of an “F” grade at four weeks. Students who are administratively withdrawn from more than one course will be placed on probation or suspended (see Academic Probation and Academic Suspension).

## Academic Honesty

It is expected and encouraged that students in this class will work together on labs as teams. The report will also be constructed (For FA11 only) as a team effort during lab and submitted by each student to the email account I provide you with. Each student must submit an individual copy (even though it may be a duplicate of your team effort). However, you may not submit the work of others outside your team as part of your report: to do so is a violation of the Lyon Honor Code. Thus, each lab should be pledged with the above provisions obeyed.

**All graded work in this class is to be pledged in accordance with the Lyon College Honor Code.**

“Students seeking reasonable accommodations based on documented learning disabilities must contact the Office of Academic Services at 307-7332.”

## Tentative Schedule for Physics 241.01 and 241.02 Fall 2012 R.1

<b>labs</b>	<b>Lab Dates</b>
TBA	Th & F: August 23, August 24
Lab 01: Forces & Force Tables	Th & F: August 30, August 31
Lab 02: Motion in 1 and 2 dimensions	Th & F: September 06, September 07
<b>Class Test 1 (phy210,phy240)</b>	<b>Friday September 14</b>
Lab 03: Inclined Planes & Friction	Th & F: September 13, September 14
Lab 04: Atwood's Machine, Mechanical Advantage, Work and Energy	Th & F: September 20, September 21
TBA	Th & F: September 27, September 28
Lab 05: Centripetal Force and Hooke's Law	Th & F: October 04, October 05
<b>Class Test 2 (phy210,phy240)</b>	<b>Wednesday October 10</b>
Fall Break	October 11-October 14
Lab 06: Static Equilibrium	Th & F: October 18, October 19
Lab 07: Simple Harmonic Oscillation	Th & F: October 25, October 26
Lab 08: Standing Waves and Vibrations	Th & F: November 01, November 02
<b>Class test 3 (phy210,phy240)</b>	<b>Friday November 09</b>
*Lab09: Archimedes' Principle and Pressure	Th & F: November 08, November 09
Lab 10: Thermodynamics	Th & F: November 15, November 16
<b>Class test 4 (phy210,phys240)</b>	<b>Friday November 30</b>
TBA	Th & F: November 29, November 30
TBA	Th & F: December 07, December 08

## **Notes on the lab write-up for physics labs (Fall 2012)**

Your first (cover) page should include the following information:

Your Name, Date, Partners, Title of Experiment and the abstract.

***Each lab must be the unique written effort of the student team submitting the report. You may NOT reference or use lab reports (prepared by others, outside your team) in your report preparation.***

**Lab reports must be electronically submitted to the appropriate address as a single pdf document.**

**Title:** Concise wording that describes the essence of the lab.

**Abstract** - a summary of your research including general methods and major conclusions. This is usually one paragraph long and should convince someone to read your paper.

**Methods:** - A brief discussion of experimental techniques. Diagrams are usually appropriate in this section.

**Results** -written usually in the past perfect tense or passive voice; describes your findings, data collected, and includes data tables, graphs, general trends, derived formulas, etc. All work and data tables must be shown here. In general, you need to have a copy of your original data with you but the data included in the lab report can be copied from your original data.

**Discussion and analysis** - tense can vary, describes your results in relation to other data, discusses problem associated with the lab, postulates trends in the data, predicts results given different circumstances, suggests sources of error, etc. **Be sure to include sample calculations in this section.**

**Literature Cited** - a list of books, articles, etc., that you used to assist you in presenting your data and which were referred to in the write-up. **When citing a reference from the internet, you MUST include the URL that points directly to the document so that a single click of the mouse will bring up that exact document. Every lab report will have at least 1 citation or the report will not be accepted.**

Your presentation of the lab is important. Be sure it is grammatically correct and neatly typed. Be careful of tense changes within a paragraph. Data collected during a lab must be authentic. "Fudging" is unacceptable and unnecessary.

Lab write-ups should be as **concise** as possible within these guidelines. I am not looking for exhaustive tomes of work in a lab write-up.

As an approximate guide to how points will be assigned for the written lab reports:

+0.5 points are obtained for a clear and correct abstract.

+0.5 points are obtained for clearly stated methods, using diagrams where appropriate.

+1 points is obtained for all results included (in readable form, of course).

+0.5 points are obtained for discussion and analysis.

+0.5 points are obtained for correct and relevant and authoritative literature references.

Total for the written portion of the lab is 3 points per lab.

The total for your lab work in a lab is 10 points thus 7 points will be provided by successful and careful attention to the mechanics of the lab itself.

## **Educational Goals for Physics Students & Assessable Learning Outcomes PHY 241 FUNDAMENTALS OF PHYSICS I LABORATORY / 1 credit**

Experimental techniques for Fundamentals of Physics I. Corequisite: PHY 240 (/210).

### **General Education Objectives (proposed)**

- 1. Students can apply critical thinking to pose and answer questions.**
- 2. Students can use the processes and methods of science and mathematics to demonstrate how reproducible results give rise to the discovery of fundamental laws and the development of theories.**
- 3. Students can articulate a basic knowledge of current scientific understanding of the universe and the scientific and mathematical laws that govern it.**
- 4. Students can summarize, interpret, analyze, and critically evaluate data and reports relating to the natural sciences and mathematics.**

### **Physics Program Objectives**

There are several general goals of the Physics program that students completing the physics program should have. A non-exhaustive list of these program objectives include:

- (a) Ability to perform a mathematical formulation of a physical system
- (b) Ability to discuss (mathematically and linguistically) a physical system drawing upon a well-developed foundation built upon physical fundamentals.
- (c) Ability to formulate complex arguments based upon physical foundations and which are testable by experimentation.
- (d) Ability to produce technologically enabled students with an understanding of the basis for experimental design.

### **non-exhaustive list of intended learning outcomes follows**

- (a) Perform simple experiments designed to complement classroom material.
- (b) Analyze data collected in a systematic manner and explore the compliance of this data with anticipated theoretical results.
- (c) Write a detailed technical report covering the particular experiment at hand.
- (d) Ability to discuss with colleagues the physical system under study.
- (e) Develop an experiential-based method of inquiry leading to a scientifically creative individual.

The present incarnation of the lab experiments is composed of the following experiments:

- (1) Forces and Force Tables (hands-on experience with vectors)
- (2) Motion in 1 and 2 dimensions
- (3) Inclined planes and friction (statics, dynamics and non-conservative forces)
- (4) Atwood's Machine, Mechanical Advantage, Work and Energy
- (5) Centripetal Force and Hooke's Law.
- (6) Static Equilibrium
- (7) Simple Harmonic Oscillation
- (8) Standing Waves and Vibrations
- (9) Archimedes' Principle and Pressure

(10) Thermodynamics (linear expansion and calorimetric measurements)