Lyon College Course Syllabus Pandemic SP2022

Course: Phy250.01/SP22	Fundamentals of Physics II	**MWF** 08–08:50
Professor: Stuart Hutton	**Office:** Derby 248	**Office Phone:** ***.307.7560
Email: stuart.hutton@lyon.edu	**Office Hours:** **MW** 10:00–10:50/AR	
Physics Email: lyonphysics@*****.***	**Physics Web Gateway:** physics.lyon.edu	**Physics SMS:** 307.***.8765

Honor Code

All graded work in this class is to be pledged in accordance with the Lyon College Honor Code. The use of a phone for any reason during the course of an exam is considered an honor code violation.

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 Students who are administratively withdrawn from more than one course will be placed on probation or suspended.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 Interim Director of Academic Support Courtney Beal in the Morrow Academic Center at (870) 307-7016 or at courtney.beal@lyon.edu.

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 Danell Hetrick, Title IX Coordinator and Interim Vice-President for Student Life and Dean of Students, or Sh’Nita Mitchell, Title IX Coordinator and Associate Dean of Students, 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 **Tuesday January 25, 2022.**

Last day to drop with a W is **Wednesday March 9, 2022.**

College-Wide COVID-19 Policies for Spring, 2022

Masks are mandated when indoors in all campus buildings, including academic buildings, Edwards Commons, Becknell Gymnasium and residence halls. Refer to the full campus policy online for more details. Participation in community surveillance testing in mandatory. Vaccines are STRONGLY encouraged for all faculty, staff, and students. Vaccines are NOT MANDATED forLyon College community members.

Lyon Covid safety guidelines

The following COVID safety guidelines are provided for members of the Lyon community:

1. ***All persons must wear a mask that covers both the mouth and nose when on campus.***
2. ***Social distancing is required on Lyon College's campus.***

More details are provided on the Lyon College COVID-19 web page LINKED HERE.

Class Specific Guidelines

In labs:
Social distance must be maintained even with PPE.

Students must use Saran Wrap on computer keyboards and mouse bags over the mice. Also this should cover equipment where appropriate. If you use gloves this is not then required.

Student lab and work areas must be cleaned and sanitized before and after use.
Do Not leave the protective wrap behind. Throw it away.
Appropriate masks must be worn that cover the nose and mouth.

In Class:
Social distance must be maintained even with PPE.
Appropriate masks must be worn that cover the nose and mouth.

Contravention of these guidelines will result in immediate dismissal from lab or class.

College-Wide COVID-19 Policies for Spring, 2022

Masks are mandated when indoors in all campus buildings, including academic buildings, Edwards Commons, Becknell Gymnasium and residence halls. Refer to the full campus policy online for more details. Participation in community surveillance testing in mandatory. Vaccines are STRONGLY encouraged for all faculty, staff, and students. Vaccines are NOT MANDATED forLyon College community members.

Tentative Syllabus for Physics 250: Spring 2022

Professor: Dr. Stuart Hutton
Office: Derby Center: 248 Research Lab: Derby 219: General Physics lab: 148
SMS: 307.*.8765 /lab email: lyonphysics@<*.com> web: physics.lyon.edu**
Phone: *.307.7560 Email: stuart.hutton@lyon.edu**

During tests: you are forbidden to communicate with others except for me. You are required to be present during the specified times for the tests.

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

In this course, you will have several grading opportunities, tests, homework and in-class problems. The various weight of each of these activities in your final point grade is shown below. Late assignments will normally not be accepted. Additionally, since we will be doing in-class problems, poor attendance will negatively affect your grade: in particular, you will not receive credit for class participation for unexcused absences. There are no make-ups for in-class worksheets.

Tests (4 tests and 1 [comprehensive] final exam)=90%
Each test is worth 18% of your grade.
Homework / in-class problems/ class participation=10%

Phy251 is a separate course from either Phy220 or Phy250. The grade in Phy251 has no impact upon the grade in either Phy220 or Phy250 except as a co-requisite.

Your work on tests will be graded for correctness. The tests will be multiple choice. You are expected to become proficient with physical quantities and units in addition to being able to do the physics leading to the solution of problems. You are expected to each day come prepared for class. This is accomplished by having looked over the worksheet before class, and then working the problems for complete understanding after class. Students are generally expected to commit two hours of study outside of class for each hour of lecture. You will also notice that before each of the 4 tests, I have scheduled an Untest. On this day, you should come prepared to work as if this were the actual test. The format of the untests is not multiple choice. Instead you are expected to work through the problems as if it were an actual test. I have also scheduled several Unquizzes. Time permitting, we will allow about 10 minutes for you to complete self-diagnostic Unquizzes. During unquizzes and untests, you are encouraged to ask questions and discuss approaches to the solutions.

Course Description: Physics 250

In this course you will be exposed to fundamentals of physics. Among the topics that we will cover are electrostatics, magnetism and optics. Refer to Student Learning Outcomes for a discussion of minimal course outcome expectations.

Course Objectives: Physics 250

As a consequence of this course, you should obtain an enhanced understanding of the fundamentals of physics. In addition, you should come away from this course with an ability to solve fundamental problems involving physical principles.

Course Prerequisites: Physics 250

You are expected to be proficient with algebra and trigonometry. It is strongly recommended that your life will be made easier if you review trigonometry. Additionally you must satisfy the calculus prerequisites for physics 250. Phy251 is a concurrent requirement.

Text: Physics 250

The textbook in this course is:
Principles of Physics, Serway and Jewett, Fourth edition
ISBN: 0-534-49143-X

You may use earlier editions of this text (which can be obtained at much lower prices online {$0.25 for example is a low price}) but you will need to be sure to read the correct portions of the text.
The schedule is designed around this particular text edition. You may use earlier or later editions but you will need to be sure to read the correct portions of the text. The text must be considered to be a very important resource so students are expected to be reading along in the text as the course progresses.

You have many resources on the campus: the library, your colleagues and your professor. Your prime learning resource, however, must be considered to be the classroom.

Punctual and complete class attendance is expected. Absences will negatively impact your final grade. Attendance will be taken.
.

Academic Honesty

It is expected and encouraged that students in this class will work together on homework problems. If you use reference work, be sure to include proper references. Questions during tests should be directed to the professor only and students are not permitted to communicate with each other during tests. Students are specifically prohibited from discussing any aspect of tests until all students have completed the test in both phy250 and phy210. Contravention of these conditions will be considered to be a violation of the Lyon College Honor Code.

CLASS SCHEDULE / OFFICE HOURS Spring 2022

Office
Derby 248

General Lab
Derby 148

Research Lab
Derby 219

PROFESSOR Stuart Hutton

Monday	Tuesday	Wednesday	Thursday	Friday
8:00-8:50 PHY250.01 Fundamentals of Physics II	8:00-9:15	8:00-8:50 PHY250.01 Fundamentals of Physics I	8:00-9:15	8:00-8:50 PHY250.01 Fundamentals of Physics I
9:00-9:50 PHY220.01 General Physics 2	9:30-10:00	9:00-9:50 PHY220.01 General Physics 2	9:30-10:00	9:00-9:50 PHY220.01 General Physics 2
10:10-10:50 Office Hours	10:00 – 10:50	10:10-10:50 Office Hours	10:00 – 10:50	10:10-10:50 Office Hours
11:00-11:50 Lunch	11:00-11:50 Lunch	11:00-11:50 Lunch	11:00-11:50 Lunch	11:00-11:50 Lunch
12:35 – 1:50	12:00-12:50	12:35 – 1:50	12:00 - 12:50	12:00 - 12:50 SGA
13:00-14:50	13:00-14:50	13:00-15:50 PHY251.01 Fundamentals of Physics Lab 2 Derby 148	13:00-15:50 PHY251.02 Fundamentals of Physics Lab 2 Derby 148	13:00-15:50 PHY251.03 Fundamentals of Physics Lab 2 Derby 148

Tentative Master Schedule: R.1 for Physics 220 and Physics 250 and Physics 251 Spring 2022

labs WRF	Worksheet Number	Date	220: Cutnell: 8th ed. Assignment Reading : Homework	250:Serway 4th ed Assignment: Reading: homework
	Worksheet 01: Electrostatics 1	W January 12	chapter 18	chapter 19
		F January 14	chapter 18	chapter 19
	MLK Day	M January 17		
L00/ L01 In-Lab Problems	**Worksheet 02: Electrostatics 2**	W January 19	chapter 18	chapter 19
	Worksheet 03: Gauss' Law:UQ01	F January 21	chapter 19	chapter 19
	Worksheet 03A: Problems	M January 24	chapter 19	chapter 20
Lab 02: In-Lab Problems		W January 26	chapter 19	chapter 20
	Worksheet 04: potential : QU02	F January 28	chapter 19	chapter 20
	Worksheet 05: capacitance	M January 31	chapter 19	chapter 20
No Lab	**UnTest 01**	W February 02	chapter 19	chapter 21
	Test 01	F February 04		
	Worksheet 06: Problems	M February 07	chapter 20	chapter 21
Lab 03: Series & Parallel R	**Worksheet 07: emf, RC circuit**	W February 09	chapter 20	chapter 21
	Worksheet 08: Kirchhoff's laws 1: UQ03	F February 11	chapter 20	chapter 21
	Worksheet 09: Kirchhoff's laws 2	M February 14	chapter 21	chapter 22
Lab 04: EMF and RC Circuit	**Worksheet 10: Magnetic fields 1**	W February 16	chapter 21	chapter 22
	UQ04	F February 18		
	Worksheet 11: Magnetic fields 2	M February 21	chapter 21	chapter 22
Lab05: Current Balance	**Worksheet 12: Ampere's law**	W February 23	chapter 22	chapter 23
	UnTest 02	F February 25		
	Test 02	M February 28		
Lab 07: Solenoids	**Worksheet 13: Calculating B**	W March 02	chapter 22	chapter 23
	Worksheet 14:Faraday's law:UQ 05	F March 04		
	Worksheet 15: Inductance	M March 07	chapter 22	chapter 23
Lab 08: Oscilloscopes	**Worksheet 17: RLC Circuits 1 (No WS 16)**	W March 09	chapter 22	chapter 23
	Worksheet 18: RLC Circuits 2: UQ06	F March 11	chapter 23	chapter 23
		M March 14	chapter 23	chapter 23
Lab 06: Magnetic Levitation	**Starting Optics**	W March 16	chapter 23	chapter 24
	UnTest 03	F March 18		
	Spring Break	March 19 – March 27		
	Test 03	M March 28		
Lab : TBA	**Worksheet 19: Thin Lens Eqtn. 1**	W March 30		
	Worksheet 20: Thin Lens Eqtn. 2:UQ07	F April 01		
	Worksheet 21: Refraction	M April 04	chapter 26	chapter 26
Lab 09: focal lengths	**Worksheet 22: Mirror Equation**	W April 06	chapter 26	chapter 25
	Worksheet 23: Multiple lenses:UQ 08	F April 08	chapter 25	chapter 25
	Geometrical Optics, Ray trace	M April 11	chapter 25	chapter 25
WR: Lab TBA	**Worksheet 24: Thin films**	W April 13	chapter 25	chapter 27
	Easter Holiday	F April 15 – M April 18	chapter 27	chapter 28
Lab10: Reflection	**Worksheet 25: interference**	W April 20	chapter 27	chapter 27
	UQ09	F April 22	chapter 24	chapter 24
	TEM Waves	M April 25	chapter 30: 30.1 – 30.4	Chapter 29: 29.1, 29.2
Lab : TBA	**Bohr Model**	W April 27		
	UnTest 04	F April 29		
	Test 04	M May 02		
	Last Day of Classes	W May 04		
	Final Exams	May 05 – May 10		

Physics Problem Solving Rubric Rev Fall 2019

	1	0.7	0.4	0
1, Critical Thinking: Solution started correctly. Note: sketches may be considered here as required in problem statement.	correct approach If required, sketches were correct.	approach would lead to correct result Sketches miss one label or some other component absent or incorrect.	Something is right in the approach but insufficient to reach problem solution. Sketches miss multiple labels, directions incorrectly indicated	incorrect approach Sketch not present or not at all correctly labeled.
2. Quantitative Literacy: Solution proceeded quantitatively	Mathematical operations correct and units correct	Mathematical operations and units correct however an error usually related to incorrect units or the final numerical result present	Mathematical operations have some correct steps but misapplication or other errors prevented problem completion. Units reported in final result not present or incorrect .	Necessary mathematical operations incorrect and units absent
3, Scientific Thought & Informational Literacy Note: this may be contained within an equation starting the problem solution.	correctly stated physical principle or law and physical terminology needed to solve problem.	physical principle or law used shown however omission or extraneous material present. physical terminology needed to solve problem used but not complete or absent important concept.	statement of physical principle or law present but would not apply to present problem so as to lead to solution. physical terminology needed to solve problem incomplete and would not have lead to problem completion.	no statement of physical principle/ law or incorrect physical principle/ law. Did not use physical terms needed to solve problem or incorrect terms used.

Problem scoring: maximum per **problem section** is about 5 points, some sections may have fewer points. In a test containing 4 problems, this equates to 25% of the total test score. The final score per problem is calculated as follows:

$$P_i = \frac{\text{total number of points from rubric}}{\text{maximum rubric points per problem}} \times \frac{100}{\text{\# of problems on test (normally 4)}}$$

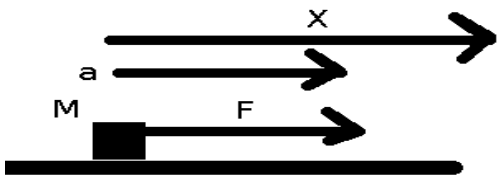
The test score is then determined by

$$percentage test\ grade = \sum_{i=1}^{\text{i=Number of problems on test}} P_i$$

Example of a complete solution

Find the vector position at time t of an object of mass M when subjected to a constant force $\vec{F}=F\,\hat{x}$ for a time t if the object was initially at x=0 and at rest. Provide a numerical result with correct SI units for F=1 N, M=1/2 kg and t=2 s. Include a correctly labeled sketch showing F acting on M, a and x.

Solution:



Newton's law: $\vec{F}=M\vec{a}\Rightarrow\vec{a}=\frac{\vec{F}}{M}:\vec{F}=F\,\hat{x}\Rightarrow\vec{a}=\frac{F}{M}\hat{x}$: $a_x=\frac{F}{M}$

Constant force : kinematic equations of motion in x direction for position:

$$x=x_0+v_{x,0}t+\frac{1}{2}a_x t^2$$

Object initially at rest: $v_{x,0}=0\ m/s$. Object initially at x=0: $x_0=0\ m$.

Kinematic equation reduces to: $x=\frac{F}{2\mathrm{M}}t^2$

With numerical values: $x=\frac{1\mathrm{N}}{2\,x\frac{1}{2}kg}(2\mathrm{s})^2=4\frac{Ns^2}{kg}=4\,m$

Final answer with vectors: $\vec{x}=4\,m\,\hat{x}$

Score:

1: Started with Newton's law and used correct equation of motion, additionally a correctly labeled sketch was drawn showing correct vector directions as was required=1

2: Algebra (including vectors) correctly lead to final result, unit algebra correct=1

3: Correctly used physical information in the problem which were mass M, initial conditions (at x=0, at rest) , time t, constant force, vector directions. Correct numerical quantities (including correct vectors) provided in final result with correct SI units reported=1

Student Learning Outcomes for the Physics Program at Lyon College RSP2017

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 Phy220/Phy250/Phy251

Critical thinking: 220,250,251
Inquiry and analysis: 251
Quantitative literacy: 220,250,251
Teamwork: 251
Scientific thought and Information literacy: 220,250,251

Portions related to Phy251 will be evaluated for **2** selected labs with rubric data recorded. Since students are allowed to submit revised reports, the initial submission will normally serve as the indicator since students are given the opportunity to revise submission based upon my comments. Portions related to 220/250 rubric will have data recorded for 4 selected problems; one from each exam.

Critical thinking is regularly evaluated in phy220, phy250 and phy251. In Phy220 and Phy250 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 Phy251, 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 phy251 as part of the required element of completed lab writeups. It is evidenced by student explanation of the experiment and is a required element by the rubric.

Quantitative literacy is evidenced primarily in phy220 and phy250 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 phy251 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 writeup and is a required element by the rubric.

Teamwork is regularly evaluated in phy251 and is evidenced by successful team completion of lab writeups as is required by the rubric.

Scientific thought and information literacy is regularly evaluated in phy251 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. Information literacy is regularly evaluated in phy251 and is evidenced by correct physical terminology in lab reports as required by the lab rubric. It is also a significant portion of phy220 and phy250 and is evidenced by student success in using the basic physical terminology enabling students to correctly initiate quantitative solutions to physical situations.