

**Syllabus for Physical Sciences, PHYS 115X**  
**(FE1, CRN 35925)**  
**(FE2, CRN 35926)**

**Spring 2015**

**TR 5:20-6:50 PM, REIC 202 (Lecture)**  
**T 7:00-10:00 PM, REIC 253 (Laboratory)**  
**R 7:00-10:00 PM, REIC. 253 (Laboratory)**

**Instructor:** Ataur R. Chowdhury

**Office:** REIC 118

**Office Hours:** MWF 10:30-11:30  
TR 4:00-5:00 PM, 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](mailto:archowdhury@alaska.edu)

**Teaching Assistant:** TBA

**Prerequisites:** Placement in ENGL 111X or higher; placement in DEVM F105 or higher; or permission of the instructor. Recommended: DEVM F105.

**Texts:** The Physics of Everyday Phenomena, Griffith and Brosing, Seventh Edition, McGraw Hill. Printed copies of laboratory manual will be distributed during the first meeting of the laboratory session.

**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) electricity and magnetism.

**Course Outline:** Basic concepts and general overview of phenomena in physics. Reflections on interrelatedness and interdependence within different scientific disciplines.

**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 assistant (TA) of PHYS 115X and others, during the following hours.

MTWR: 10-5 PM (REIC 122)

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

MWF 10:30-11:30 AM, and

TR: 4:00-5:00 PM (REIC 122)

**Natural Science Core Classes:**

PHYS 115X 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.

**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.

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Homework:

On the average, 9-12 special problems/exercises/questions will be assigned each week on Thursdays. The homework will be due back at the beginning of class the following Thursday. Students may turn in their homework in the designated box inside the physics office (REIC 102) anytime before it is due. **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, except for the first week and week of the midterm, one quiz every week of the semester on Thursday, and these quizzes will be administered during the last 10-15 minutes of the class and are designed to test students' understanding of the subject material covered during the preceding week. The quiz will be open-text, and will parallel the homework and will include problems similar to the homework and 'intuitive' questions pertaining to the subject materials.

Examinations:

There will be a midterm (March 5, Thursday) and a final comprehensive examination (May 8, Friday, 5:45-7:45 PM) for this course. The examinations will consist of, in most part, problems/questions similar to those in the homework, quizzes, and those worked out in class. The exams will be close-book, close-note, but the relevant equations will be provided along with the tests.

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.**

Paper on CORE Relevance:

PHYS 115X 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 working as a group, with no more than four in each, and be required to write a short paper (3-5 pages, double-spaced, not including references) on a selected

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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 before the spring break, and the complete paper is due on or before April 23, 2015.

**Grading Policy:**

Homework	15%
Lab	15%
Quiz	30%
Paper	8%
Midterm	12%
<u>Final</u>	<u>20%</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. Allowed grades will be limited to A,B,C,D,IN,NB,F, 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 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 contact the instructor or directly to the Office of Disabilities Services (208 WHIT, 474-5655, uaf-disabilityservices@alaska.edu).

**General Remarks**

*“Physics is just the refinement of everyday thinking,”* A. Einstein

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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

<u>Dates</u>	<u>Topics</u>	<u>ReadinAssignment</u>
Jan. 15	syllabus, scope of physics	Ch 1: sections 1-5
20	speed, velocity, acceleration	Ch 2: sections 1-3
22	motion with constant acceleration <b>Quizz#1</b>	Ch 2: sections 4-5
27	falling objects	Ch 3: sections 1-3
29	projectile motion <b>Quiz#2</b>	Ch 3: sections 4-5
Feb. 3	Newton's laws	Ch 4: sections 1-4
5	applications of Newton's laws <b>Quiz#3</b>	Ch 4: sections 5
10	centripetal force	Ch 5: sections 1-2
12	planetary motions <b>Quiz#4</b>	Ch 5: sections 3-5
17	work and power	Ch 6: sections 1-2
19	mechanical energy	Ch 6: sections 3-5

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**Quiz#5**

24	momentum and impulse	Ch 7: sections 1-2
26	conservation of momentum, collisions	Ch 7: sections 3-5

**Quiz#6**

Mar. 3	rotational motion	Ch 8: sections 1-3
5	<b>Midterm</b>	

10	conservation of angular momentum	Ch 8: sections 4-5
12	static fluids	Ch 9: sections 1-3

**Quiz#7**

17	Spring Break (No Classes)
19	Spring Break (No Classes)

24	Fluids in motion	Ch 9: sections 4-5
26	temperature, heat	Ch 10: sections 1-5

**Quiz#8**

31	heat engine, second law	Ch 11: sections 1-
April 2	heat pump, entropy	Ch 11: section 3-5

**Quiz#9**

7	electric charge, Coulomb's law	Ch 12: sections 1-3
9	electric field, potential	Ch 12: sections 4-5

**Quiz#10**

14	electric circuit, Ohm's law	Ch 13: sections 1-3
16	electrical energy, power	Ch 13: sections 3-5

**Quiz#11**

21	magnetostatics	Ch 14: sections 1-3
23	Faraday's law, induction	Ch 14: sections 3-5

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**Last day to submit paper**  
**Quiz#12**

28	transverse wave, interference	Ch 15: sections1-3
30	sound wave and music	Ch 15: sections4-5

**Quiz#13**

May 8      **Final Examination** (chapters 1-15), Tuesday, 5:45-7:45 PM,

PHYSICS 115X LABORATORY

TA: TBA  
Room: 253 (REIC)  
Lab Hour: TBA

Laboratory Schedule

<u>Lab.</u>	<u>Week of</u>	<u>Lab Title</u>
#1	Jan 19-23	Distance, Velocity, and Acceleration
#2	Jan 26-30	The Force Table
#3	Feb 2-6	Centripetal Acceleration
#4	Feb 9-13	Simple Machines
#5	Feb 16-20	The Simple Pendulum and Harmonic Motion
	Feb 23-27	Recitation for Midterm
#6	Mar 2-6	Ballistic Pendulum and Projectile Motion
#7	Mar 9-13	Torque, Angular Acceleration and Moment of Inertia
	Mar 16-20	SPRING BREAK
#8	Mar 23-27	Archimedes' Principle
#9	Mar 30-April 3	Human Power
#10	Apr 6-10	DC Circuits
#11	Apr 13-17	The Speed of Sound in Air
	Apr 20-24	MAKE -UP LABORATORY
	Apr 27-May 1	Recitation for Final
	May 4-8	FINALS