

PHYSICS 4A: PHYSICS FOR SCIENTISTS AND ENGINEERS

COURSE AND INSTRUCTOR INFORMATION:

Semester: Spring 2022 (53878)
Title: Physics for Scientists and Engineers
Units: 4.00 CEUs
Hours: 3 lecture, 3 lab hours
Time: Lecture Asynchronous, Lab Tuesday 8:00 AM – 10:50 AM
Location: Lecture Hybrid and Online, Lab PHY 70
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: OpenStax University Physics Volume 1 available here: [University Physics \(https://openstax.org/details/books/university-physics-volume-1\)](https://openstax.org/details/books/university-physics-volume-1)

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. I will be taking attendance through Canvas. Lab attendance is mandatory.

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.

HOMEWORK:

Homework should be done by **beginning of lab** to be turned in at the beginning of lab, unless otherwise noted. You must do the homework on paper with **pencil**.

The homework assignments will be posted on Canvas and may require you to watch a video (ex. Crash Course Physics) and answering some questions on the material. There will also be reading guides and homework questions based on the required reading for each module. This reading will typically consist of sections of the textbook, but other sources may be used. No late homework will be accepted.

If any circumstances change, you will need to upload the homework on Canvas as either a PDF or WORD document. Any other format will not be accepted.

LABORATORY REPORTS:

Lab is mandatory and will be done in class. Further instruction for each lab will be given in the modules and in class.

EXAMS:

There will be two exams and one cumulative final. They will be based on lecture, quizzes, homework, and labs. More detailed information on exams will be provided as the exams get close.

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 0 (Introduction to the course) must be done by the due date to keep enrollment in the course. If you do not complete this module by the due date, you will be dropped from the course.
- Attendance will be taken through the participation. Remember, **attendance is mandatory**, so if you do not participate in class and quizzes, 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.

STUDENT SUCCESS:

- Technology Support: <https://www.reedleycollege.edu/campus-life/technology-help.html>

- Tutoring Services: <https://www.reedleycollege.edu/academics/tutoring-services/index.html>
- COVID-19 information is uploaded to the Reedley College site: <https://www.reedleycollege.edu/covid-19/index.html>
- DSPS contact information:
 - Hours: Monday – Friday 8:00 am – 5:00 pm
 - Phone: 559-638-0332
 - See more DSPS information here: <https://www.reedleycollege.edu/student-services/disabled-student-programs-and-services/index.html>

GRADING:

Weighted Grades:

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

Grading Scale:

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. In each module, there will be one to a few chapters that will be covered within the week.

Date	Module Topic	Deliverable (Homework, Labs, Quizzes, Exams)
1/10 – 1/14	Module 0: Introduction to the Course	Introduce Self, HW 0 Set-up Canvas, Quiz 0
1/17	<i>Martin Luther King Jr. Day</i>	
1/18 – 1/21	Module 1: Units; Mathematics Review (Ch. 1, 2)	Quiz 1
1/24 – 1/28	Module 2: Motion Along a Straight Line (Ch. 3)	HW 1, Quiz 2, Lab 1
1/31 – 2/4	Module 3: Motion in Two and Three Dimensions (Ch. 4)	HW 2, Quiz 3, Lab 2
2/7 – 2/11	Module 4: Newton's Laws of Motion (Ch. 5) & Applications (Ch. 6), Review for Exam 2	HW 3, Quiz 4, Lab 3
2/14 – 2/17	Exam 1	HW 4, Study Guide, Exam 1
2/18	<i>Lincoln Day</i>	
2/21	<i>Washington Day</i>	
2/22 – 2/25	Module 5: Work and Kinetic Energy (Ch. 7)	Quiz 5, Lab 4
2/28 – 3/4	Module 6: Potential Energy and Conservation of Energy (Ch. 8)	HW 5, Quiz 6, Lab 5
3/7 – 3/11	Module 7: Linear Momentum and Collisions (Ch. 9)	HW 6, Quiz 7, Lab 6
3/14 – 3/18	Module 8: Fixed Axis Rotation (Ch. 10)	HW 7, Quiz 8, Lab 7
3/21 – 2/25	Module 9: Angular Momentum (Ch. 11)	HW 8, Quiz 9, Lab 8
3/28 – 4/1	Review for Exam 2	HW 9
4/4 – 4/8	Exam 2	Study Guide, Exam 2
4/11 – 4/15	<i>Spring Break</i>	
4/18 – 4/22	Module 10: Static Equilibrium and Elasticity (Ch. 12)	Quiz 10, Lab 9
4/25 – 4/29	Module 11: Gravitation (Ch. 13)	HW 10, Quiz 11, Lab 10
5/2 – 5/6	Module 12: Fluid Mechanics (Ch. 14)	HW 11, Quiz 12, Lab 11
5/9 – 5/13	Module 13: Waves and Acoustics, Final Exam Review	Study Guide
5/16 – 5/20	Final Exam	Final Exam

*Note: This syllabus, including the course outline, is subject to change.