

## Tentative Syllabus for Physics 390: Fall 2013

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**During class periods and during tests:  
cell phones are to be switched off.**

### Office Hours

I will schedule several office hour blocks. I will be very close to my office or research lab 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:**

<b>200-180]</b> <b>A</b>	<b>(180-160]</b> <b>B</b>	<b>(160-140]</b> <b>C</b>	<b>(140-120]</b> <b>D</b>	<b>&lt;(120</b> <b>F</b>
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**The final course grade may reflect subjective course aspects such as attendance and positive class participation.**

In this course, you will have several grading opportunities. The various weight of each of these activities in your final point grade is shown below. You are required to attend each seminar session. If you miss a session, your grade will be reduced by 10 points.

Note: The timing is presented as {x:y} where x is for a 5 student schedule and y is a for a 6 student schedule. This may require adjustment if class size changes.

This class will consist of several {10:8} minute timed presentations of which {8:6} minutes is devoted to presentation and  $\approx 2$  minutes is devoted to question and answer sessions (5 presentations for each class period). There will also be a formal presentation consisting of a total of 25 minute and: 20 minutes will be devoted to a formal presentation based upon independent research on an approved physics topic and 4 minutes will be devoted to question and answer sessions. A formal paper covering the formal presentation will be due the week of November 7 - November 11. **As you can see, our time is tight so it is extremely important that you arrive on time and ready to begin.**

### Grades will be obtained as follows:

Each {10:8} minute presentation period provides a maximum of 10 points: 8 points total for a presentation and 2 points total for active class discussion.

**Total for {8:6} minute presentations=100 points.**

On the dates shown on the schedule, you will submit (electronically) required preliminary topics, updates or rough drafts. You will receive 2.5 points for each of these submissions for a total **of 20 points**. The formal paper will provide you with an additional **30 points**. The formal presentation will provide you with an additional **50 points**.

**Total maximum course points: 100+20+30+50=200**

**Presentations will be graded for preparedness and correctness.**

**Do not try to give a presentation that you have not adequately prepared for! This means that you must normally set aside time to prepare your presentations each week.**

Your topics for the {10:8} minute presentations will come from the areas of physics mentioned during the particular week. I will provide you with several topics within each area for your selection. Topics 8, 9 and 10 will be self-chosen, subject to approval and must come from physics areas. The topic choice for the formal presentation is subject to professor approval and must come from physics areas.

### **Course Description**

In this course, you will have an opportunity to gain experience with presentation of complex topics in physics. Topics will be at the level of each student's background in physics. Individually chosen topics may come from areas beyond general physics (such as modern physics), subject to approval.

### **Course Objectives**

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 discuss, among peers fundamental problems involving physical principles.

### **Course Prerequisites**

Students in this course must have completed the following:

- (1) either Physics 210 or 240 (2) Physics 241
- (3) either Physics 220 or 250 (4) Physics 251

Text Book: There is no required text for this course.

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. Tardiness is considered to be an unexcused absence and will negatively impact your final grade.**

### **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 homework problems. If you use reference work, be sure to include proper references. On tests, students are required to keep notes and books closed except as instructed. **Your professor will supply all the paper needed for the tests.** Any questions during tests should be directed to the professor only. **CELL PHONES AND OTHER WIRELESS OR NETWORKED DEVICES (INCLUDING COMPUTERS) MAY NOT BE USED DURING TESTS,** If you do use such devices during a test, it will automatically be considered to be a violation of the Lyon College Honor Code. **When you use references in your work, they must be properly referenced; both in talks and in written work.**

**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."

<b>Tentative Schedule for Physics 390: Fall 2013 (Schedule for 5 or 6 students enrolled)</b>			
<b>Date</b>	<b>Events</b>	<b>Topics (presented on dates shown)</b>	<b>who presents what</b>
<b>August 21, 2013</b>	Organizational meeting	Assignment of topics for next classes	
<b>August 28, 2013</b>	<b>10 minute presentations</b>	<b>Mechanics I</b> kinematics conservation of energy conservation of momentum uniform circular motion Newton's laws Statics	ALL
		preliminary topic submission	ALL
<b>September 4, 2013</b>	<b>10 minute presentations</b>	<b>Mechanics II</b> Torque and Equilibrium vibrations gravity non-uniform circular motion simple harmonic oscillation rigid body rotational motion	ALL
<b>September 11, 2013</b>	<b>10 minute presentations</b>	<b>Waves</b> traveling pulses standing waves transverse waves on strings sound TEM waves longitudinal waves	ALL
		Revised prelim topic submission	ALL
<b>September 18, 2013</b>	<b>10 minute presentations</b>	<b>Thermodynamics</b> linear expansion ideal gas internal energy entropy adiabatic ideal gas Carnot Cycle and heat engine	ALL
		Formal topics submission for approval	ALL
<b>September 25, 2013</b>	<b>10 minute presentations</b>	<b>Electrostatics</b> Coulomb's law Electric dipole Gauss's Law Electrostatic Potential Capacitance and energy density Resistance and current	ALL
		Formal Progress Update 01	ALL
<b>October 2, 2013</b>	<b>10 minute presentations</b>	<b>Magnetism</b> Ampere's law Law of Biot-Savart Solenoid magnetization Inductance and energy density Displacement current	ALL
		Formal Progress Update 02	ALL

<b>October 9, 2013</b>	<b>10 minute presentations</b>	<b>Optics</b> Snell's Law images formed with thin lenses images formed with spherical mirrors dispersion and prisms polarization and Brewster's angle interference of light waves	ALL
		Formal Progress Update 03	ALL
<b>October 16, 2013</b>	<b>10 minute presentations</b>	<b>Misc. Physics Topics I</b> (Student Selected)	ALL
		Formal Progress Update 04	ALL
<b>October 23, 2013</b>	<b>10 minute presentations</b>	<b>Misc. Physics Topics II</b> (Student Selected)	ALL
		Formal Paper Rough Draft Due	ALL
<b>October 30, 2013</b>	<b>10 minute presentations</b>	<b>Misc. Physics Topics III</b> (Student Selected)	ALL
		Formal Topic Papers Due	ALL
<b>November 6, 2013</b>	<b>25 minute presentations</b>	1-2x	tbd
<b>November 13, 2013</b>	<b>25 minute presentations</b>	1-2x	tbd
<b>November 20, 2013</b>	<b>25 minute presentations</b>	1-2x	tbd
<b>December 4, 2013</b>	<b>25 minute presentations</b>	1-2x	tbd

## **Educational Goals for Physics Students**

There are several general goals that students completing a physics course should have. Among these general goals are

- (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.

There are several rather specific goals that students completing a physics course should have. A non-inclusive topical course by course list primary outcomes is shown below.

Phy390

### **Phy 390 SEMINAR IN PHYSICS / 1 credit**

Students research areas from advanced physics and deliver oral presentations supported by a formal paper. Prerequisite: MTH 220 and either PHY 220 or PHY 250 or permission of instructor. Course may be repeated for credit once.

This is the physics seminar course, introduced in the Spring of 2005 and taught for the first time in Fall 2005. As such, this course is in development. It is a one-hour course with a primary intention of providing students with the opportunity to discuss in detail physics problems.

### **A non-exhaustive listing of primary learning outcomes follows:**

- (a) increased ability to provide short presentations of problems and topics which they have covered in previous physics courses.
- (b) ability to actively participate in intellectual discussions based upon their physics background at the conclusion of each presentation.
- (c) ability to perform independent research over one topic from advanced physics.
- (d) ability to write a technical paper covering the particular advanced topic.
- (e) ability to provide an extended presentation covering their advanced topic.
- (f) ability to actively participate in an intellectual discussion of advanced topics presented.

# Physics 390:Fall 2013

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## Announcements

### Online Dice Roller

<b>Date</b>	<b>Events</b>	<b>Topics (presented on dates shown)</b>	<b>who presents what</b>
<b>August 21</b>	<b>Organizational meeting</b>	<b>Assignment of topics for next classes</b>	
<b>August 28</b>	<b>10 minute presentations</b>	<b>Mechanics I</b>	
	<b>preliminary topic</b>	<b>submission</b>	<b>ALL</b>
		<b>kinematics</b>	
		<b>conservation of energy</b>	
		<b>conservation of momentum</b>	
		<b>uniform circular motion</b>	
		<b>Newton's laws</b>	
		<b>Statics</b>	
<b>September 04</b>	<b>10 minute presentations</b>	<b>Mechanics II</b>	
		<b>Torque and Equilibrium</b>	
		<b>vibrations</b>	
		<b>gravity</b>	
		<b>non-uniform circular motion</b>	
		<b>simple harmonic oscillation</b>	
		<b>rigid body rotational motion</b>	
<b>September 11</b>	<b>10 minute presentations</b>	<b>Waves</b>	
	<b>Revised prelim topic</b>	<b>submission</b>	<b>ALL</b>

		traveling pulses	
		standing waves	
		transverse waves on strings	
		sound	
		TEM waves	
		longitudinal waves	
September 18	10 minute presentations	Thermodynamics	
	Formal Topics	Submission for approval	ALL
		linear expansion	
		ideal gas	
		internal energy	
		entropy	
		adiabatic ideal gas	
		Carnot Cycle and heat engines	
September 25	10 minute presentations	Electrostatics	
	Formal Progress	Update 01	ALL
		Coulomb's law	
		Electric dipole	
		Gauss's Law	
		Electrostatic Potential	
		Capacitance and energy density	
		Resistance and current	
October 02	10 minute presentations	Magnetism	
	Formal Progress	Update 02	ALL
		Ampere's law	
		Law of Biot-Savart	
		Solenoid	
		magnetization	
		Inductance and energy density	
		Displacement	

		<b>current</b>	
<b>October 09</b>	<b>10 minute presentations</b>	<b>Optics</b>	
	<b>Formal Progress</b>	<b>Update 03</b>	<b>ALL</b>
		<b>Snell's Law</b>	
		<b>images formed with thin lenses</b>	
		<b>images formed with spherical mirrors</b>	
		<b>dispersion and prisms</b>	
		<b>polarization and Brewster's angle</b>	
		<b>interference of light waves</b>	
<b>October 16</b>	<b>10 minute presentations</b>	<b>Misc. Physics Topics I</b>	
		<b>(Student Selected)</b>	<b>ALL</b>
	<b>Formal Progress</b>	<b>Update 04</b>	<b>ALL</b>
<b>October 23</b>	<b>10 minute presentations</b>	<b>Misc. Physics Topics II</b>	
		<b>(Student Selected)</b>	<b>ALL</b>
	<b>Formal Paper</b>	<b>Rough Draft Due</b>	<b>ALL</b>
<b>October 30</b>	<b>10 minute presentations</b>	<b>Misc Physics Topics III</b>	
		<b>(Student Selected)</b>	<b>ALL</b>
	<b>Formal Topic</b>	<b>Papers Due</b>	<b>ALL</b>
<b>November 06</b>	<b>25 minute presentations</b>	<b>1-2x</b>	tbd
<b>November 13</b>	<b>25 minute presentations</b>	<b>1-2x</b>	tbd
<b>November 20</b>	<b>25 minute presentations</b>	<b>1-2x</b>	tbd
<b>December 04</b>	<b>25 minute presentations</b>	<b>1-2x</b>	tbd