

Tentative Syllabus for Physics Lab 241: Fall 2013

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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] A	(90-80] B	(80-70] C	(70-60] D	<(60 F
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There are about 10 labs this semester and 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 awarded contingent upon submission of an acceptable lab report. The other 30% (or 3 points) is awarded for submission of an acceptable report following the guidelines and rubric on the lab website. Note, however, that in the event that an acceptable lab report is not submitted, the lab is considered to not have been done and the final course grade will be lowered by 1 letter grade. Each student team is to submit an individual and independent lab 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 when experiments are done 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. The full lab, including writeup, must be completed or your grade will be reduced by one letter grade for each lab not fully completed.

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. 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 2 - 3 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 (proofread) 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 or more of the labs without makeup, 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. 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 as a team effort among the group lab partners 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 Dean of the Faculty at (870) 307-7332.”

Withdrawal Deadlines

Last day to drop with no record of the course is 02 September 2013.

Last day to drop with a W is 23 October 2013.

Schedule for Phy210, Phy240, and Phy241: Fall 2013: Revision 01

labs	Worksheet Number	Date	210: Cutnell: 8th ed. Assignment Reading : Homework	240:Serway 4th ed Assignment: Reading: homework
	pt	W: August 21, 2013	Chapter 01: Units, vectors, math and trig	Chapter 01 Introduction and Vectors
TBA:lab 0: intro lab	Worksheet 01 units trig	F :August 23, 2013	Chapter 01:H01	Chapter 01:H01
	Worksheet 02 1d motion	M: August 26, 2013	Chapter 02:H02: 1d motion	Chapter 02:H02 1d motion
	Worksheet 03 freefall	W: August 28, 2013	Chapter 02:H03	Chapter 02:H03
Lab 01: Forces & Vectors	Worksheet 04 2d motion1	F: August 30, 2013 UQ1	Chapter 03:H04: 2d motion	Chapter 03:H04: 2d motion
	Worksheet 05 2d motion2	M: September 02, 2013	Chapter 03:H05	Chapter 03:H05
	Worksheet 05 2d motion2	W: September 04, 2013	Chapter 03:H05	Chapter 03:H05
Lab 02: 1 and 2 D motion	Worksheet 06 force1, fbd	F: September 06, 2013 UQ2	Chapter 04:H06: Forces, fbd	Chapter 04:H06 Forces, fbd
	Worksheet 07 force 2, fbd	M: September 9, 2013	Chapter 04:H07	Chapter 04:H07
	UnTest#1	W: September 11, 2013	Chapter 04	
Lab 03: Planes & Friction	Test 1:coverage: ws01-ws07	F: September 13, 2013		
	Worksheet 08 inclined plane	M: September 16, 2013	Chapter 06:H08: work and energy	Chapter 06:H08 Energy and Energy Transfer
	Worksheet 09 inclined 2	W: September 18, 2013	Chapter 06: H09	Chapter 07:H09 Potential Energy
Lab 04: Atwood's, mechanical advantage, work & Energy	Worksheet 10 energy 2	F: September 20, 2013 UQ3	Chapter 07:H10: impulse, momentum	Chapter 08:H10 Momentum and Collisions
	Worksheet 11 spring energy	M: September 23, 2013	Chapter 07: H11	Chapter 08:H11
	Worksheet 12 collisions1	W: September 25, 2013	Chapter 05:H12: Uniform Circular Motion	Chapter 10:H12 Rotational Motion
TBA	Worksheet 13 collisions2	F: September 27, 2013 UQ4	Chapter 08:H13: Rotational kinematics	Chapter 10:H13
	Worksheet 14 ucm 1	M: September 30, 2013	Chapter 08: H14	Chapter 10:H14
	Worksheet 15 acc frames	W: October 02, 2013	Chapter 09:H15: Rotational dynamics	Chapter 10:H15
Lab 05: Centripetal Force & Hooke's Law	Worksheet 16 non ucm	F: October 04, 2013	Chapter 09: H16	Chapter 10:H16
	UnTest#2	M: October 07, 2013		
	Test 2:coverage: ws08-ws16	W: October 09, 2013		
	Fall Break	Thurs: Oct 10 - Sun:Oct 13		
	Worksheet 17 rotate2 energy	M: October 14, 2013	Chapter 09: H17	Chapter 10:H17
	Worksheet 18 torque,L	W: October 16, 2013	Chapter 09: H18	Chapter 10:H18
Lab 06: Static Equilibrium	Worksheet 19 statics	F: October 18, 2013 UQ5	Chapter 10: H19 Simple Harmonic Oscillation	Chapter 12:H19 Oscillatory Motion
	Worksheet 20 osc1:spring	M: October 21. 2013	Chapter 10: H20	Chapter 12:H20
	Worksheet 21 osc2:pendulum	W: October 23, 2013	Chapter 10: H21	Chapter 12:H21
Lab 07: Simple Harmonic Oscillation	Worksheet 22 string waves1	F: October 25, 2013 UQ6	Chapter 16:H22 waves and sound	Chapter 13:H22 Mechanical Waves
	Worksheet 23:string waves2	M: October 28, 2013	Chapter 16:H23	Chapter 13:H23
	Worksheet 24 sound waves	W: October 30, 2013	Chapter 17:H24: wave superposition	Chapter 14:H24 :Superposition and Standing Waves
Lab 08: Standing Waves and Vibrations	Worksheet 25 beats, doppler	F: November 01, 2013	Chapter 17: H25	Chapter 14:H25
	Worksheet 26 archimedes (not on test 3)	M: November 04, 2013	Chapter 17:H26	Chapter 15: H26:Fluid Mechanics :Sections 15.1 - 15.4
	Untest#3:	W: November 06, 2013		
Lab09: Archimedes' Principle & Pressure	Test 3: Coverage: ws17-ws25	F: November 08, 2013	Chapter 12: Temperature and Heat	Chapter 16: Temperature and the kinetic theory of gasses
	Worksheet 27 thermo1	M: November 11, 2013	Chapter 13:H27: transfer of heat	Chapter 16:H27
	Worksheet 28 thermo2	W: November 13, 2013	Chapter 14:H28: 1DG and kinetic theory	Chapter 17: H28:Energy in Thermal Processes: 1 st law of thermo
Lab 10: Thermodynamics	Worksheet 29 thermo3	F: November 15, 2013 UQ7	Chapter 15::H29: thermodynamics	Chapter 18: H29: Heat Engines, Entropy, and the 2 nd law of thermo
	Worksheet 30 thermo4	M: November 18, 2013	Chapter 15: H30	Chapter 18:H30
	Worksheet 31 fluids1	W: November 20, 2013	Chapter 11: H31: Fluids	Chapter 16: H31:Fluid Mechanics: Sections 15.5-15.9
TBA	Untest #4	F: November 22, 2013		
	Test 4:coverage ws26-ws31	M: November 25, 2013		
	Thanksgiving	W: Nov 27- Sun:Dec 01		
		M: December 02, 2013		
		W: December 04, 2013		
TBA	Course Review / last day	F: December 06, 2013		
	Final Exams	December 09-13, 2013		

Notes on the lab write-up for physics labs (Fall 2013)

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)

Physics 241:Fall 2013

[Syllabus](#) : [Primary Learning Outcomes](#) : [Schedule](#) : [Notes on the lab writeup](#)

[Full Syllabus](#) (combined from the documents above)

Note: in order to properly view the documents (except pdf) you must have [dejaVu fonts](#) and you may want [STIX fonts](#)

Important details:

You should ALWAYS save your lab report before sending it.

Name the document you save using the following convention:

Suppose your name is Kilay Tulizm and you want to send lab 03. From swriter, save lab 03 as lab03KT without spaces (use only letters and numbers).

Next export your lab as a pdf, of a similar name except it has .pdf at the end.

Check with your file manager to see that you have lab03KT.pdf

How to send the pdf file:

In the subject line, make the subject the same as your file name prefixed by the course number and section with a colon (here, it would be PHY24101:lab03 Kilay Tulizm)

Attach your pdf file to the email and send it. Make sure that you proofread the pdf file before sending it!

Where to email the labs to?

email address: LyonPhysics@.....

After sending, you should receive automatic confirmation of receipt.

You will also want to email yourself all files used and sent as a backup.

Date	Lab Materials	
August 22 August 23	TBA01: Introductory lab	
September 12 September 13	Lab 01: Forces and Force Tables	[P]
	Animation (1) :: Spreadsheet (1)	
September 05 September 06	Lab 02: Motion in 1 and 2 dimensions	[P]
	Animation (1) :: Spreadsheet (1)	
	In lab Problems for Lab 02	[P]
September 12 September 13	Lab 03: Inclined Planes & Friction	[P]
	Video (wmv : mpeg) :: Spreadsheet (1)	
September 19 September 20	Lab 04: Atwood's Machine, Mechanical Advantage, Work and Energy	[P]
	Spreadsheets: WorkPowerEnergy : MechanicalAdvantage1 : MechanicalAdvantage2	
September 26 September 27	TBA02: In Lab Problems [1 : 2]	
October 03 October 04	Lab 05: Centripetal Force and Hooke's Law	[P]
	Video (1) :: Spreadsheets: Centripetal Force : Hooke's Law : Slinky Investigations	

October 17	Lab 06: Static Equilibrium	[P]
October 18	Animation (1) :: Torque Calculations	
October 24	Lab 07: Simple Harmonic Oscillation	[P]
October 25	Simple Harmonic Calculator : Slinky Period Calculator	
October 31	Lab 08: Standing Waves and Vibrations	[P]
November 01	Video (1) :: Standing and Traveling Wave Calculator::Problems [P]	
November 07	Lab09: Archimedes' Principle	[P]
November 08	Spreadsheet (1)	
November 14	Lab 10: Thermodynamics	[P]
November 15	Spreadsheet: Cal : Expansion	
November 21	TBA	
November 22		
December 05	TBA	
December 06		