

Syllabus for General Physics I, PHYS 211X

Spring 2021

Lecture
MWF 5:50-6:50 PM, REIC 201

Laboratory
REIC 254

33763 T 6:00-9:00 PM

- Course:** PHYS 211X
- CRN:** 33764
- Course Type:** In person classroom teaching and Laboratory
- Instructor:** Ataur R. Chowdhury
- Office:** REIC 118
- Office Hours:** MW 2:00-3:30 PM
- Contact:** Phone (907) 474-6109
Fax (907) 474-6130
Email archowdhury@alaska.edu
- 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, Fourth Edition, Pearson.
- Course Outline:** Calculus-based introduction to classical mechanics, including: kinematics, Newton's laws, momentum, work, energy, gravity, rotational motion, oscillations, and fluids.
- Special notes:** Additional topics include waves. The laboratory part is integrated in the course.
- 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) traveling waves.

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Student Learning Outcomes:

1. Calculate particle motion in one and two dimensions.
2. Apply energy and momentum conservation to solve physical problems
3. Work with the equations associated with oscillatory motion
4. Describe the societal relevance of physics and its connection to other fields of science.
5. Ability to safely use basic laboratory equipment, to develop a testable hypothesis, to systematically collect and analyze data, and to report and interpret experimental results.

Instructional methods: Interactive lecture based instruction

Mode of Instruction: Face-to face live lectures in class

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 (TAs) during the hours posted on the door of REIC 122.

MTWR: TBA (REIC 122)

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

Course Requirement and Policies:

Media Requirement: All submissions for all requirement for this course, because of COVID-19, will have to be uploaded using digital media. Please make sure you have access to digital media when you submit your assignment, and when you attend classes.

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. **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.**

It is not required that you attend class, but because of COVID-19, regular class attendance will be taken in the event of an unwanted tracing for identifying people who could be infected. Also, keep in mind that if you do not show up in class, you will not receive any credit for in-class participation, which will be mainly based on

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in class quizzes (see next). All quizzes will be given in class at least one every week during lectures for a duration of 15-20 minutes each.

Participation/Quiz: During the lecture, the students will be expected to take part in meaningful discussion and ask questions to better comprehend the subject material. To engage students in active participation, there may be, from time to time, some pop quizzes and clicker questions. These quizzes will be administered anytime during the lecture, 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. All pop quizzes/clickers will take place online, using Google forms, and has to be submitted online.

Make-up quizzes, if you miss class for valid reasons, may be arranged with approval from the instructor.

Homework:

On the average, 8-12 problems/exercises/questions will be assigned each week on Fridays, and these will be posted on the blackboard. The homework will be due back by 5:00 PM on Fridays the following week. The homework has to be submitted in the dropbox assigned for homework on the blackboard. **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. All assignments on homework will be posted on the Black Board, and solutions have to be uploaded on the Black Board in their respective drop box.

Examinations:

There will be one midterm/sectional examination (February 19, Friday, 5:50-6:50 PM) and a final comprehensive examination (April 28, Wednesday, 7:00-9:30 PM) for this course. Examinations will consist of, in most part, material similar to those in the homework, quizzes, and those covered in class. First midterm will be based on material covered in class and homework prior to the date of test, the second one will include material covered after the first midterm, and the final will be comprehensive and will include all material covered in the semester, with more weight on material covered after the second midterm. All exams will be held during their designated time in class or at another place with prior approval from the instructor. These tests will be administered using Google form platform.

Make-up exams, for valid reasons, may be arranged with approval from the instructor.

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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 Zachary Tourville.

Paper:

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 some 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 issues that relate to physics, such as global warming, nuclear energy, etc, discuss both pros and cons of the issue based on scientific data, and draw conclusion about public policy of such an issue. A detailed outline of the paper will be provided later during the semester. You are required to submit a short outline for the paper by February 15 by email to the instructor, and submit it on the blackboard by April 16 in the respective drop box.

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

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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.

Course Evaluation:

The final grade for this course will be based on student's performance on homework and final, and will be weighted as follows.

Homework	15%
Lab	15%
Paper	10%
Participation/Quiz	24%
Midterm	15%
<u>Final</u>	<u>21%</u>
Total	100%

The final grading for this course will be based on a curve. For a given score, your letter grade will not be lower than what it would be expected based on standard grading scale (90-100 = A, 80-90 = B, etc.). Allowed grades are limited to letter grades A,B,C,D,F,I,BN, and no plus-minus grades will be given for this course.

Incomplete Grade Policy: "The letter "I" (Incomplete) is a temporary grade used to indicate that the student has satisfactorily completed (C or better) the majority of work in a course but for personal reasons beyond the student's control, such as sickness, has not been able to complete the course during the regular semester. Negligence or indifference are not acceptable reasons for an "I" grade."

Student Protections and Services:

COVID-19 Essentials: Because of COVID-19, University has put in place some mandatory procedures to adhere to. All students are encouraged to observe these rules to ensure a safe environment for all of us for a successful fall semester. I request all of you to do the following:

- 1) Wear mask during class,
- 2) Maintain social distancing in class,
- 3) Use designated doors for entering and exiting,
- 4) Try to sit at the same place in class (for tracing),
- 5) Check updates about COVID-19 on the website listed below on a regular basis.

<https://sites.google.com/alaska.edu/coronavirus/uaf/uaf-students?authuser=0>

Further, students are expected to adhere to the university's policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

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Protection: Every qualified student is welcome in my classroom. Students at this university are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. As required, if I notice or am informed of certain types of misconduct, then I am required to report it to the appropriate authorities. For more information on your rights as a student and the resources available to you to resolve problems, please go the following site: www.uaf.edu/handboo

UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: alaska.edu/nondiscrimination.

Services: As needed, I am happy to work with you, disability services, veterans' services, rural student services, etc to find reasonable accommodations.

Effective communication: Students who have difficulties with oral presentations and/or writing are strongly encouraged to get help from the UAF Department of Communication's Speaking Center (907-474-5470, speak@uaf.edu) and the UAF English's Department's Writing Center (907-474-5314, Gruening 8th floor), and/or CTC's Learning Center (604 Barnette st, 907-455-2860).

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.

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Course Calendar:

Tentative Schedule

Lecture, Reading, Quizz and Exam

<u>Dates</u>	<u>Topics</u>	<u>ReadinAssignment</u>
Jan 11	syllabus, position, velocity	Ch 1: sections 1-4
13	acceleration, linear motion	Ch 1: sections 4-7
15	one dimensional motion	Ch 2: sections 1-4
18	AK Civil Rights Day (no classes)	
20	motion with constant acceleration	Ch 2: sections 4-5
22	free fall, motion on incline	Ch 2: sections 5-7
25	vectors	Ch 3: sections 1-3
27	moton in one dimension	Ch 3: sections 3-6
29	motion in two dimensions, projectile	Ch 4: sections 1-4
Feb. 1	circular motion	Ch 4: sections 5-7
3	concept of force	Ch 5: sections 1-4
5	Newton's 1 st and 2 nd law	Ch 5: sections 5-7
08	linear motion	Ch 6: sections 1-3
10	friction, drag	Ch 6: sections 4-6
12	Newton's 3 rd law	Ch 7: sections 1-3
15	examples of 3 rd law	Ch 7: sections 4-5
17	dynamics in two dimensions	Ch 8: sections 1-5
19	Midterm Examination	Ch.1-8
22	kinetic energy, potential energy	Ch 9: sections 1-3
24	restoring force, elastic collisions	Ch 9: section 4-7
26	work and energy	Ch 10: sections 1-5

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Mar	1	conservation of energy	Ch 10: sections 6-8
	3	linear momentum	Ch 11: sections 1-3
	5	conservation of momentum	Ch 11: sections 4-6
	8	Spring Break (no classes)	
	10	Spring Break (no classes)	
	12	Spring Break (no classes)	
	15	motion of rigid bodies	Ch 12: sections 1-4
	17	torque, angular momentum	Ch 12: sections 5-8
	19	rolling, conservation of momentum	Ch 12: sections 9-11
	22	Newton's law of gravity	Ch 13: sections 1-4
	24	energy, satellite orbits	Ch 13: sections 5-6
	26	static properties of fluids	Ch 14: sections 1-4
	29	dynamic properties of fluids	Ch 14: sections 5-6
	31	simple harmonic motion	Ch 15: sections 1-4
April	2	pendulum	Ch 15: sections 5-6
	5	damped harmonic motion	Ch 15: section 5-8
	7	traveling waves	Ch 16: sections 1-4
	9	sound waves	Ch 16: sections 5-6
	12	Doppler effect	Ch 16: section 7-9
	14	standing waves	Ch 17: sections 1-4
	16	interference	Ch 17: sections 5-7
		Last Day to Submit Paper	
	19	beats	Ch 17: section 8
	21	make up lectures	
	23	make up lectures	

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26 make up lecture

28 **Final Examination** 7:00-9:30 PM, Wednesday, April 28, REIC 201

PHYSICS 211X LABORATORY

Room: 254 (REIC)

Laboratory Schedule

Please go to blackboard for your weekly lab schedule.