

Syllabus for College Physics II, PHYS 104X Spring 2019

Lecture

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

Laboratory (REIC 258)

34189 M 2:15-5:15 PM
34190 M 6:00-9:00 PM
34191 T 9:30-12:30 PM
34192 T 2:15-5:15 PM
34193 T 6:00-9:00 PM
34194 W 2:15-5:15 PM
34195 W 6:00-9:00 PM
36252 R 9:30-12:30 PM

Course: PHYS 104X

Course Type: In person classroom teaching and Laboratory

Instructor: Ataur R. Chowdhury

Office: REIC 118

Office Hours: MWF 2:00-3:30 PM

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

Prerequisites: PHYS 103X; placement in ENGL111x or higher; placement in DEVM 105 or higher; or permission of instructor.

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

Course Outline: **Coulomb's law**, electrical potential, capacitance, **Kirchoff's Laws**, magnetic field, **Faraday's Law**, **electromagnetic waves**, **physical and geometrical optics**, waves and particles, **atomic and nuclear physics**.

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.

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Course Objectives: To acquire a basic understanding of (1) the fundamentals of electricity and magnetism, (2) physical and geometrical optics, (3) foundations of modern physics, and (4) atomic and nuclear physics.

Student Learning Outcomes: At the completion of the course, students will gain

- (1) basic understanding of phenomena of electricity and magnetism,
- (2) familiarity with the laws that govern optical properties of materials,
- (3) basic understanding of concepts of modern physics,
- (4) firsthand knowledge of atomic and nuclear properties of materials,
- (5) hands-on experience performing lab experiment, and
- (6) critical knowledge of how to analyze and interpret experimental data.

Instructional methods: Interactive lecture based instruction

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:

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 as well as modern 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 ends, keeping cell phones in silent mode, and refraining from talking during the class.**

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Homework:

On the average, 8-12 problems/exercises/questions will be assigned each week on Fridays. The homework will be due back by 4:30 PM on Fridays the following week. There is a designated drop-box for PHYS 104X 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 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 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' questions pertaining to the subject material covered during the previous week. **Make-up quizzes, for valid reasons, may be arranged with approval from the instructor.**

Examinations:

There will be a midterm examination (March 4, Monday, 9:15-10:15 AM) and a final comprehensive examination (May 1, Wednesday, 8:00-10:00 AM, REIC 201) 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 all material covered in the semester, with more weight on material covered after the midterm.

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 and make-up rules, please consult the lab policy posted on the blackboard by the lab instructor Beth Robert.

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.

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Course Evaluation:

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

Homework	15%
Lab	15%
Midterm	15%
Quizzes	30%
<u>Final</u>	<u>25%</u>
Total	100%

The final grade for this course will be based on a curve. To be consistent with the university policy, any grade higher than 90% will be at least an A, any grade higher than 80% will be at least be a B, and so on. 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:

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).

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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.

Course Calendar:

Tentative Schedule

Lecture, Reading, Quizz and Exam

Dates	Topics	ReadinAssignment
Jan 14	syllabus, electric charge, Coulomb's Law	Ch 16: sections 1-4
16	electric field, Gauss's Law, DNA	Ch 16: sections 5-11
18	electrc potential, electrical energy	Ch 17: sections 1-5
21	AK Civil Rights Day (no classes)	
23	capacitance, energy storage, EKG	Ch 17: sections 7-10
25	electric current, Ohm's Law	Ch 18: sections 1-3
	Quizz # 1	
28	electric power, alternating current	Ch 18: sections 5-7
30	electrical conduction in human nervous system	Ch 18: sections 10
Feb 1	DC circuits and Kirchhoff's Rules	Ch 19: sections 1-3
	Quiz # 2	
4	capacitors, RC circuits	Ch 19: sections 5-7
6	circuits and Kirchhoff's Rules	Ch 20: sections 1-4
8	magnetic force, Ampere's Law	Ch 20: sections 5-8

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Quiz # 3

11	emf, Faraday's Law	Ch 21: sections 1-4
13	electric generator, transformer	Ch 21: sections 5-8
15	induction and inductance	Ch 21: sections 8-10

Quiz # 4

18	Maxwell's equations, EM waves	Ch 22: sections 1-2
20	light as EM waves, speed of light	Ch 22: sections 3-4
22	reflection of light, image formation	Ch 23: section 1-3

Quiz # 5

25	refraction of light, thin lenses	Ch 23: sections 4-7
27	combination of lenses	Ch 23: sections 8-9
Mar 1	wave nature of light, Huygens' Principle	Ch 24: sections 1-2

Quiz # 6

4	Midterm	
6	interference and diffraction of light	Ch 24: sections 3-6
8	camera, human eye, magnifying glasses	Ch 25: sections 1-3

11 **Spring Break** (no classes)

13 **Spring Break** (no classes)

15 **Spring Break** (no classes)

18	telescope, microscope, CT scan	Ch 25: sections 5-9
20	special relativity	Ch 26: sections 1-3
22	time dilation, length contraction	Ch 26: sections 4-5

Quiz # 7

25	relativistic momentum, mass, energy	Ch 26: sections 7-9
27	blackbody radiation, photoelectric effect	Ch 27: sections 1-3
29	Compton effect, interaction of radiation	Ch 27: sections 6-8

Quiz # 8

Apr. 1	electron microscope, Bohr Model	Ch 27: sections 9-12
3	quantum theory, uncertainty principle	Ch 28: sections 1-3

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5	quantum view of atoms and molecules Quiz # 9	Ch28: sections 5-8
8	overview of molecules and solids	Chapter 29
10	radioactive decays	Ch30: sections 1-6
12	half-life, detection of radiation Quiz # 10	Ch30: sections 8-13
15	nuclear energy, fission, fusion	Ch31: sections 1-3
17	measurement of radiation, MRI	Ch31: sections 5-9
19	elementary particles, antiparticles Quiz # 11	Ch 32: sections 1-6
22	charm, quarks, grand unified theory	Ch32: sections 8-12
24	universe and stellar evolution	Ch33: sections 1-3
26	expanding universe, big bang theory Quiz#12	Ch33: sections 5-7
29	Overview for final exam	
May 1	Final Examination (chapters 16-33), 8:00-10:00 AM, REIC 201	

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PHYSICS 104X LABORATORY

Room: 258 (REIC)

Laboratory Schedule

Please check on the blackboard for weekly schedule.