

SYLLABUS FOR PHYSICS 4B

REEDLEY COLLEGE

Physics 4B-55216
Mr. Timothy Evans

Office: N/A

Office Hours: N/A

Meeting Days: Tu/Th

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Physics for Scientists & Engineers II

Semester: Fall 2018

Meeting Room: PHY 70

Time: 5:00pm – 6:50 pm (Tu, Lecture), 7:00pm-8:50pm (Tu, Lab)
5:30pm –7:20pm (Th, Lecture)

COURSE DESCRIPTION: This course will deal with many physical concepts consistent with a second course in physics including: fluid and continuum mechanics, mechanical wave motion and vibrations, thermo dynamics and introductory statistical mechanics, and electromagnetism.

Basic Skills Advisories: ENGL 1A

Subject Prerequisites: Physics 4A, Mathematics 6 (Math 6 may be taken concurrently.)

REQUIRED TEXT: Douglas C. Giancoli, Physics for Scientists & Engineers, Pearson Education Publishing, 4th Edition, 2009.

REQUIRED MATERIALS: Mastering Physics is a required software for completing online homework assignments. This is part of the textbook package that you should have from Physics 4A. A **scientific calculator** is also recommended to have for in-class work and on exams.

ATTENDANCE: Students are expected to attend all class meetings, be on time, and be in class the entire class session. Calling me to tell me you will be absent **does not** excuse you. **STUDENTS LEAVING CLASS BEFORE THE END OF CLASS WILL BE COUNTED AS BEING ABSENT! Six (6) absences total or three (3) absences in the first three weeks of class** may result in a drop from the course. However, if you decide to drop the course, it is **your** responsibility to make the drop official in the Administrations and Records office or else possibly receive a grade of **F**.

Behavioral Standards: Your classmates and I would greatly appreciate that students in the class take care of any personal needs (i.e., using the restroom, getting a drink, sharpening a pencil) before class begins. Please turn your phone off when entering the class. You may not use your phone as a calculator. Do not bring guests to class.

NOTE: The deadline to drop for a refund is **August 24th**
The deadline to add a class is **August 31st**
The deadline to drop a class to avoid a “W” is **August 31st**
The final deadline to drop with a “W” is **October 12th**
Labor Day is **September 3rd** (Monday) and campus will be closed.
Veteran’s Day is **November 12th** (Monday) and campus will be closed.
Thanksgiving Break is **November 22nd-23rd** (Thursday/Friday) and campus will be closed.

TARDIES: Students are expected to be on time. It is distracting, rude and unfair to fellow classmates and to the instructor when a student is late. It is your responsibility to notify the instructor (on a break or after class) that you are present if you arrive after roll has been taken.

HOMEWORK: All homework problem sets will be through Mastering Physics, which is an online program. **Homework sets will be assigned every Monday at 11:59PM and due the following Tuesday at 11:59PM, starting from the first week!** I may assign an offline problem to go alongside the online homework, but I will notify you well in advance. In this case, the offline problem would be due the same day the online homework is due, but **IN CLASS. NO LATE HOMEWORK WILL BE ACCEPTED!**

Students are required to participate in all class discussions and activities. You may not start the homework during class. You may not study for another class or read a book during class.

LAB REPORTS: There will be 10 lab reports throughout the semester performed by groups of 2-4 students. These reports will be opportunities to apply theory and lecture material in physics experiments. Write-ups will be provided to students will be due at the end of the lab period or possibly by the next class meeting, depending on the assignment difficulty. It is important that you work with your group on these reports and understand all the content yourself as there may be a **pop quiz once or twice** throughout the semester that could govern part of your participation grade.

EXAMS: There will be 2 midterm exams during the semester. There are no makeup exams for missed tests. **NO EXCEPTIONS!** (The final exam can replace your lowest midterm exam score if the final exam score is higher!) You may use a 3" x 5" note card (both sides) for your own formula sheet on midterm exams and the final (you may write ANYTHING on here, formulas, practice problems, whatever helps you the most!) Exams will consist of 8-10 multiple choice problems (no scantron) and 2-3 free response questions. Only scientific calculators may be used.

FINAL EXAM: A two-hour comprehensive final exam worth 1 test will be given at the end of the semester during finals week. You are required to take the final exam; however, the final exam will replace your lowest test score if your final exam score is higher.

Date and Time of Final Exam: Tuesday, December 11th 500PM – 700PM, Room: PHY 70

GRADING:

HOMWORK (10%): There will be 15 homework problem sets throughout the semester. The homework percentage is calculated by taking your homework averages, which will give you a score between 0 and 100. This is 10% of your final grade.

EXAMS (45% total): All exam percentages will be averaged. This will give you a score between 0 and 100. Your exam score is worth 45% of your grade. The midterm exams will take place on Tuesdays and should only take between 90 minutes and two hours to complete, but I will give you 3 hours and 50 minutes to complete them.

LAB REPORTS (15%): Reports will be graded between 0 and 100 then averaged. Your lab reports are worth 15% of your grade.

PARTICIPATION (5%): Participation points will be governed by active participation in lab sessions with your group. A few short quizzes (approximately 5 minutes long) may be given to reinforce participation. Moreover, you will be required to perform at least one problem at the white board in front of the class to get the full participation grade!

Stellar participation by students may allow for their grade to **EXCEED** 5% for extra credit (up to 7.5%!)

FINAL EXAM (25%): The Final Exam will be worth 25% of your grade. The final exam will cover unit 3 and parts of unit 1 and 2, so it is essentially comprehensive, as most physics exams are. This exam will only be two hours in duration. If you score higher than your lowest midterm on the final exam, it will **replace** your lowest exam score!

Example Student: If your homework grade is 75, your midterm grade is 85, your lab report grade is 95, your participation grade is 100 and your final is 80, then you would compute your grade as follows:

$$(.10) (75) + (.45) (85) + (.15) (95) + (.05) (100) + (.25) (80) = 7.5 + 38.25 + 14.25 + 5 + 20 = 85$$

<u>Percent of Total Points</u>	<u>Grade</u>
89-100	A
78-88.99	B
65-77.99	C
55-64.99	D
0-54.99	F

Grades will not be “rounded” by percentage points.

WHERE TO FIND YOUR GRADE:

I will put your grades on Canvas. You can also calculate it yourself at any time using the method above.

SPECIAL NEEDS REQUESTS: If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact me as soon as possible.

Academic Dishonesty

Students at Reedley College are entitled to the best education that the college can make available to them, and they, their instructors, and their fellow students share the responsibility to ensure that this education is honestly attained. Because cheating, plagiarism, and collusion in dishonest activities erode the integrity of the college, each student is expected to exert an entirely honest effort in all academic endeavors. Academic dishonesty in any form is a very serious offense and will incur serious consequences.

Cheating is the act or attempted act of taking an examination or performing an assigned, evaluated task in a fraudulent or deceptive manner, such as having improper access to answers, to gain an unearned academic advantage. Cheating may include, but is not limited to, copying from another's work, supplying one's work to another, giving or receiving copies of examinations without an instructor's permission, using or is playing notes or devices inappropriate to the conditions of the examination, allowing someone other than the officially enrolled student to represent the student, or failing to disclose research results completely.

Plagiarism is a specific form of cheating: the use of another's words or ideas without identifying them as such or giving credit to the source. Plagiarism may include, but is not limited to, failing to provide complete citations and references for all work that draws on the ideas, words, or work of others, failing to identify the contributors to work done in collaboration, submitting duplicate work to be evaluated in different courses without the knowledge and consent of the instructors involved, or failing to observe computer security systems and software copyrights.

Incidents of cheating and plagiarism may result in any of a variety of sanctions and penalties, which may range from a failing grade on a particular examination, paper, project, or assignment in question to a failing grade in the course, at the discretion of the instructor and depending on the severity and frequency of the incidents.

Class Cancellation Notification

If I must cancel class for reasons beyond my control, I will inform the Dean's office as soon as possible and there will be an official notification posted on the door. You can also check on the Reedley College website where the administration updates what classes are cancelled. Finally, Canvas will be used to inform you of a class cancellation, which you can check online or on your cell phone if you download the app for your mobile phone. Please note that it is unlikely that I will be cancelling any classes, we have too much to do! If it has been a few minutes and I have not shown up, please do not leave as if I am running late I will inform the prior instructor and they will let you know where I am and how long I will be. Please note again that I will probably not be late either, but this is just in case!

Course Objectives

In the process of completing this course, students will:

- Complete assignments and lab reports outside of class requiring the application of concepts studied in class.
- Develop new ideas using previously held knowledge as their foundation.

- Use problem solving processes developed in this course requiring sound reasoning skills that enhance responsible decision-making.
- Use the appropriate language of physics and mathematics in order to solve problems in physics.
- Use the scientific method for experiments illustrating basic ideas in physics, producing results which must be compared and/or correlated with what has been presented in class lectures.

Course Outcomes

Upon completion of this course, students will be able to:

1. Apply basic concepts and fundamental laws in electricity and magnetism.
2. Understand the relationship between temperature and molecular kinetic energy.
3. Apply basic concepts and fundamental laws in thermodynamics, electricity, and magnetism.
4. Apply the First Law of Thermodynamics.
5. Calculate the electric potential of various charge configurations.
6. Determine the capacitance of various electrical systems.
7. Differentiate the heat transfer mechanisms of conduction, convection, and radiation.
8. Relate electric field and electric potential.
9. Solve basic problems involving electrical circuits.
10. Solve basic problems in thermal expansion.

COURSE CONTENT OUTLINE:

Unit 1 (Fluid Dynamics, Wave Motion, Oscillations) — Material for Exam 1 Date for Exam 1: Tuesday, September 25th (5:00PM – 8:50PM in PHY 70)

- A) Review of Fluids (Giancoli Ch 13)
 - 1) Pressure / States of Matter
 - 2) Hydrostatics / Buoyancy
 - 3) Hydrodynamics

- B) Oscillations, Waves, and Sound (Giancoli, Ch 14/15/16)
 - 1) Spring Oscillations / Simple Harmonic Motion
 - 2) Energy of SHM
 - 3) Pendulum Motion
 - 4) Damped and Forced Oscillations
 - 5) Wave motion
 - 6) Mathematical Representation of Waves
 - 7) Standing Waves, Interference, and Resonance
 - 8) Longitudinal Waves, Sound Characteristics
 - 9) Intensity and Sources of Sound
 - 10) Beats and Doppler Effect

Unit 2 (Thermodynamics) — Material for Exam 2

Date for Exam 2: Tuesday, November 6th (5:00PM – 8:50PM in PHY 70)

- C) Thermal Expansion, Temperature, and Kinetic Theory (Giancoli Ch 17/18)
 - 1) Atomic Theory / Temperature
 - 2) Zeroth Law of Thermodynamics
 - 3) Thermal Expansion, Ideal Gas Law
 - 4) Molecular Interpretation
 - 5) Distribution of Molecular Speeds

- D) Heat and the First/Second Laws of Thermodynamics (Giancoli Ch 19/20)
 - 1) Heat as Energy Transfer
 - 2) Specific Heat
 - 3) Calorimetry
 - 4) Latent Heat
 - 5) Thermal Work
 - 6) Heat Transfer
 - 7) Heat Engines // Carnot Cycle
 - 8) Entropy

Unit 3 (Electrostatics) — Additional Material for Final Exam
Date for Final Exam: Tuesday, December 11th (5:00PM – 7:00PM in PHY 70)
The Final Exam will be comprehensive but will focus on Unit 3.

- E) Electric charges and Electric Fields (Giancoli Ch 21)
 - 1) Static Electricity and Conservation of Charge
 - 2) Atomic Charge
 - 3) Insulators and Conductors
 - 4) Coulomb's Law // Electric Fields
 - 5) Electric Field Lines

- F) Gauss's Law (Giancoli Ch 22)
 - 1) Electric Flux
 - 2) Gauss's Law and Applications

- G) Electric Potential and Capacitance (Giancoli Ch 23, 24)
 - 1) Potential Energy vs. Potential
 - 2) Point Charges vs. Distributions
 - 3) Equipotential Surfaces
 - 4) Capacitors

- H) Introduction to Circuits* (Time permitting) (Giancoli Ch 25, 26)
 - 1) Electric Batteries
 - 2) Current & Resistance
 - 3) Household Circuits & Microscopic Theory

- 4) EMF and Terminal Voltage
- 5) Adding Resistors in Series/Parallel
- 6) Kirchoff's Rules
- 7) RC Circuits

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EXAM 1 — Tuesday, September 25th (5:00PM – 8:50PM in PHY 70)

EXAM 2 — Tuesday, November 6th (5:00PM – 8:50PM in PHY 70)

FINAL EXAM — Tuesday, December 11th (5:00PM – 7:00PM in PHY 70)