Formalities

If you'll just add the following text at the beginning of all your syllabi, you'll be good to go (this is the PREFERRED method so that any updates propagate to all syllabi:

> **Standard Lyon College Policies are incorporated into this syllabus and can be found at the following link: http://www.lyon.edu/standard-course-policies.**

If you really just want to copy and paste all the policies into your syllabi instead (NOT preferred), you can*, but be sure and use the exact wording found at the link above and include all of it.*

Tentative Syllabus for Physics 210: Fall 2024 R1

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**

Note: in my classes, I will be wearing a mask at times.

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

[Location:Meeting times] =[Derby 007:MWF 09:00-09:50]

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, and in-class problems. I expect active participation in our class. 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%

Phy241 is a separate course from either Phy210 or Phy240. The grade in Phy241 has no impact upon the grade in either Phy210 or Phy240 except as a co-requisite.

Your work on tests will be graded for correctness. 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 210

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

Course Objectives: Physics 210

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 210

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. Phy241 is a concurrent requirement.

Text: Physics 210

The textbook in this course is:
Physics, 8th Edition, by John D. Cutnell, Kenneth W. Johnson
ISBN 978-0-470-22355-0

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. Again, 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.

Punctual and complete class attendance is expected. Absences will negatively impact your final grade. Attendance will be taken. Consistently arriving to class late will constitute absences.

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 phy240 and phy210. **Use of any networked device during a test is considered to be automatically an honor code violation.** Contravention of these conditions will be considered to be a violation of the Lyon College Honor Code.

CLASS SCHEDULE / OFFICE HOURS Fall 2024

Professor: Stuart Hutton

Monday	Tuesday	Wednesday	Thursday	Friday
8:00-8:50 PHY240.01 Fundamentals of Physics I Derby 007	8:00-9:15	8:00-8:50 PHY240.01 Fundamentals of Physics I Derby 007	8:00-9:15	8:00-8:50 PHY240.01 Fundamentals of Physics I Derby 007
9:00-9:50 PHY210.01 General Physics 1 Derby 007	9:30-10:00	9:00-9:50 PHY210.01 General Physics 1 Derby 007	9:30-10:00	9:00-9:50 PHY210.01 General Physics 1 Derby 007
10:00-10:50 Phy335.01 Modern Physics Derby 148	10:00 – 10:50	10:10-10:50 Office Hours	10:00 – 10:50	10:10-10:50 Office Hours
11:00-11:50 Office Hours	11:00-11:50 Phy335.01 Modern Physics Derby 148	11:00-11:50 Phy390.01 Seminar Derby 148	11-11:50	11:00-11:50
12:00-12:50	12:00-12:50	12:00 - 12:50	12:00 - 12:50 Phy321.01 Astrophotography Derby 148	12:00 - 12:50 SGA
14:00-14:50 Phy335.01 Modern Physics Derby 148	13:00-14:50	13:00-15:50 PHY241.01 Fundamentals of Physics Lab 1 Derby 148	13:00-15:50 PHY241.02 Fundamentals of Physics Lab 1 Derby 148	13:00-15:50 PHY241.03 Fundamentals of Physics Lab 1 Derby 148
	16:00-16:50 Div Meetings	16:00-16:50 P&T Worthington		

Schedule for Phy210, Phy240, and Phy241: Fall 2024: Revision 02

labs	Worksheet Number	Date	210: Cutnell: 8th ed. Assignment Reading : Homework	240:Serway 4th ed Assignment: Reading: homework
[RF: No Lab]	Class Initialization	F August 16	Chapter 01: Units, vectors, math and trig	Chapter 01 Introduction and Vectors
	Worksheet 01 units trig	M August 19	Chapter 01:H01	Chapter 01:H01
WRF Lab 00	Worksheet 02 1d motion	W August 21	Chapter 02:H02: 1d motion	Chapter 02:H02 1d motion
	Worksheet 03 free fall	F August 23	Chapter 02:H03	Chapter 02:H03
	Worksheet 04 2d motion1	M August 26 **UQ01**	Chapter 03:H04: 2d motion	Chapter 03:H04: 2d motion
WRF Lab 01: Forces & Vectors	Worksheet 05a 2d motion2	W August 28	Chapter 03:H05	Chapter 03:H05
	Worksheet 05 2d motion2	F August 30	Chapter 03:H05	Chapter 03:H05
	Labor Day (no classes)	**M September 02**		
WRF Lab 02: Problems: 1 and 2 D motion	Worksheet 06 force1, fbd	W September 04 **UQ02**	Chapter 04:H06: Forces, fbd	Chapter 04:H06 Forces, fbd
	Worksheet 07 force 2, fbd	F September 06	Chapter 04:H07	Chapter 04:H07
	UnTest#1	**M September 09**		
WRF Lab 03: Planes & Friction	**Test 1**	**W September 11**		
	Worksheet 08 inclined plane	F September 13	Chapter 06:H08: work and energy	Chapter 06:H08 Energy and Energy Transfer
	Worksheet 09 inclined 2	M September 16 **UQ03**	Chapter 06: H09	Chapter 07:H09 Potential Energy
WRF Lab 04: Atwood's, mechanical advantage, work & Energy	Worksheet 10 energy 2	W September 18	Chapter 07:H10: impulse, momentum	Chapter 08:H10 Momentum and Collisions
	Worksheet 11 spring energy	F September 20	Chapter 07: H11	Chapter 08:H11
	Worksheet 12 collisions1	M September 23 **UQ04**	Chapter 05:H12: Uniform Circular Motion	Chapter 10:H12 Rotational Motion
WRF Lab 05: Centripetal Force & Hooke's Law	Worksheet 13 collisions2	W September 25	Chapter 08:H13: Rotational kinematics	Chapter 10:H13
	Worksheet 14 ucm 1	F September 27	Chapter 08: H14	Chapter 10:H14
	Worksheet 15 acc frames	M September 30 **UQ05**	Chapter 09:H15: Rotational dynamics	Chapter 10:H15
WR: Lab TBA	Worksheet 16 non ucm	W October 02		
	Hurkle-Durkle Day	**F October 04**		
	UnTest#2	**M October 07**		
WRF Lab 06: Static Equilibrium	**Test 2**	**W October 09**		
	Worksheet 17: Rotate2 energy	F October 11	Chapter 09: H17	Chapter 10:H17
	Worksheet 18 Torque, L	M October 14 **UQ06**	Chapter 09: H18	Chapter 10:H18
WRF Lab 07: Simple Harmonic Oscillation	Worksheet 19 statics	W October 16	Chapter 10: H19 Simple Harmonic Oscillation	Chapter 12:H19 Oscillatory Motion
	Worksheet 20 osc1:spring	F October 18		
	Worksheet 21 osc2:pendulum	M October 21 **UQ07**		
WF: Lab TBA	Worksheet 22 string waves1	W October 23	Chapter 10: H20	Chapter 12:H20
	Service Day	**R October 24**		
	Worksheet 23:string waves2	F October 25	Chapter 10: H21	Chapter 12:H21
	Worksheet 24 sound waves	M October 28 **UQ08**	Chapter 16:H22 waves and sound	Chapter 13:H22 Mechanical Waves
WRF Lab 08: Standing Waves and Vibrations	Worksheet 25 beats, Doppler	W October 30	Chapter 16:H23	Chapter 13:H23
	UnTest 3	**F November 01**		
	Test 3	**M November 04**		
WRF Lab09: Archimedes' Principle & Pressure	Worksheet 27 therm 01	W November 06	Chapter 12: Temperature and Heat	Chapter 16: Temperature and the kinetic theory of gasses
	Worksheet 28 therm 02	F November 08	Chapter 13:H27: transfer of heat	Chapter 16:H27
	Worksheet 29 therm 03	M November 11 **UQ09**	Chapter 14:H28: IDG and kinetic theory	Chapter 17: H28:Energy in Thermal Processes: 1st law of thermo
WRF Lab 10: Thermodynamics	Worksheet 30 therm 04	W November 13	Chapter 15::H29: thermodynamics	Chapter 18: H29: Heat Engines, Entropy, and the 2nd law of thermo
	Worksheet 30 (continued)	F November 15	Chapter 15: H30	Chapter 18:H30
	Worksheet 26	M November 18 **UQ10**	Chapter 17: H25	Chapter 14:H25
WRF: Lab TBA	Worksheet 31 Fluids 1	W November 20	Chapter 11: H31: Fluids	15: H26:Fluid Mechanics Sections 15.1 – 15.4 Chapter 16: H31:Fluid Mechanics: Sections 15.5-15.9
	Untest #4	**F November 22**		
	Thanksgiving Break	**M November 25 - 29**		
	Test 4	**M December 02**		
[WRF: No Lab]	Gravitational Interactions	W December 04		
	Course Review / last day	**F December 06**	**Final Exams**	**December 09-13**

Physics Problem Solving Rubric Rev FA2024

Note: this rubric indicates the process for completion of physics problems. Since our tests are multiple choice, this should be viewed as a self-guided checklist for successful and complete problem completion. For sample calculations in lab reports, you should follow this rubric closely.

	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:

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

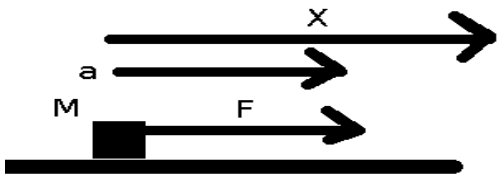
The test score is then determined by

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

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: $\vec{F}=M\vec{a}\Rightarrow\vec{a}=\frac{\vec{F}}{M}:\vec{F}=F\hat{x}\Rightarrow\vec{a}=\frac{F}{M}\hat{x}$: $a_x=\vec{a}\cdot\hat{x}=\frac{F}{M}$

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

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

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

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

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 FA2024

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 exam problems.

General Education learning outcomes for Phy 210/Phy240/ Phy241/Phy220/Phy250/Phy251

Critical thinking: 210,240.241,220,250,251
Inquiry and analysis: 241.251
Quantitative literacy: 210,240.241,220,250,251
Scientific thought and Information literacy: 210,240.241,220,250,251

Portions related to Phy:241,251 will be evaluated by percentage numbers of accepted labs. Students are allowed to submit revised reports. Portions related to Phy:210,240,220/250 rubric will have results recorded from exams.

Critical thinking is regularly evaluated in 210,240.241,220,250,251. 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 accepted 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 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 sample calculations sometimes partially enabled by spreadsheet examples and being able to interpret the results. This is evidenced by the accepted writeup and is a required element by the rubric.

Scientific thought and information literacy 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. Information literacy is regularly evaluated in 241/251 and is evidenced by correct physics 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.