Syllabus for General Physics I, PHYS 211X

Fall 2015

Lecture
MWF 10:30-11:30 AM, REIC 201A

Laboratory
REIC 254
F01, 75470, M 6:00-9:00 PM
F02, 75471, T 2:15-5:15 PM
F03, 75472, T 6:00-9:00 PM
F04, 75473, W 2:15-5:15 PM
F05, 75474, W 6:00-9:00 PM
F06, 75475, R 6:00-9:00 PM
F07, 75476, R 9:30-12:30 PM
F08, 75477, T 9:30-12:30 PM
F09, 75478, M 2:15-5:15 PM
FH1, 75480, R 6:00-9:00 PM

Instructor: Ataur R. Chowdhury

Office: REIC 118

Office Hours: MWF 2:00-3:00 PM
T 9:00-12:00 Noon, or feel free to drop in whenever I am in my office.

Contact: Phone (907) 474-6109
Fax (907) 474-6130
Email archowdhury@alaska.edu

Teaching Assistants: TBA
Lab Instructor: Jeanie Talbot, j.talbot@alaska.edu, 474-7857

Prerequisites: Concurrent enrollment in MATH 252x; placement in ENGL 111x or higher; or permission of instructor. Recommended: one year of high school physics.

Text: Physics for Scientist and Engineers: A strategic Approach, Randall D. Knight, Third Edition, Pearson.

Course Objectives: To acquire a basic understanding of (1) the fundamentals of motion of objects, (2) propagation of waves, and (3) statics and dynamics of fluidic motion.

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Course Outline: Vectors, kinematics, **forces**, **Newton's Laws**, **momentum**, **work**, **energy**, **rotational motion**, oscillations, waves, gravity, fluid. (Chapters 1-15, 20-21 in the text). The **highlighted** topics will form the major focus of this course, and the students will be assessed for the mastery of these concepts through homework, quizzes, labs, and tests.

Credits: 4 credits: 3 hr. of lecture, and 3hr. of lab per week.

Help Session: Help with homework and lab is available through the teaching assistants during the following hours.

MTWRF TBA (REIC 122)

Additional help with the homework is available through the instructor during his designated office hours.

T 9:00-12:00 Noon (REIC 118)
MWF 2:00-3:00 PM (REIC 118)

Natural Science Core Classes:

PHYS 211X is one of the core courses under the natural science component of UAF Core Curriculum, and the intended goal of any natural science core courses is to prepare students for lifelong learning in natural sciences. The basic premise of these courses is to educate our students for making decisions based on "scientific method" and this entails making informed decision based on experimental observations. For this course, the students will learn this method by doing hands-on laboratory exercises during their laboratory sessions. The students will collect data, perform statistical analysis of the data, and draw conclusions following "scientific method" that is appropriate for physics and perhaps for all physical sciences.

A second expectation of Core courses, the so called "science and society", is related to scientific knowledge as it applies to public policies and issues. The students will be exposed to many illustrative examples in class to study the interplay between sound scientific knowledge and resulting public policies. These examples should help students with decision making processes that involve scientific data, and should help to sharpen their abilities as how to scientific knowledge applies to develop public issues/policies and how some of the policies/issues were put in place without any sound scientific reasoning. Every student will pick a topic of current highly debated societal issue, such as global warming, genetically modified food, partial birth abortion, cloning, etc, discuss both pros and cons of the issue based on scientific data, and draw conclusion about public policy of such an issue.

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Course Requirements/ Policies:

Class Attednence:
For a better understanding of the course material attendance and participation in classroom activities are very important. This particular course is generally regarded as one of the basic courses that deal with the fundamentals of classical physics, and it is highly expected that the students will commit themselves to attend the class regularly. There will be supplemental materials for this course and the students will be held responsible for all the materials that will be brought in from outside the text. The students will be expected to take part in meaningful discussion and ask questions to better comprehend the subject material. It is highly expected that the students will cause least disruption of class activities by showing up before the class starts, not leaving the class before it stops, keeping cell phones in silent mode, and refraining from talking during the class.

Homework:
On the average, 8-12 problems/exercises/questions will be assigned each week on Thursdays. The homework will be due back by 12:00 Noon on Fridays the following week. There is a designated drop-box for PHYS 211X homework inside Physics office (REIC 102). NO LATE HOMEWORK WILL BE ACCEPTED. NO EXCEPTIONS (barring emergencies and extreme situations). Group work is highly encouraged for solving problems, and for additional help with the homework the students are most welcome to consult the instructor during the office hour or any other time by prior appointment. Any homework you submit should reflect you own best effort. Copying of homework is absolutely not acceptable and will result in a grade of zero for the assignment.

Quizzes: There will be one quiz every week of the semester on Fridays, except the first week and the week of the midterm. These quizzes will be administered during the last 15-20 minutes of the class and are designed to test students understanding of the subject material covered during the preceding week. The quiz may include problems similar to the homework, those worked out in class, and may also include 'intuitive' question pertaining to the subject material covered during the previous week.

Examinations:
There will be a midterm examination (October 30, Friday, 10:30-11:30 AM) and a final comprehensive examination (Dec 16, Wednesday, 10:15-12:15 PM) for this course. Examinations will consist of, in most part, material similar to those in the homework, quizzes, and those covered in class. Midterm will cover the material covered in class and homework prior to the date of test, and the final will be comprehensive and will include material covered in chapters 1-15 and 20-21, with more weight on material covered after the midterm.

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Laboratory:
The laboratory is an integral part of this course, and each student must register for and attend the lab section and perform all ten labs that are listed in this handout. All labs and reports must be completed. Every effort must be made to make up a lab during the same week if possible. Last week of the semester would be set aside for makeup lab. Lab reports must be turned in on time, any lab turned in late will get deducted 20% for each week after the date it is due. A PASSING GRADE IN THE LAB IS REQUIRED TO PASS THE COURSE. For details about the lab, please consult the lab policy posted on the blackboard by the lab instructor Jeanie Talbot.

Paper on CORE Relevance:
PHYS 211X is a CORE course, and like any other CORE course it requires that the experience and knowledge you gain through this course bears some relevance to the society. You will be required to write a short paper (3-5 pages, double-spaced, not including references) on a selected topic and show how it relates in a meaningful way to any public policy/guidance issue based on scientific training. You can work individually or work in a group (not more than 4) to get this paper done. Detailed instructions about wring the paper will be provided in class. An outline for the paper is due before the midterm, and the complete paper is due by Dec 4, 2015.

Grading Policy:

Homework	15%
Lab	15%
Midterm	12%
Quizzes	30%
Paper	8%
Final	20%
Total	100%

The final grading for this course will be based on a curve, the average of which is usually taken to be the break-point of letter grade B and C, and the standard deviation of the grade point distribution will separate subsequent letter grades. Allowed grades are limited to A,B,C,D,F,IN,NB, and no plus-minus grades will be given for this course.

Academic Honesty

UAF expects and requires academic honesty from all members of the University community, and takes any act of plagiarism and cheating seriously. It is expected that all assignments, including homework and reports, that are turned in for this course must the original work of the individual student. Failure to comply with this policy will result in penalty as stipulated under UAF regulations.

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Disabilities Services

The UAF Office of Disability Services implements the Americas with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. Any student who may need assistance with disabilities, should feel free to contact the instructor or directly to the Office of Disabilities Services (204 WHIT, 474-5655, uaf-disabilityservices@uaf.edu).

General Remarks

"Physics is just the refinement of everyday thinking," A. Einstein

Physics is the subject that requires you to think and ponder. Physics is not mathematics, but it does require mathematics to make it useful. In order for you to succeed in this course you may pay heed to the following suggestions.

1. Read the chapter before it is discussed in class so that you know the material and know what questions to ask for clarification.
2. Start your homework on day one so that you have ample time to think about the questions and get the help you need.
3. Think the problems through and follow the logical sequence to get the result.
4. Do not hesitate to ask for help. We wish all of you to excel and we are here to help.

Tentative Schedule

Lecture, Reading, Quizz and Exam

Dates	Topics	Reading Assignment
Sept. 4	syllabus, position, velocity	Ch 1: sections 1-4
7	**Labor Day** (no classes)	
9	acceleration, linear motion	Ch 1: sections 4-7
11	one dimensional motion	Ch 2: sections 1-4
	Quiz#1	
14	motion with constant acceleration	Ch 2: sections 4-5
16	free fall, motion on incline	Ch 2: sections 5-7
18	vectors	Ch 3: sections 1-3
	Qiuz#2	

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21	vector algebra	Ch 3: sections 3-4
23	motion in two dimensional, projectile	Ch 4: sections 1-3
25	circular motion	Ch 4: sections 5-7
	Quiz#3	
28	concept of force	Ch 5: sections1-4
30	Newton's 1st and 2nd law	Ch 5: sections 5-7
Oct. 2	linear motion	Ch 6: sections 1-3
	Quiz#4	
5	friction, drag	Ch 6: sections 4-6
7	Newton's 3rd law	Ch 7: sections 1-3
9	examples of 3rd law	Ch 7: sections 4-5
	Quiz#5	
12	dynamics in two dimensions	Ch 8: sections 1-5
14	linear momentum	Ch 9: sections 1-3
16	conservation of momentum	Ch 9: sections4-6
	Quiz#6	
19	kinetic energy, potential energy	Ch 10: sections1-3
21	restoring force, elastic collisions	Ch 10: section 4-7
23	work and energy	Ch 11: sections1-5
	Quiz#7	
26	conservation of energy	Ch 11: sections6-9
28	motion of rigid bodies	Ch 12: sections 1-4
30	**Midterm Examination**	**(Ch 1-11)**
Nov. 2	torque, angular momentum	Ch 12: sections 5-8
4	rolling, conservation of momentum	Ch 12: sections 9-11
6	Newton's law of gravity	Ch 13: sections1-4
	Quiz#8	

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9	energy, satellite orbits	Ch 13: sections 5-6
11	simple harmonic motion	Ch 14: sections1-4
13	pendulum	Ch 14: sections 5-6
	Quiz#9	
16	damped harmonic motion	Ch 14: section 5-8
18	static properties of fluids	Ch 15: sections1-4
20	dynamic properties of fluids	Ch 15: sections5-6
	Quiz#10	
23	traveling waves	Ch 20: sections1-4
25	sound waves	Ch 20: sections5-6
27	**Thanksgiving** (no classes)	
30	Doppler effect	Ch 20: section 7
Dec. 2	standing waves	Ch 21: sections1-4
4	interference	Ch 21: sections5-7
	Quiz#11	
	Last day to submit paper.	
6	beats	Ch 21: section 8
9	make up lectures	
11	make up lectures	
	Quiz#12	
14	make up lectures	
16	**Final Examination** 10:15-12:15 PM, REIC 201A (Ch 1-15, 20-21)	

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PHYSICS 211X LABORATORY

Room: 254 (REIC)

Laboratory Schedule

Dates	Lab Title
9/3-4	**No labs**
9/8-11	Math Review
9/14-18	Lab 1: Uncertainty Analysis
9/21-25	Lab 2: Distance, Velocity, Acceleration
9/28-10/2	Lab 3: Acceleration and Force
10/5-9	Lab 4: Simple Machines
10/12-16	Lab 5: Momentum
10/19-23	**Recitation**
10/26-30	Lab 6: Conservation of Mechanical Energy
11/2-6	Lab 7: Ballistic Pendulum
11/9-13	Lab 8: Torque and Angular Momentum
11/16-20	Lab 9: Driven Harmonic Motion
11/23-27	MAKE-UP LABS, Thanksgiving holiday
11/30-12/4	Lab 10: The Speed of Sound
12/7-11	**Recitation**
12/14-18	**FINALS WEEK**