

GENERAL COURSE INFORMATION

(from the Collin College Generic Course Syllabus)

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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: Upon successful completion of this course, students should be able to do the following:

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 PROVIDED COURSE INFORMATION

Instructor: Meade Brooks

Office Location: 213 Lawler Hall, Preston Ridge Campus

Office Hours: On-campus: Mon 12:00 - 1:00 pm, Wed 11:00 am - 12:00 pm

Online via Canvas: Tue/Thu 10:00 am - 12:00 pm

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

Email: Send ALL email to me through the course Canvas mail system, NOT my collin.edu email.

COURSE INFORMATION

Last Day to Withdraw from Course: TBA

Meeting Times/Location: This is a hybrid course. The lecture is online with an optional 1 hour weekly meeting on-campus. This 1 hour session will focus on application of the course concepts covered in the online lecture. Lab activities will be performed on-campus in the Physics Lab (LH TBA).

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

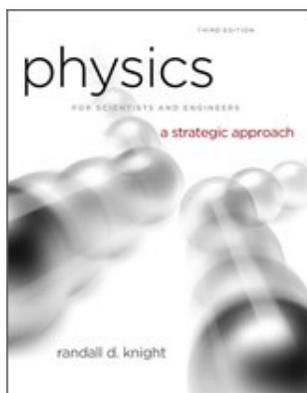
Minimum Student Skills: Students should have the attributes, skills and knowledge necessary for success in this online course including: self-motivation, good time-management skills, self-discipline, good reading comprehension, persistence, available time, ability to use a laptop, printer, software, and the Internet. Find out if you are ready to take an online course by completing the readiness assessment **SmarterMeasure** (https://www.collin.edu/academics/ecollin/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 will 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



Textbook: Physics for Scientists and Engineers with Modern Physics, 4th Edition

Author: Randall D. Knight

ISBN: 9780134110561

This online lecture makes use of several digital resources, and while available, a printed copy of the course textbook is not necessary. Pearson, the publisher, has made available a low-price digital textbook (eText) for this class packaged with MasteringPhysics, the online assignment system we will use for homework and exams. Follow the directions on the [MasteringPhysics and Textbook Access \(https://collin.instructure.com/courses/833936/pages/masteringphysics-and-textbook-access\)](https://collin.instructure.com/courses/833936/pages/masteringphysics-and-textbook-access) page to purchase these required course resources.

Wherever you purchase your textbook (whether printed or digital), be sure your purchase includes MasteringPhysics! You will be unable to complete your chapter assignments or exams without access to MasteringPhysics.

Supplies: You should have a scientific calculator and computer with internet access.

COURSE COMPONENTS

Homework Problems: You will be given assignments by chapter in the MasteringPhysics online assignment system.

Discussions: Questions have been developed for a variety of course topics. Students must reply to each discussion question which are graded upon level of participation and thoughtfulness. Additionally, students must reply to at least 2 student postings on the topic.

Video Assignments: Involves watching the Mechanical Universe series and completing a worksheet for each video.

Team Sports Project: Students will work in groups of 5-6 students to research and analyze the physics involved in a variety of sports.

Exams: Three major tests will be given. These will be completed in the MasteringPhysics online assignment system. There is no traditional final exam for this course.

Lab: Students will participate in laboratory activities on-campus. Students may register for any PHYS

2425 lab at the Preston Ridge Campus.

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

MasteringPhysics HW	35%
Lab	25%
Exams (3)	15%
Video Assignments	10%
Team Sports Project	10%
Graded Discussions	5%
TOTAL	100%

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.

COURSE SCHEDULE

Week 1	Chapter 1 - Concepts of Motion Chapter 2 - Kinematics in One Dimension
Week 2	Chapter 3 - Vectors and Coordinate Systems
Week 3	Chapter 4 - Kinematics in Two Dimensions
Week 4	Chapter 5 - Force and Motion
Week 5	Chapter 6 - Dynamics I: Motion Along a Line Chapter 7 - Newton's Third Law
Week 6	Exam 1 , Chapters 1 – 7 Chapter 8 - Dynamics II: Motion in a Plane
Week 7	Chapter 9 - Work and Kinetic Energy Chapter 10 - Interactions and Potential Energy
Week 8	Chapter 11 - Impulse and Momentum
Week 9	Chapter 12 - Rotation of a Rigid Body
Week 10	Chapter 13 - Newton's Theory of Gravity
Week 11	Chapter 14 - Fluids and Elasticity Exam 2 , Chapters 8 – 14
Week 12	Chapter 15 - Oscillations Chapter 16 - Traveling Waves

Week 13	Chapter 17 - Superposition Chapter 18 - A Macroscopic Description of Matter
Week 14	Chapter 19 - Work, Heat, and the First Law of Thermodynamics
Week 15	Chapter 20 - The Micro/Macro Connection
Week 16	Chapter 21- Heat Engines and Refrigerators Exam 3 , Chapters 15 – 21