

PHYSICS 4A: PHYSICS FOR SCIENTISTS AND ENGINEERS

COURSE AND INSTRUCTOR INFORMATION:

Semester: Spring 2021
Title: Physics for Scientists and Engineers
Units: 4.00 CEUs
Hours: 4 lecture, 3 lab hours
Time: Asynchronous
Location: 100% Online
Instructor: Kylee Jo Ford
Email: kylee.ford@reedleycollege.edu (Please give me 24 – 48 hours to reply)
Office Hours: Virtual and by appointment/email/Zoom only

COURSE DESCRIPTION:

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

PREREQUISITES:

Math 5B. Advisories: English 1A.

STUDENT LEARNING OUTCOMES:

- ✓ Experience the interaction between theory and experiment in scientific investigation.
- ✓ Learn fundamental laboratory techniques.
- ✓ Learn to solve problems in oscillatory motion.
- ✓ Study the laws of fluid mechanics.
- ✓ Learn the basic concepts of mechanical waves.
- ✓ Learn to solve basic problems in classical mechanics.
- ✓ Study important properties of matter.
- ✓ Improve mathematical skills through the process of applying mathematics to the physical world.

CSLOs:

PHYS-4A SLO1: 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

PHYS-4A SLO2: Apply dimensional analysis to determine the units for an unknown quantity or to check the validity of equations.

PHYS-4A SLO3: Correctly report the units of an observable when it is measured or calculated.

PHYS-4A SLO5: Distinguish between important physical observables, such as mass and weight or speed and velocity.

PHYS-4A SLO4: Identify the complementary roles of experimental investigation and theoretical explanation in science.

REQUIRED COURSE MATERIALS:

Textbook: University Physics available here: [University Physics](#)

Lab – Pivot Interactives: \$10 lab simulation one-time purchase

<https://www.pivotinteractives.com/>

OTHER MATERIALS:

- iPad or Tablet: Lots of students these days are using iPads and tablets, which are great because your work can be written digitally and uploaded immediately instead of having to take pictures or scan your work, expensive though.
- Traditional pencil and paper: You definitely need to write out your notes and your work (I also recommend making a notebook of your homework solutions) so if you don't have access to a tablet, pencil and paper are great! I personally use blank white paper, but graph paper, engineering paper, or lined paper are just fine.
- Scientific Calculator: A calculator is a nice tool to have and to be comfortable with. But there are other programs you can use when doing your homework such as:
 - [Wolfram Alpha](#)
 - [Math is Fun](#)
 - You can't use these other programs on the exam though, so practice using a calculator!

ATTENDANCE:

It is important to watch videos uploaded, as this will be the lecture portion.

PROGRESS QUIZZES/PARTICIPATION:

Each week there will be a Progress Quiz due (unless otherwise stated on the schedule).

These quizzes are based on the lecture videos for the week. This is also how I will take attendance.

HOMEWORK:

Homework should be done by the end of each week and turned in on Canvas. You must do the homework on either paper or on a tablet, as discussed above, and upload as a PDF, WORD, PNG, or JPEG file. Any other format will not be accepted. I will provide study guides for the midterm exams and the final exam, which will also be graded as homework.

LABORATORY REPORTS:

Lab reports will be done using a WORD document, which will be given to you in the assignment description. You will use Pivot Interactives and PhET (I will give you the websites each lab) to complete labs throughout the course.

EXAMS:

There will be two midterm exams and one cumulative final. They will be based on lecture, quizzes, discussions, homework, and labs.

COURSE POLICIES:

Communication:

If you ever need to reach me, consider one of the following options to do so. Please give me 24 – 48 hours to respond and I will respond as soon as I am able. When messaging me, please identify yourself with your full name and the course which you are enrolled (ex. “Kylee Ford, PHYS 4A”).

- Message me using the “Inbox” tab on Canvas.
- Email me directly.
- Office Hours are virtual (through Zoom) and will be determined through a poll.

Attendance and Drop Policy:

- Module 1 (Introduction to the course) must be done by the due date in order to keep enrollment in the course. If you do not complete this module by the due date, you will be dropped you from the course.
- Attendance will be taken through the participation in discussion boards. These will be weekly. Remember, attendance is mandatory, so if you do not participate in these discussions, it is as if you did not attend class.
- You must do all lab activities assigned and turn in by the due date. Attendance in lab is mandatory, so you must do the activity to show you attended, as you would in-person.

Late Work Policy:

- Late work will only be accepted unless the student has a compelling reason AND has reached out to the instructor beforehand. Late work may be accepted with a documented and compelling reason.
- A 2-day late period will be accepted for Homework assignments, but at a reduced 10% per day it is late.
- There will be no late exams.
- Missing the final exam may result in a failing grade for the course.

GRADING:

Object	Weighted Grades
Progress Quizzes/Participation	10%
Homework	15%
Laboratory	20%
Midterm Exams	30% (15% each exam)
Final Exam	25%
Total	100%

Grade	Percentage
A	90.0 – 100.0%
B	80.0 – 89.99%
C	70.0 – 79.99%
D	60.0 – 69.99%
F	<60.0%

GENERAL COURSE OUTLINE:

Each module is one week, unless otherwise stated.

Date	Module Topic	Deliverable (Homework, Labs, Quizzes, Exams)
1/11 – 1/17	Module 0: Introduction to the Course	Introduce Self, HW 0 Set-up Canvas, Quiz 0
1/18 – 1/24	Module 1: Units, Mathematics Review	HW 1, Quiz 1
1/25 – 1/31	Module 2: Motion Along a Straight Line	HW 2, Quiz 2, Lab 1
2/1 – 2/7	Module 3: Motion in Two and Three Dimensions	HW 3, Quiz 3, Lab 2
2/8 – 2/14	Module 4: Newton's Laws of Motion	HW 4, Quiz 4, Lab 3
2/15 – 2/21	Module 5: Applications of Newton's Laws; Midterm Exam 1 Review	HW 5, Quiz 5, Lab 4
2/22 – 2/28	Exam 1	Study Guide, Exam 1
3/1 – 3/7	Module 6: Work and Kinetic Energy	HW 6, Quiz 6, Lab 5
3/8 – 3/14	Module 7: Potential Energy and Conservation of Energy	HW 7, Quiz 7, Lab 6
3/15 – 3/21	Module 8: Linear Momentum and Collisions	HW 8, Quiz 8, Lab 7
3/22 – 2/28	Module 9: Fixed Axis Rotation	HW 9, Quiz 9, Lab 8
3/29 – 4/4	SPRING BREAK	
4/5 – 4/11	Module 10: Angular Momentum	HW 10, Quiz 10, Lab 9

4/12 – 4/18	Module 11: Static Equilibrium and Elasticity; Midterm Exam 2 Review	HW 11, Quiz 11, Lab 10
4/19 – 4/25	Exam 2	Study Guide, Exam 2
4/26 – 5/2	Module 12: Gravitation	HW 12, Quiz 12, Lab 11
5/3 – 5/9	Module 13: Fluid Mechanics	HW 13, Quiz 13, Lab 12
5/10 – 5/16	Module 14: Waves and Acoustics, Final Exam Review	Study Guide
5/17 – 5/20	Final Exam	Final Exam