

PHYSICS 4A: PHYSICS FOR SCIENTISTS AND ENGINEERS

COURSE AND INSTRUCTOR INFORMATION:

Semester: Spring 2024 (50061)
Title: Physics for Scientists and Engineers
Units: 4.00 CEUs
Hours: 3 lecture, 3 lab hours
Time: Lecture Asynchronous, Lab Thursday 5:00 PM – 7:50 PM
Location: Lecture Online, Lab in PHY 70
Instructor: Kylee 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:

Co-Requisite: Mathematics 5B.
Advisory: English 1A or 1AH.

COURSE OBJECTIVES:

In the process of completing this course, students will:

- ✓ Experience the interaction between theory and experiment in scientific investigation and fundamental physics laboratory techniques.
- ✓ Study the laws of Newtonian Mechanics, Conservation Laws, Fluid Mechanics, Oscillations & Waves.
- ✓ Improve mathematical skills through the process of applying mathematics to the physical world.

STUDENT LEARNING OUTCOMES:

Upon successful completion of the course, students will be able to:

- ✓ 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
- ✓ Identify the complementary roles of experimental investigation and theoretical explanation in science.
- ✓ Apply dimensional analysis to determine the units for an unknown quantity or to check the validity of equations.

REQUIRED COURSE MATERIALS:

Textbook: OpenStax University Physics Volume I available here:

<https://openstax.org/books/university-physics-volume-1/pages/1-introduction>

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: [Desmos](#), [Wolfram Alpha](#) and [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 and in person during lab. **Lab attendance is mandatory.**

- Notes on Lab Attendance: You will not be allowed to make up labs without reasonable notification and credible supporting documentation of legitimate reasons (doctor's note, obituary, etc.). A missed lab can greatly affect your grade. **Three missed labs = failing the course.**

PARTICIPATION:

Participation is based on your participation during class. I will be keeping track of this using online discussions, labs, and review days.

PROBLEM SOLVING:

Problem solving assignments will be posted on Canvas and will consist of you doing the work on your own time. These will be due at the end of each week and will require you **to turn them in as a .pdf, .docx, .png, or .jpg through Canvas**. Make sure to upload all work in your own handwriting. Late work will not be accepted.

HOMEWORK:

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. Homework should be done by the **provided due date set on Canvas**. No late homework will be accepted.

LABORATORY REPORTS:

Lab is mandatory and will be done in class. Each lab is **due at the end of the class period**, unless otherwise stated. Complete all lab assignments neatly in pencil so that you can cleanly erase any mistakes. Show all your work, where relevant. Further instruction for each lab will be given in the modules and in class.

EXAMS:

There will be three exams and one cumulative final. They will contain multiple choice and free response questions. 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.

- Come by during Office Hours.

Attendance and Drop Policy:

- Module 0 (Introduction to the Course) must be done by the due date on Canvas 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. Attendance in lab is mandatory. Remember, **three missed labs = failing the course**.

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.** If you contact me prior to the exam with a documented and compelling reason, we may be able to work out a time before the scheduled exam.
 - Note: If you have a documented and compelling reason the week of the exam and know you cannot make it, you must schedule a time to take the exam within a week of the exam (meaning this needs to be done within a reasonable timeframe).
- **There will be no late final exam.** Missing the final exam may result in a failing grade for the course.

Academic Dishonesty Policy:

- 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:

- 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, in an attempt 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 displaying 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:

- 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 the 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.

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
Participation	5%
Problem Solving	15%
Homework	5%
Laboratory	20%
Exams	30%
Final Exam	25%
Total	100%

Grading Scale:

Grade	Percentage
A	90.0 – 100.0%
B	80.0 – 89.9%
C	70.0 – 79.9%
D	60.0 – 69.9%
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.

Week	Dates	Reading	Lecture - Online	Lab - Thursdays in PHY 70
Week 1	1/8 – 1/14		Introductions	Lab 0 - Mathematics Review
Week 2	1/15 – 1/21	Ch. 1 - 2	Measurement, Estimating, Vectors; <i>Martin Luther King, Jr. Day (1/15) No Classes Held</i>	Lab 1 - Measurements
Week 3	1/22 – 1/28	Ch. 3	Describing Motion: Kinematics in One Dimension	Lab 2 - Graph Matching
Week 4	1/29 – 2/4	Ch. 4	Kinematics in Two or Three Dimensions	Lab 3 - Projectile Motion
Week 5	2/5 – 2/11		Exam 1 Review	Study Session
Week 6	2/12 – 2/18	Ch. 5	Dynamics: Newton's Laws of Motion; <i>Lincoln Day (2/16) No Classes Held</i>	Exam #1 (Ch. 1 – 4)

Week 7	2/19 – 2/25	Ch. 6	Using Newton's Laws: Friction, Circular Motion, Drag Forces; Washington Day (2/19) No Classes Held	Lab 4 - Vector Addition
Week 8	2/26 – 3/3	Ch. 7	Work and Energy	Lab 5 - Measuring Frictional Forces
Week 9	3/4 – 3/10	Ch. 13	Gravitation and Newton's Synthesis	Study Session
Week 10	3/11 – 3/17		Exam 2 Review	Exam #2 (Ch. 5 – 7, 13)
Week 11	3/18 – 3/24	Ch. 8	Potential Energy and Conservation of Energy	Lab 6 - Determining g on Inclined Plane
Week 12	3/25 – 3/31		Spring Break (3/25 - 3/29)	NO CLASS
Week 13	4/1 – 4/7	Ch. 9	Linear Momentum and Collisions	Lab 7 - Ballistic Pendulum
Week 14	4/8 – 4/14	Ch. 10 - 11	Rotational Momentum; Angular Momentum	Lab 8 - Collisions
Week 15	4/15 – 4/21	Ch. 12	Static Equilibrium; Elasticity and Fracture	Lab 9 - Center of Mass/Torque
Week 16	4/22 – 4/28	Ch. 14	Fluids	Study Session
Week 17	4/29 – 5/5		Exam 3 Review	Exam #3 (Ch. 8 – 11)
Week 18	5/6 – 5/12		Final Exam Review	Study Session
Week 19	5/13 – 5/17		Finals Week	Final Exam

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