Course Syllabus

Course Description

Provides fundamental concepts of classical physics with minimized computation in a conceptual and practical manner intended for non-science major students. Main topics covered are Newtonian mechanics, properties of matter and energy, and basic ideas of thermodynamics.

Course Textbook(s)


Course Learning Outcomes

Upon completion of this course, students should be able to:

1. Describe standard units of measurement to include components of a valid measurement.
2. Illustrate the scientific method within everyday situations.
3. Explain Newton's laws of motion at work in common phenomena.
4. Explain the concepts and applications of momentum, work, mechanical energy, and general relativity.
5. Identify the building blocks of matter to include their influence on physical properties.
6. Describe thermodynamic concepts and their applications.

Credits

Upon completion of this course, the students will earn 3 hours of college credit.

Course Structure

1. **Study Guide**: Course units contain a Study Guide that provide students with the learning outcomes, unit lesson, required reading assignments, and supplemental resources.
2. **Learning Outcomes**: Each unit contains Learning Outcomes that specify the measurable skills and knowledge students should gain upon completion of the unit.
3. **Unit Lesson**: Unit Lessons, which are located in the Study Guide, discuss lesson material.
4. **Reading Assignments**: Units contain Reading Assignments from one or more chapters from the textbook and/or outside resources.
5. **Suggested Reading**: Suggested Readings are listed within the Study Guide. Students are encouraged to read the resources listed if the opportunity arises, but they will not be tested on their knowledge of the Suggested Readings.
6. **Learning Activities (Non-Graded)**: Non-Graded Learning Activities are provided to aid students in their course of study.
7. **Discussion Boards**: Discussion Boards are part of all CSU Term courses. More information and specifications can be found in the Student Resources link listed in the Course Menu bar.
8. **Unit Assignments**: Students are required to submit for grading Unit Assignments. Specific information and instructions regarding these assignments are provided below. Grading rubrics are included with each assignment. Specific information about accessing these rubrics is provided below.
9. **Ask the Professor**: This communication forum provides you with an opportunity to ask your professor general or course content related questions.
10. **Student Break Room**: This communication forum allows for casual conversation with your classmates.

CSU Online Library
The CSU Online Library is available to support your courses and programs. The online library includes databases, journals, e-books, and research guides. These resources are always accessible and can be reached through the library webpage. To access the library, log into the myCSU Student Portal, and click on “CSU Online Library.” You can also access the CSU Online Library from the “My Library” button on the course menu for each course in Blackboard.

The CSU Online Library offers several reference services. E-mail (library@columbiasouthern.edu) and telephone (1.877.268.8046) assistance is available Monday – Thursday from 8 am to 5 pm and Friday from 8 am to 3 pm. The library’s chat reference service, Ask a Librarian, is available 24/7; look for the chat box on the online library page.

Librarians can help you develop your research plan or assist you in finding relevant, appropriate, and timely information. Reference requests can include customized keyword search strategies, links to articles, database help, and other services.

LibGuides

Think of a LibGuide (a Library Guide) as a mini-website to help you with your assignments. It has relevant information such as databases, e-books, and websites specific to your courses. If you have any questions, please reach out to your friendly library staff.

Click here for the LibGuide for this course.

Unit Assignments

Unit I Assignment

Conceptual Experiment

Purpose: To visualize the relationship between displacement, velocity, and time through graphical analysis.

A fundamental job of physics is to describe the motion of an object. In order to do this, you need basic elements such as displacement, velocity, and time to depict it. In this activity, you will investigate how constant-paced linear motion is depicted and how you can calculate the velocity. First, practice using the worksheet with the sample problem below. Click here to access the Unit I Assignment worksheet for this unit.

For the example problem, let us use a simple case. Let us assume that you are walking from your house at a constant pace for 100 seconds to get to the 100 meter-mark, and you come back to your house at the same pace.

Please click on the following link for a video with detailed instructions on how to plot the relation between time and distance and how to obtain the velocity.


To view a transcript of this video, click here.

You can also click here to review the PowerPoint presentation for further instructions on graphing the data, but it is not required to view this resource.

To view a pdf version of this presentation, click here.

After practicing with the sample problem, read the instructions and problem on the worksheet and complete it using the given data. In the worksheet, complete the graph, fill in the table, and answer the questions. Submit the completed worksheet for grading.

Information about accessing the grading rubric for this assignment is provided below.

Unit II Problem Solving

For this assignment, you will complete the Unit II problem solving practice assignment worksheet. This assignment will allow you to demonstrate what you have learned in this unit. Instructions for completing this assignment are located on the worksheet.

Click here to access the template for this assignment. Save all of your work directly to the template and submit it in Blackboard for grading.

Information about accessing the grading rubric for this assignment is provided below.

Unit III PowerPoint Presentation

For this assignment, you will create a PowerPoint that demonstrates the concepts covered in this unit. Find and select images that apply/explain/identify various physical concepts that we have learned in this unit. Identify the concept that is being demonstrated in that image, and provide an explanation that relates the image to the concept. Your presentation must contain at least these concepts:
• How impulse-momentum theorem relates to Newton's second law.
• The relationship between linear momentum conservation and Newton’s third law.
• How momentum conservation is exemplified in various physical activities.
• The difference between kinetic and potential energy.
• The relation among work, energy and power in daily life.

Some other topics that may be included are impulse, elastic/inelastic collision, energy conservation, power, work, angular momentum conservation, torque, center of mass/gravity, and centripetal/centrifugal force, among others.

Click here for a sample of what your PowerPoint may look like.

For a pdf version of this sample PowerPoint presentation, click here.

Your PowerPoint must be a minimum of 10 slides not including the title and reference slide. You are required to insert appropriate images and diagrams to enhance your content. In addition to the images, you must use at least two scholarly references in your presentation. Any images or information used should be cited in APA format. Also, it is a good idea to utilize presenter notes and provide narration, but this is not required.

Information about accessing the grading rubric for this assignment is provided below.

Unit IV Assignment
Conceptual Experiment
For this activity, you are going to calculate escape velocities for several exoplanets and compare them with our major planets.

In order to find escape velocities for the given exoplanets, enter the appropriate values of their masses and radii in unit of Earth’s mass and Earth’s radius in the provided template. Then, the escape velocity and gravitational acceleration will be automatically evaluated. In the case of our major planets, insert data from Table 10.1 on p. 199 in the textbook. After completing the table, answer the questions directly on the worksheet. You will save and upload your work on the provided template and submit it when you are complete.

Click here for the Unit IV assignment template.

Information about accessing the grading rubric for this assignment is provided below.

Unit V Problem Solving
For this assignment, you will complete the Unit V problem solving practice assignment worksheet. This assignment will allow you to demonstrate what you have learned in this unit. Instructions for completing this assignment are located on the worksheet.

Click here to access the template for this assignment. Save all of your work directly to the template and submit it in Blackboard for grading.

Information about accessing the grading rubric for this assignment is provided below.

Unit VI Article Review
Select and read one of the articles below:


After reading the article, you will write an article review that includes a short summary of the article and your general thoughts about the article. You should address how the physical concepts that we have learned in this unit are used or applied. In your discussion of how this article applies to the unit concepts, you should:

• describe various fluid dynamics terminologies within the article,
• distinguish between atmospheric pressure and liquid pressure, and
• describe ideal gas law for various practical applications.

Your article review should be at least three pages long, and it should be formatted in APA style. You are not required to use any references other than the article, but any information from outside sources, including the article, should be cited in APA style.

Information about accessing the grading rubric for this assignment is provided below.

Unit VII PowerPoint Presentation
You have been invited to talk about thermodynamic concepts—specifically the three heat transfer methods (convection,
conduction, and radiation)—in front of a high school physics class. To aid you in your presentation, you need to create a PowerPoint about the thermodynamic concepts with examples based on your experiences. In your presentation, be sure to include the following:

- compare and contrast the three heat transfer methods with examples,
- describe the relation among density, temperature, and volume when the pressure is constant, and
- explain the blackbody radiation curve.

Your PowerPoint must be a minimum of 10 slides not including the title and reference slides. You are required to insert appropriate images and diagrams to enhance your content. In addition to the images, you must use at least two scholarly references in your presentation. Any images or information used should be cited in APA format. Also, it is a good idea to utilize presenter notes and provide narration, but this is not required.

Information about accessing the grading rubric for this assignment is provided below.

**Unit VIII Problem Solving**

For this assignment, you will complete the Unit VIII problem solving practice assignment worksheet. This assignment will allow you to demonstrate what you have learned in this unit. Instructions for completing this assignment are located on the worksheet.

Click [here](#) to access the template for this assignment. Save all of your work directly to the template and submit it in Blackboard for grading.

Information about accessing the grading rubric for this assignment is provided below.

**Grading Rubrics**

This course utilizes analytic grading rubrics as tools for your professor in assigning grades for all learning activities. Each rubric serves as a guide that communicates the expectations of the learning activity and describes the criteria for each level of achievement. In addition, a rubric is a reference tool that lists evaluation criteria and can help you organize your efforts to meet the requirements of that learning activity. It is imperative for you to familiarize yourself with these rubrics because these are the primary tools your professor uses for assessing learning activities.

Rubric categories include: (1) Discussion Board, (2) Assessment (Written Response), and (3) Assignment. However, it is possible that not all of the listed rubric types will be used in a single course (e.g., some courses may not have Assessments).

The Discussion Board rubric can be found within Unit I’s Discussion Board submission instructions.

The Assessment (Written Response) rubric can be found embedded in a link within the directions for each Unit Assessment. However, these rubrics will only be used when written-response questions appear within the Assessment.

Each Assignment type (e.g., article critique, case study, research paper) will have its own rubric. The Assignment rubrics are built into Blackboard, allowing students to review them prior to beginning the Assignment and again once the Assignment has been scored. This rubric can be accessed via the Assignment link located within the unit where it is to be submitted. Students may also access the rubric through the course menu by selecting “Tools” and then “My Grades.”

*Again, it is vitally important for you to become familiar with these rubrics because their application to your Discussion Boards, Assessments, and Assignments is the method by which your instructor assigns all grades.*

**APA Guidelines**

The application of the APA writing style shall be practical, functional, and appropriate to each academic level, with the primary purpose being the documentation (citation) of sources. CSU requires that students use APA style for certain papers and projects. Students should always carefully read and follow assignment directions and review the associated grading rubric when available. Students can find CSU’s Citation Guide by clicking [here](#). This document includes examples and sample papers and provides information on how to contact the CSU Success Center.

**Communication Forums**

These are non-graded discussion forums that allow you to communicate with your professor and other students. Participation in these discussion forums is encouraged, but not required. You can access these forums with the buttons in the Course Menu.

[Click here for instructions on how to subscribe/unsubscribe and post to the Communication Forums.](#)

**Ask the Professor**

This communication forum provides you with an opportunity to ask your professor general or course content questions. Questions may focus on Blackboard locations of online course components, textbook or course content elaboration,
additional guidance on assessment requirements, or general advice from other students.

Questions that are specific in nature, such as inquiries regarding assessment/assignment grades or personal accommodation requests, are NOT to be posted on this forum. If you have questions, comments, or concerns of a non-public nature, please feel free to e-mail your professor. Responses to your post will be addressed or e-mailed by the professor within 48 hours.

Before posting, please ensure that you have read all relevant course documentation, including the syllabus, assessment/assignment instructions, faculty feedback, and other important information.

Student Break Room

This communication forum allows for casual conversation with your classmates. Communication on this forum should always maintain a standard of appropriateness and respect for your fellow classmates. This forum should NOT be used to share assessment answers.

Schedule/Grading

The following pages contain a printable Course Schedule to assist you through this course. By following this schedule, you will be assured that you will complete the course within the time allotted.

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<th>About Science and Motion</th>
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