

COURSE SYLLABUS

University Physics I

GENERAL COURSE INFORMATION

Course Number: PHYS 2425

Course Title: University Physics I

Course Description: Lecture: Fundamental principles of physics, using calculus, for science, computer science, and engineering majors; the principles and applications of classical and modern mechanics, including harmonic motion, physical systems, and the laws of thermodynamics; and emphasis on problem solving. Lab: Basic laboratory experiments supporting theoretical principles presented in the lecture section involving the principles and applications of classical mechanics, including harmonic motion and physical systems; experimental design, data collection and analysis, and preparation of laboratory reports. Lab required.

Course Credit Hours: 4

Lecture Hours: 3

Lab Hours: 3

Prerequisite: MATH 2413 equivalent within the last five years with a grade of "C" or better

Prerequisite/Concurrent Enrollment: MATH 2414 equivalent

Student Learning Outcomes:

- **State-mandated Outcomes:** Upon successful completion of this course, students will:

Lecture

1. Determine the components of linear motion (displacement, velocity, and acceleration), and especially motion under conditions of constant acceleration. (Critical Thinking; Empirical/Quantitative)
2. Solve problems involving forces and work.
3. Apply Newton's laws to physical problems.
4. Identify the different types of energy.
5. Solve problems using principles of conservation of energy.
6. Define the principles of impulse, momentum, and collisions.
7. Use principles of impulse and momentum to solve problems.
8. Determine the location of the center of mass and center of rotation for rigid bodies in motion.
9. Discuss rotational kinematics and dynamics and the relationship between linear and rotational motion.
10. Solve problems involving rotational and linear motion.
11. Define equilibrium, including the different types of equilibrium.
12. Discuss simple harmonic motion and its application to real-world problems.
13. Solve problems involving the First and Second Laws of Thermodynamics.

Lab

1. Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner. (Communication Skills; Teamwork)
 2. Conduct basic laboratory experiments involving classical mechanics.
 3. Relate physical observations and measurements involving classical mechanics to theoretical principles.
 4. Evaluate the accuracy of physical measurements and the potential sources of error in the measurements.
 5. Design fundamental experiments involving principles of classical mechanics.
 6. Identify appropriate sources of information for conducting laboratory experiments involving classical mechanics.
- **Additional Collin Outcomes:**
 1. Use the basic SI units of measurement in problem solving.
 2. Solve problems involving the theoretical derivation of relationships and equations using calculus.
 3. Solve problems in kinematics and dynamics.
 4. Apply vector analysis to appropriate problems.
 5. Analyze and solve problems involving energy and work.
 6. Analyze and solve problems using the concepts of momentum and collisions.
 7. Solve problems involving the basic principles of fluid dynamics.
 8. Solve problems involving heat and the laws of thermodynamics.
 9. Explain and utilize the concepts of wave motion and sound
 10. Demonstrate the proper collection, analysis, and reporting of scientific data

Withdrawal Policy: See the current *Collin Registration Guide* for last day to withdraw.

Collin College Academic Policies: See the current *Collin Student Handbook*.

Americans with Disabilities Act Statement: Collin College will adhere to all applicable federal, state and local laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to contact the ACCESS office, SCC-D140 or 972.881.5898 (V/TTD: 972.881.5950) to arrange for appropriate accommodations. See the current *Collin Student Handbook* for additional information.

INSTRUCTOR INFORMATION

Instructor's Name: Meade Brooks

Office Number: 213 Lawler Hall, Preston Ridge Campus, Science Building

Office Hours: My office hours are online. I will be specifically monitoring course Canvas communications (Mail and Discussions) from 6-10 pm Tuesday evenings.

Phone Number: 972-377-1640 (do not leave voicemail, email instead)

Email: mbrooks@collin.edu

Class Information:

Section Number: BP1

Meeting Times/Location: This is a Blended Course with an online lecture accompanied by a lab. Except for the final exam (given in the Preston Ridge Testing Center), the lecture is entirely online. The lab is 50% online and will meet on-campus on Friday's for a total of three meetings (from 8:00 AM - 12:00 PM in room LH227 at the Preston Ridge Campus).

Technology Requirements: This course uses a variety of online technologies. For detailed information on the minimum technology requirements for this course and other related information, visit the eCollin Learning Center at:

<http://www.collin.edu/academics/ecollin/index.html>

Minimum Student Skills: Students should have the attributes, skills and knowledge necessary for success in this online course including: self-motivation, good time-management skills, self-discipline, good reading comprehension, persistence, available time, ability to use a laptop, printer, software, and the Internet.

Find out if you are ready to take an online course by completing the readiness assessment SmarterMeasure (http://online.collin.edu/eLC_smartermeasure.html). This is an important tool that helps determine your skills for taking an online course. From the SmarterMeasure assessment, you will discover information about your:

- Reading Speed and Comprehension
- Technical Competency and Knowledge
- Typing Speed and Accuracy
- Personal Attributes that relate to distance learning success

Netiquette Expectations: Sensitive discussion topics may be brought up in this class, so please think carefully before responding. Keep these guidelines in mind:

- Standards of courtesy and respect must be maintained at all times in our online "classroom." Join in to the discussion, but remember that this is still a "classroom" setting and that respect and consideration are crucial for any intellectual discussion.
- Discussion areas are the place for intelligent and respectful airing of ideas. Name-calling and personal attacks are not permitted.

- Any violation of the standards of appropriate behavior online will be reported to the Dean of Students and appropriate disciplinary action will be taken by the college.

A good rule of thumb is that you should never post a response online that you would not be willing to say in person. Once the course begins, please use your Canvas communication tools to contact Professor Brooks.

COURSE RESOURCES:

You will need to purchase **three** primary resources for this course:

1. *Digital Course Textbook*
2. *Online Homework Assignment Account*
3. *Lab Simulation Package*.

These resources must be purchased **online** at the [Kinetic Books](#) bookstore.

(1) Digital Course Textbook:

This course uses a digital physics text book developed by Kinetic Books. The book title is Physics for Scientists and Engineers and must be purchased at the Kinetic Books web site (cost is \$64.95). All “lectures” in this course are given by the student reading and interacting with the digital textbook.

The digital physics textbook contains the usual textual information found in most physics books that outline and explain physics concepts. However, the Kinetic Books digital physics textbook is unique in that woven into the digital text are animations, audio & video information, interactive examples & practice problems, and games. You will access the digital textbook online at the Kinetic Books web site.

Students should purchase their digital textbook before the start of the semester. These are available for purchase at the Kinetic Books on-line store via credit card [here](#). The textbook version to purchase is the [Physics for Scientists and Engineers-1-Year License](#). An email will be sent to you with your account information after your order is submitted. This license is valid for one calendar year from the date of purchase. Note that a printed textbook and solutions guide is also available.

(2) Online Homework Assignment Account

Your chapter assignment problems will be completed online and are based on the digital physics textbook you must purchase. An assignment account is bundled with your purchase of the digital textbook. Students may log in to their assignment page at

<http://homework.kineticbooks.com>.

To see your assignments you must first use the menu options to APPLY for this course (look for the appropriate semester under Professor Brooks at Collin College). I will then accept you into my class at which time you will have access to your assignments for this course. Detailed assignment information, including due dates, is available at this website. You do not need to be online to answer the questions, but you do need to be online to submit your answers.

Completing homework assignments thoroughly and on time is **very** important. The best way to study for tests in this course is to thoroughly complete and understand the homework. Test problems will reflect an understanding of both homework problems and examples worked in the digital textbook. You may ask questions regarding homework assignments by emailing Professor Brooks using Canvas mail or, preferably, by posting a discussion question in Canvas.

(3) Lab Simulation Package

The Virtual Physics Labs may be purchased [here](#) (cost is \$29.95). Each textbook and virtual lab package contains content for both PHYS 2425 and PHYS 2426 courses. With the web access license, PHYS 2426 must be taken within one year of PHYS 2425 to use the same Kinetic Books resources before they expire.

Supplies: You should have a scientific calculator, computer with internet access, and Scantron form for the final exam (the small half-sheet size)

Attendance Policy: No make-ups will be given for missed labs or the final exam.

Course Requirements: Course requirements include homework problems, simulation labs, on-campus labs, video assignments, a physics of technology project, and final exam.

Homework Problems: The homework problems will be delivered and graded through Kinetic Books (grades will be immediately available upon submission of assignment).

Simulation Labs: Consists of interacting with online simulations and completing the corresponding worksheets.

On-campus Labs: Consists of three on-campus lab meetings during which you will perform a variety of hands-on experiments.

Video Assignments: Involves watching the Mechanical Universe physics video series (accessible online through Canvas) and completing a video worksheet for each video.

Physics of Sports Project: Physics is best learned through real-world applications. This project will give you a chance to explore the physics of your favorite sport. More information is given online in the Canvas course.

Exams: The final exam will be given in the Preston Ridge Testing Center. The final exam is the only exam given in this course.

Course Calendar:

Course assignments that correspond to each chapter should be completed as listed in the following calendar:

Week	Course Material
Week 1	Students access their course materials Chapter 1 - Measurement and Mathematics Chapter 2 - Motion in One Dimension Chapter 3 – Vectors Chapter 4 - Motion in Two and Three Dimensions
Week 2	Chapter 5 - Force and Newton's Laws Chapter 6 - Applications of Newton's Laws Chapter 7 - Work, Energy, and Power Chapter 8 – Momentum Chapter 9 - Uniform Circular Motion
Week 3	Chapter 10 - Rotational Kinematics Chapter 11 - Rotational Dynamics Chapter 12 - Static Equilibrium and Elasticity Chapter 13 - Gravity and Orbits Chapter 14 - Fluid Mechanics
Week 4	Chapter 15 - Oscillations and Harmonic Motion Chapter 16 - Wave Motion Chapter 17 - Sound Chapter 18 - Wave Superposition and Interference
Week 5	Chapter 19 - Temperature and Heat Chapter 20 - Kinetic Theory of Gases Chapter 21 - First Law of Thermodynamics, Gases, and Engines Chapter 22 - Second Law of Thermodynamics, Efficiency, and Entropy Final Exam (Comprehensive)

Method of Evaluation: Course averages will be calculated as follows:

Homework Problems	35 %
Video Assignments	10 %
Sports Project	5 %
Labs (50% online, 50% oncampus)	30 %
Final Exam (comprehensive)	20 %

	100 % possible

Grades will be determined as follows:

90 – 100	= A
80 – 89	= B
70 – 79	= C
60 – 69	= D
0 – 59	= F

All class grades will be available through Canvas. Grades will usually be posted within one week of assignment submission. Instructor turn-around time for email or discussion postings is typically 24 hours or less during the week, a bit longer on weekends.