PHYS 4A - Physics for Scientists and Engineers
Fall 2021
Section #55059

Class Format:
Hybrid; Online, plus face-to-face meetings on Wednesdays from 1:00 pm to 3:50 pm in PHY 70.

Optional Additional Meeting:
Mondays, 1:00-2:50pm, PHY-70 (Starting on Week 2)
- This will generally be a problem-solving session to review that week's textbook problems and to answer any questions.

Instructor:
Dr. John Heathcote
Office:
FEM-4A
Phone:
(559) 494-3000 ext. 3215
e-mail:
john.heathcote@reedleycollege.edu

Office Hours:
M W 9:00-9:50am
T Th F 10:00-10:50am

If you cannot make regular office hours, feel free to make an appointment.

Course Communication Policy:
My instructions to you each week will be posted in a weekly module. Be sure to read through all instructions posted in the module so that you fully understand what you need to complete each week. (Do not simply look at assignments posted in your course calendar. You will miss some important instructions if you do that.)

I will send Canvas messages regularly to keep you updated on the progression of the class and any important announcements. You will need to read these to stay informed about the class.

Please contact me with any questions or concerns you have about this class. Come to my office hours or contact me through a Canvas message. I will reply within 24 hours on weekdays. I may be able to respond on weekends as well, but it is not guaranteed. (If I do not respond within 24 hours, please resend your message.)

Corequisite:
MATH 5B
Advisory:
ENGLISH 1A

Introduction:
Welcome to your first course in Calculus-Based Physics!

I would like to welcome you to PHYS 4A! In this course, you will learn the first topics in physics, including laws of motion, forces, work, energy, momentum, and many other topics. This course will use mathematics (algebra, trigonometry, and calculus) as a tool in analyzing and solving physics problems.

Physics is my favorite science. In physics, we aim to understand and describe the universe around us – everything from how the stars and galaxies form and evolve down to how subatomic particles interact. This course will mostly involve more everyday size scales that you deal with every day, such as how a ball flies through the air or how your car speeds up and slows down. In the end, you should have an appreciation for the physics that surrounds you every day and be prepared for more advanced classes in science and engineering!

I look forward to working with you in this class! This is a challenging topic, but we can work together so that you can be successful!

Catalog Description:
The topics covered in this course include: classical mechanics, properties of matter, gravitation, fluid mechanics, oscillatory motion and mechanical waves.

Required Textbook:
<u>Physics for Scientists and Engineers, with Modern Physics</u>, Douglas Giancoli, 4th Edition, Pearson

- This is a rather large and extensive book, but it will be the same book you will use in PHYS 4A, 4B, and 4C.
- Although a new book is very expensive, there are many cheaper, used books available online.
- If you only plan on taking PHYS 4A, you can purchase a smaller book labeled as "Volume 1". However, if you plan on continuing with the other courses in the sequence, you will want to purchase the full version.

Grading:
60%   Tests
20%   Assignments and In-Class Problems
20%   Lab Activities and Reports

Tests:
There will be <u>five tests</u> during the term. These tests will be taken during our Wednesday class meetings. The rules for what is allowed will be announced before each test. Each test will cover topics from the most recent chapters. The final test will include both topics from the recent chapters and cumulative material from the entire semester.

Assignments and In-Class Problems:
Problems from the textbook will be assigned in order to practice the concepts and problem-solving skills taught in class. These will be handwritten assignments that you will scan and submit as a pdf files. You are required to show complete diagrams and full working of your problem solving for each assignment. Grades will be based upon completion of the problems. (I will not check each problem to see if you are correct. It is your responsibility to check your work against the answers given in the textbook.) Textbook assignments will generally be due each Monday.

In addition, we will use a portion of our time on most Wednesdays to also practice other problems. You will work with other students to solve these problems, and I will be available to answer your questions. These problem sets will be graded for accuracy. You will scan your work and submit a pdf file.

Proper Approach to Assignments:
Physics assignments can be very challenging. There are often no easy step-by-step directions that are followed every time. Instead, you need to use critical thinking and develop problem-solving skills. I encourage you to talk to your classmates to discuss these problems and help each other. You will find that the solutions to the textbook problems are available at many locations online. You are allowed to look at these solutions as you complete your assignments, but use them wisely. The goal of completing an assignment is to learn the concepts and problem-solving techniques. If you blindly copy a solution, you will not learn these. Instead, use them as a final resort and then, only use them to help you better understand how to proceed. Make sure that you can actually solve that problem on your own the next time.

Lab Activities and Reports:
Most weeks, we will meet for a lab during our scheduled Wednesday lab period. You will complete the lab activity and then submit a worksheet based upon your results.

Late Work Policy:
Please do your best to keep up with this course. You will not receive full credit for tasks completed after the due date. Assignments and projects will be accepted after the deadline. However, your grade will drop by 2% for each day that you are late.

HOWEVER, I do understand that circumstances to come up. If you have a good reason to ask for an extension for a task, please communicate that to me as early as possible. Depending on the situation, I will consider an extension for you.

Grading Scale:
90-100%   A
80-89.9%   B
70-79.9%   C
60-69.9%   D
<60%   F

Attendance and Drop Policy:
If you are absent at our first class-meeting on Wednesday, August 11, you will be dropped as a no show. In addition, if you miss two of our class meetings, you may be dropped. (However, if you plan on dropping the course, it is your responsibility to drop.)

Accommodations for Students with Disabilities:
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.

Add Date:	Friday, August 27	Last day to add a course
Drop Date:	Friday, October 8	Last day to drop this course
Holidays:	Monday, September 6	Labor Day
	Thursday, November 11	Veterans' Day
	Thursday-Friday, November 25-26	Thanksgiving Holiday
Final:	**Monday**, December 6, 1:00-2:50pm	

Student Learning Outcomes:
Upon completion of this course, students will be able to:
1. Apply algebra, trigonometry, and first-year calculus to solve physical problems such as: 1. Kinematic equations 2. Vector quantities 3. Newton's Laws 4. Conservation of energy and momentum 5. Rotating bodies 6. Gravity 7. Oscillatory motion 8. Mechanical waves
2. Apply dimensional analysis to determine the units for an unknown quantity or to check the validity of equations.
3. Correctly report the units of an observable when it is measured or calculated.
4. Distinguish between important physical observables, such as mass and weight or speed and velocity.
5. Identify the complementary roles of experimental investigation and theoretical explanation in science.