

Syllabus for College Physics I, PHYS 103X Fall 2014

Lecture

MWF 9:15-10:15 AM, REIC 201A

Laboratory (REIC 258)

77532 T 2:15-5:15 PM (Jonathan)

77533 W 2:15-5:15 PM (Sara)

77534 W 6:00-9:00 PM (Ryan)

77535 R 2:15-5:15 PM (Biswa)

77536 T 6:00-9:00 PM (Biswa)

81165 M 6:00-9:00 PM (Ryan)

81347 R 6:00-9:00 PM (Jonathan)

81717 R 8:00-11:00 AM (Sara)

Instructor: Ataur R. Chowdhury

Office: REIC 118

Office Hours: MWF 10:30-11:30 AM, 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

SI Instructor: Dorothy O'Donnell

Teaching Assistants:

Ryan Bernier
Biswa Neupane
Sara Vogler
Jonathan Whitefield

Lab Instructor: Jeannie Talbot, jktalbot2@alaska.edu, 474-7857, REIC 114

Prerequisites: High school algebra, trigonometry and geometry; placement in ENGL 111x or higher; placement in DEVM 105 or higher; or permission of instructor.

Text: Physics, Douglas C. Giancoli, Seventh Edition, Pearson.

Course Objectives: To acquire a basic understanding of (1) the fundamentals of motion of objects, (2) propagation of waves, (3) statics and dynamics of fluidic motion, and (4) thermodynamic laws.

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Course Outline: Vectors, kinematics, **forces**, **Newton's Laws**, **momentum**, **work**, **energy**, **rotational motion**, oscillations, waves, gravity, fluid, and **laws of thermodynamics**. (Chapters 1-15 of 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 hours of lecture, and 3 hours of lab per week.

Help Session: 1. Help with homework and lab is available through the teaching assistants during their designated hours (to be posted on the door of REIC 122).

MTWR: TBA (REIC 122)

2. SI sessions: Dorothy will conduct help sessions during her scheduled hours (TBA).

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

MWF: 10:30-11:30 AM (REIC 122)

Natural Science Core Classes:

PHYS 103X 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 highly debated current 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 Attendance:

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.

Homework:

On the average, 8-12 problems/exercises/questions will be assigned each week on Thursdays. The homework will be due back by 5:00 PM the following Thursday. There will be a designated dropbox for homework for PHYS 103x 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 your 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 Friday, except the first week and week of the midterm and final. These quizzes will be administered during the last 15 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 and may also include 'intuitive' question pertaining to the subject materials.

Examinations:

There will be one midterm exam (October 27, Monday, 9:15-10:15 AM, REIC 201A) and a final comprehensive examination (Dec. 17, Wednesday, 8:00-10:00 AM REIC 201A) for this course. Examinations will consist of, in most part, material similar to those in the homework, quizzes and those worked out in class. The first sectional examination will cover the material covered in class, quizzes and homework prior to the date of test, the second sectional will be based on material covered after the first one, and the final will be comprehensive and will include material covered in chapters 1-15, with more weight on material covered after the second sectional examination.

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

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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.

Paper on CORE Relevance:

PHYS 103X 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) on a selected topic and show how it relates in a meaningful way to any public policy/guidance issue based on scientific training. Detailed instructions about writing the paper will be provided in class. An outline for the paper is due the week after the midterm, and the complete paper is due by the day of Final, November 21, 2014.

Grading Policy:

Homework	20%
Lab	18%
Midterm	12%
Quiz	24%
Paper	8%
<u>Final</u>	<u>18%</u>
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.

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 be the original work of the individual student. Failure to comply with this policy will result in penalty as stipulated under UAF regulations.

Disabilities Services

The UAF Office of Disability Services implements the Americans 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

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contact the instructor or directly to the Office of Disabilities Services (208 WHIT, 474-5655, uaf-disability-service@alaska.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, Quiz and Exam

<u>Dates</u>	<u>Topics</u>	<u>Reading Assignment</u>
Sept. 5	syllabus, overview of physics	Ch 1: sections 1-4
Sept. 8	units, significant figures	Ch 1: sections 4-7
Sept.10	one dimensional motion	Ch 2: sections 1-4
Sept.12	motion with constant acceleration	Ch 2: sections 5-7
	Quiz#1	
Sept. 15	vectors and scalars	Ch 3: sections 1-4
Sept. 17	projectile motion	Ch 3: sections 5-7
Sept. 19	concept of force, Newton’s laws	Ch 4: sections 1-5
	Quiz#2	
Sept. 22	applications of Newton’s laws	Ch 4: sections 6-7
Sept. 24	weight, frictional force	Ch 4: sections 8-9

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Sept. 26	circular motion Quiz#3	Ch 5: sections 1-3
Sept. 29	Newton's law of gravity	Ch 5: sections 6-7
Oct. 1	Kepler's laws	Ch 5: sections 8-10
Oct. 3	work and energy Quiz#4	Ch 6: sections 1-5
Oct. 6	conservation of energy, power	Ch 6: sections 6-10
Oct. 8	linear momentum	Ch 7: sections 1-4
Oct. 10	conservation of momentum Quiz#5	Ch 7: sections 5-6
Oct. 13	conservation of momentum	Ch 7: sections 7-8
Oct. 15	motion of rigid bodies	Ch 8: section 1-4
Oct. 17	torque, angular momentum Quiz#6	Ch 8: sections 5-8
Oct. 20	static equilibrium	Ch 9: sections 1-4
Oct. 22	elastic properties	Ch 9: sections 5-6
Oct. 24	static properties of fluids Quiz#7	Ch 10: sections 1-5
Oct. 27	Midterm	
Oct. 29	dynamic properties of fluids	Ch 10: sections 6-10
Oct. 31	viscosity, heart	Ch 10: sections 11-14
Nov. 3	harmonic motion	Ch 11: section 1-4
Nov. 5	non-harmonic motion	Ch 11: sections 5-6
Nov. 7	traveling wave Quiz#8	Ch 11: sections 7-13
Nov. 10	sound waves	Ch 12: sections 1-4
Nov. 12	interference, Doppler effect	Ch 12: sections 6-7
Nov. 14	temperature Quiz#9	Ch 13: sections 1-4
Nov. 17	ideal gas law	Ch 13: sections 6-8
Nov. 19	kinetic theory, molecular speed	Ch 13: sections 9-11

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Nov. 21	real gas, phase change Quiz#10	Ch13: sections 12-14
Nov. 24	heat, calorimetry	Ch14: sections 1-4
Nov. 26	latent heat, heat transfer	Ch14: sections 5-8
Nov. 28	Thanksgiving (no class)	
Dec. 1	laws of thermodynamics	Ch15: sections 1-4
Dec. 3	heat engines	Ch15: sections 5-6
Dec. 5	entropy and second law Quiz#11	Ch15: sections 7-9
Dec. 8	Global warming	Ch15: sections 11-12
Dec. 10	review for final	
Dec. 12	review for final (last class meeting) Quiz#12	
Dec. 17	Final Examination (chapters 1-15), 8:00-10:00 AM, REIC 201A	

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PHYSICS 103X LABORATORY

Room: 258 (REIC)

Laboratory Schedule

Week #	Dates	Lab Title
1	9/1-9/5	No lab
2	9/8-9/12	Math Review
3	9/15-9/19	Lab 1: Distance, Velocity, and Acceleration
4	9/22-9/26	Lab 2: Acceleration
5	9/29-10/3	Lab 3: Acceleration and Force
6	10/6-10/10	Lab 4: Simple Machines
7	10/13-10/17	Lab 5: Conservation of Mechanical Energy
8	10/20-10/24	RECITATION FOR MIDTERM EXAM
9	10/27-10/31	Lab 6: Conservation of Momentum
10	11/3-11/7	Lab 7: Ballistic Pendulum, and Projectile Motion
11	11/10-11/14	Lab 8: Moment of inertia and Torque
12	11/17-11/21	Lab 9: The Speed of Sound in Air
13	11/24-11/28	MAKE-UP LABS
14	12/1-12/5	Lab 10: The ideal Gas Law, $PV = nRT$
15	12/8-12/12	RECITATION FOR FINAL EXAM
16	12/15-12/18	Finals week, No Labs