Lyon College Course Syllabus

Course Number and Section: PHY251.01 and PHY251.02
Course Title: Fundamentals of Physics Lab II
Course Meeting Days/Times: [01:R 02:F] 13:00-15:50 Semester/Year: SP2016

Professor's Information

Name: Stuart Hutton
Office Location: Derby248 Office Hours: MW11-11:50 F10-10:50
E-mail Address: stuart.hutton@lyon.edu Phone Number: 307-7560

Standard Policies

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

Class Attendance Policy

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 Students who are administratively withdrawn from more than one course will be placed on probation or suspended.

Disabilities
Students seeking reasonable accommodations based on documented learning disabilities must contact the Dean of the Faculty at (870) 307-7332.

Harassment, Discrimination, and Sexual Misconduct

Title IX and Lyon's policy prohibit harassment, discrimination and sexual misconduct. Lyon encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to Clarinda Foote, Title IX Coordinator, or Patrick Mulick, Dean of Students and Title IX Investigator, about what happened so they can get the support they need and Lyon can respond appropriately. Lyon is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource (Chaplain, Counselor, or Nurse). As a faculty member, I am required to report possible Title IX violations and must provide our Title IX coordinator with all relevant details. I cannot, therefore, guarantee confidentiality.

Withdrawal Deadlines

Last day to drop with no record of the course is 26 January 2016.

Last day to drop with a W is 21 March 2016

Tentative Syllabus for Physics Lab 251: Spring 2016

Professor: Dr. Stuart Hutton
Office: Derby Center: 248 Research Lab: Derby 219: General Physics lab: 148
Phone: 870 307 7560
Email: stuart.hutton@lyon.edu
To access the Physics Gateway: http://hutton.lyon.edu

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

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 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. Refer to Student Learning Outcomes for a discussion of minimal course outcome expectations.

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 Phy220 and Phy250.

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; doing so will result in the equivalent to an unexcused absence.** 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. Your prime learning resource is the classroom: **punctual** and **complete** class attendance is expected**. Absences will negatively impact your final grade**. **Tardiness is considered to be an unexcused absence and will negatively impact your final grade; in particular you should not expect to arrive late and be permitted to do the lab**. **Use of a networked device to communicate during lab, except as required to do the lab, will be considered equivalent to an unexcused absence and a zero will be recorded for the lab grade without the possibility for a makeup. What this means: try to come in late or text during lab and you will lose a letter grade in lab.**

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. Specifically, you must check your sent email to confirm that any attachments sent were correctly attached, could be opened, and were in pdf format.**

If you miss a lab for an excusable reason, you must make up the lab for credit as soon as the schedule permits. 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. You are required to submit your completed lab writeup for the makeup lab within 2 days of completion. Do not submit non-pdf attachments or corrupted files via email and expect to obtain extra time to complete the lab.

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. Refer to Student Learning Outcomes for a discussion of minimal course outcome expectations.

Course Prerequisites

In order to be taking the physics lab, you must be currently enrolled in either physics 220 or physics 250 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://nmr.lyon.edu/~shutton/index.html.

Tentative Master Schedule: R.1 for Physics 220 and Physics 250 and Physics 251 Spring 2016

labs	Worksheet Number	Date	220: Cutnell: 8th ed. Assignment Reading : Homework	250:Serway 4th ed Assignment: Reading: homework
	Worksheet 01: Electrostatics 1	W January 13	chapter 18	chapter 19
Lab01A: Electrostatics 1		F January 15	chapter 18	chapter 19
	Martin Luther King Day (no class)	**M January 18**		
	Worksheet 02: Electrostatics 2	W: January 20	chapter 18	chapter 19
Lab 01B: Electrostatics 2		F January 22	chapter 19	chapter 19
	Worksheet 03: Gauss' Law	M January 25	chapter 19	chapter 20
	Worksheet 03A: Problems	W January 27	chapter 19	chapter 20
Lab 02: In-Lab Problems		F January 29	chapter 19	chapter 20
	Worksheet 04: potential	M: February 01	chapter 19	chapter 20
	Untest01	**W February 03**		
Lab 03: Series and parallel R & C	**Test #1**	**F: February 05**		
	Worksheet 05: capacitance	M February 08	chapter 19	chapter 21
	Worksheet 06: Problems	W February 10	chapter 20	chapter 21
Lab 04: EMF and RC Circuit	**Worksheet 07: emf, RC circuit**	F February 12	chapter 20	chapter 21
Snow Gap day		M February 15	chapter 20	chapter 21
	Worksheet 08: Kirchhoff's laws 1	W February 17	chapter 21	chapter 22
Lab05: current balance	**Worksheet 09: Kirchhoff's laws 2**	F February 19	chapter 21	chapter 22
	Worksheet 10: Magnetic fields 1	M: February 22	chapter 21	chapter 22
	Worksheet 11: Magnetic fields 2	W February 24	chapter 22	chapter 23
Lab 06: magnetic Levitation	**Worksheet 12: Ampere's law**	F February 26	chapter 22	chapter 23
	Worksheet 13: Calculating B	M February 29		
	Untest02	**W March 02**		
Lab 07: solenoids	**Test #2**	**F March 04**		
	Spring Break	**March 7 – March 11**		
	Worksheet 14: Faraday's law	M: March 14	chapter 22	chapter 23
	Worksheet 15: Inductance No ws16	W March 16	chapter 22	chapter 23
Lab 08: oscilloscopes	**Worksheet 17: RLC Circuits 1**	F March 18	chapter 23	chapter 23
	Worksheet 18: RLC Circuits 2	M: March 21	chapter 23	Chapter 23
	Worksheet 19: Thin Lens Eqtn. 1	W: March 23	chapter 23	chapter 24
Snow LTBA	**If needed**	**R: March 24**		
	Easter Vacation	**F March 25 –M March 28**		
	Untest03	**W: March 30**		
Lab TBA	**Test #3 (coverage to WS 19)**	**F: April 01**		
	Worksheet 20: Thin Lens Eqtn. 2	M April 04	chapter 26	chapter 26
	Worksheet 21: Refraction	W: April 06	chapter 26	chapter 25
Lab 09: focal lengths	**Worksheet 22: Mirror Equation**	F April 08	chapter 25	chapter 25
	Worksheet 23: Multiple lenses	M: April 11	chapter 25	chapter 25
	Geometrical Optics, Ray trace	W: April 13	chapter 25	chapter 27
Lab10: reflection	**Worksheet 24: Thin films**	F: April 15	chapter 27	chapter 27
	Worksheet 25: interference	M: April 18	chapter 27	chapter 28
	Untest04	**W: April 20**		
Lab TBA	**Test #4**	**F April 22**		
	TEM Waves	M April 25	chapter 24	chapter 24
	Bohr Model	W April 27	chapter 30: 30.1 – 30.4	Chapter 29: 29.1, 29.2
No Lab	**Last Day of Class**	F: April 29		
	Final Exams	**May 01 – May 06**		

CLASS SCHEDULE / OFFICE HOURS Spring 2016

Office		General Lab		Research Lab
Derby 248		Derby 148		Derby 219

PROFESSOR Stuart Hutton

Monday	Tuesday	Wednesday	Thursday	Friday
8:00-8:50 PHY250.01 Fundamentals of Physics I Derby 011	8:00-9:15	8:00-8:50 PHY250.01 Fundamentals of Physics I Derby 011	8:00-9:15	8:00-8:50 PHY250.01 Fundamentals of Physics I Derby 011
9:00-9:50 PHY220.01 Gen Physics I Derby 011	9:30-10:45	9:00-9:50 PHY220.01 Gen Physics I Derby 011	9:30-10:45	9:00-9:50 PHY220.01 Gen Physics I Derby 011
10:10-10:50 phy382.01 Derby 015		10:10-10:50 phy382.01 Derby 015		10:10-10:50 Office Hours Derby 248
11:00-11:50 Office Hours Derby 248	11:00 - 11:50 phy382.01 Derby 015	11:00-11:50 Office Hours Derby 248	11:00-11:50	11:00-11:50
12:00 - 12:50		12:00 - 12:50		12:00 - 12:50
1:00-1:50	1:00-2:15	1:00-1:50	1:00-3:50 PHY251.01 Fund Physics II Lab Derby 148	1:00-3:50 PHY251.02 Fund Physics II Lab Derby 148
2:00-2:50	2:30-3:45	2:00-2:50		
3:00-3:50				
4:00-4:50		4:00-4:50		4:00-4:50

Notes on the lab write-up for physics labs (Fall 2015)

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. Include a statement of your hypothesis here and if data supported it.

Introduction: An overview of your experiment, statement of hypothesis, what you did and what the theory was behind the experiment.

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. Data should be absent of obvious errors (since you would have tracked down these items).

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. Discuss how the data supports, or does not support your hypothesis and how well such support is in terms of error analysis such as percent differences. **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.

Physics Lab Grading Rubric

Note: Each student has the opportunity to revise deficient portions of the lab report during the lab period except for teamwork, arrival and departure.

	1	0.5	0
1: Scientific Thought	Hypothesis in abstract and introduction. Supporting evidence (or non-supporting) discussed in conclusion.	Hypothesis in abstract and introduction but not relevent and supporting evidence (or non-supporting) not discussed in conclusion.	Hypothesis absent in abstract and introduction; Supporting evidence (or non-supporting) not discussed in conclusion
2: Critical thinking	Correct discussion of experiment, and how results relate to hypothesis.	Incomplete discussion of experiment iand how results relate to hypothesis	poor of absent discussion of experiment, and how results relate to hypothesis.
3: Inquiry and Analysis	Complete discussion of experimental technique and data results	incomplete discussion of experimental technique and data results	poor or absent discussion of experimental technique and data results
4: Informational Literacy	Correct physical terminology contained in report. At least one reference present.	incomplete physical terminology contained in report. Reference present but not correct.	incorrect or absence of physical terminology contained in report. Reference not present.
5: Quantative Literacy	Correct usage of calculations including spreadsheets	correct usage of calculations including spreadsheets but something significant missing	Absent or incorrect usage of calculations including spreadsheets
6: Teamwork	Successful team completion of lab		Unsuccessful team completion of lab
7: Arrival	on time		tardy or absent
8: Departure	Work space returned as it was when arriving		Workspace left in disorder upon departure
9: Overall report	All required elements present		Required elements missing.
10: Quality	experimental results presented without obvious errors		experimental results presented with obvious errors

Student Learning Outcomes for the Physics Program at Lyon College Rev SP2016

1. Students who complete the physics [210]/[220], [240]/[250], [241]/[251] sequence are able to

1a. Articulate the basic principles of physics.
1b. Apply the basic principles of physics to solve a variety of qualitative and quantitative problems at the introductory physics level.

This can be measured with portions of currently-used standard exams and exam problems.

General Education learning outcomes for [210,240,241]/[220,250,251]

Critical thinking: [210,240,241]/[220,250,251]
Inquiry and analysis: [241]/[251]
Quantitative literacy: [210,240,241]/[220,250,251]
Teamwork: [241]/[251]
Information literacy: [210,240,241]/[220,250,251]
Scientific thought: [210,240,241]/[220,250,251]

Portions related to [241]/251] will be evaluated for **2** selected labs with rubric data recorded. Since students are allowed to submit revised reports, it is anticipated that this will normally serve as verification, however data is recorded for the initial submission before revision. Portions related to [210/240]/[220/250] rubric will have data recorded for **4** selected problems; one from each exam.

Critical thinking is regularly evaluated in [210,240,241]/[220,250,251]. In [210,240] / [220,250] it is evaluated in terms of starting with correct physical principles applicable to a given situation and being able to follow it through to completion. It is evaluated by use of exam problems. In [241]/[251], it is part of the process of scientific thought and is evidenced by use of supporting data for a hypothesis as is required by the lab rubric.

Inquiry and analysis is regularly evaluated in [241]/[251] as part of the required element of completed lab write ups. It is evidenced by student explanation of the experiment and is a required element by the rubric.

Quantitative literacy is evidenced primarily in [210,240]/[220,250] by successful completion of physical problems with correct units and correct numerical operations. It is evaluated by use of exam problems. Quantitative literacy is exhibited in [241/251] by students being able to follow through with calculations partially enabled by spreadsheet examples and being able to interpret the results. This is evidenced by the write up and is a required element by the rubric.

Teamwork is regularly evaluated in [241]/[251] and is evidenced by successful team completion of lab write ups as is required by the rubric.

Information literacy is regularly evaluated in [241]/[251] and is evidenced by correct physical terminology in lab reports as required by the lab rubric. It is also a significant portion of [210,240]/[220,250] and is evidenced by student success in using the basic physical terminology enabling students to correctly initiate quantitative solutions to physical situations.

Scientific thought is regularly evaluated in [241]/[251] and is evidenced by use of hypothesis with supporting evidence (or not supporting evidence) based upon experiment as is required by the lab rubric for 3 selected labs.