

Physics 221 – Fundamentals of Physics – Spring Semester 2017

Distance Education

Instructor

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Objectives

Physics is the foundation of the sciences that enable us to understand the universe on the largest and smallest scales, from the beginning of time to its uncertain future. It is also the practical basis of contemporary technology, engineering, medicine, and biology.

In this first of a two-semester sequence on the fundamental concepts and methods of physics we will explore how physics works, learn the necessary math concepts to use it, and apply it to mechanics, heat, and sound.

The objective of this course is to incorporate physics into your critical thinking skills, and to develop your ability to understand and solve problems using the fundamental concepts of physics and a reasoned approach that seeks simplification leading to quantitative understanding of how nature behaves. This is a pre-professional course and is one of two semesters that together cover much of “classical physics”. We will not ignore the really interesting new developments though, and we will develop a foundation that will

- Help you understand (and cope with) physics encountered in everyday life: LED light bulbs, microwave ovens, and car parts.
- Provide a basis for understanding the latest developments about science you will hear in the news: colliding blackholes, global warming.
- Apply physics principles to astronomy, geology, biology, chemistry, medicine, engineering, music, and yes, to cats.
- Recognize that while physics does not explain everything, it does predict observable effects through sometimes intangible, invisible, and not fully understood processes.
- Present you with mysteries not yet solved, perhaps so that you may solve them in the future and win a Nobel Prize giving due credit to your physics class.
- Teach physics that you may apply to make life better for yourself and others now, and in the future.
- Open your mind to new discovery by knowing that the world should be understandable.

Requirements

The class website will guide you through about 12 different weekly topics over the semester, and will pose specific ideas and questions to consider in that context. While you study, you are expected to use the discussion forum on the website with other students in the same way that you would work with one another for any class. This is a very important part of the class and we monitor the forum to see where you are having difficulty. We encourage collaboration and peer instruction because our goal is to have you learn by whatever means you find most helpful, but of course you must do your own work. We will try to resolve questions you may have for the class as a whole through the discussion forum whenever we can, and to respond to email individually as needed.

Use the discussion forum, take your time to understand, ask questions when you need help, and remember the objective is to learn how to observe, reason, and use your growing knowledge and skill to understand our universe. Individual and group assistance through email, our own video conferencing system, Skype or telephone is available on request.

Each week the class website has new web-based content, suggested readings, and an interactive review. There is a graded quiz on Blackboard over the week's content that may be taken any time from 3 AM Saturday morning through Monday midnight (US Eastern Time) at the end of each week. There will be three longer exams administered through Blackboard, one at midterm, one at the end of the course, and one during the final exam period. These exams will also be open from Saturday to Monday midnight. We will send email reminders weekly about the quizzes and exams.

Websites

The University's Blackboard system is its gateway to Distance Education programs:

<http://blackboard.louisville.edu/>

Use your University *User ID* and *Password* to log into Blackboard for the quizzes, exams, and announcements. For this Fundamentals of Physics class, however, all of the content will be managed on our program website at

<http://prancer.physics.louisville.edu/moodle>

This site is available only to registered students, and it requires a personal password that is different from your university computer password. Instructions on how to use this system will be posted on Blackboard and sent to registered students by email on or before the first day of classes. Please contact Professor Kielkopf if you have not received this by the second day of classes, or if you have difficulty logging into the website. The University's Help Desk can only respond to questions about Blackboard.

Textbook

The content will be provided online through the class website. For additional help, the recommended text for the course is

It is made available under the auspices of Rice University **for free** online at

<https://openstax.org/details/college-physics>

Click “Download a PDF” or links on the class website or Blackboard. It is also available in a high quality paper copy through the University’s bookstore, or through Amazon and other online retailers at low cost.

This is a comprehensive general college physics textbook that uses algebra. It covers two semesters in more detail than we will be able to cover this first semester, but has many worked problems and illustrations you will find helpful. Selected readings will be indicated in the on-line website for the class.

If you have a background in calculus, there is a similar Openstax book that is calculus-based but we do not use it explicitly in this course.

In many cases, simply by using Google and looking for an appropriate entry in the Wikipedia you can find an answer to basic astronomy and physics questions, and links to far more detail than most textbooks provide. If you follow this suggestion, be selective in accepting answers from Internet resources. Wikipedia has proven to be very reliable, as are the sites supported by NASA. There will be selected links to these resources on the class website.

Information on useful software and other materials will be provided online. While we are working to provide all content through advanced web-based technology, access to a desktop or laptop rather than a tablet or cellphone may be necessary for some of the required work. If you have problems with class content or on-line software, please use our website and post your question to the Discussion Forum. Often other students have seen the same issue and will know the answer, or if not, we can work together to a solution.

Evaluation and Grading

Quizzes and exams will evaluate your progress toward meeting the course objectives.

There will be a quiz at the end of each week. Weekly quizzes will be added and averaged to make 25% of your grade.

There will be 3 exams: the first is near mid-term; the second at the end covering the second half of the course, and a third one during the final exam period covers the entire course. Each exam counts 25%.

An additional 5% will be added for students who make consistent thoughtful contributions to the forum discussions on the class website.

To complete the course and receive a grade, you must meet the requirements noted above, including participation in the online components and taking all the quizzes and exams. Given that, letter grades are based on the graded quizzes and exams, and scoring on quizzes and exams is based on a simple percentage of correct answers.

Letter grades are approximately A (90 to 100); B (80 to 89); C (70 to 79); and D (60 to 69). Plus and minus grades may be used when a numerical score is within 2 points of a letter grade division.

Caveats

We reserve the right to make changes in the syllabus when necessary to meet learning objectives, when new physics related discoveries occur, or when there is a technical or software issue that requires a change in content or methodology. Any changes will be announced by email and posted in the current online syllabus and schedule.

Title IX/Clery Act Notification

Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain confidential support from the PEACC Program (502.852.2663), Counseling Center (502.852.6585), and Campus Health Services (502.852.6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (502-852-5787) or University of Louisville Police (502.852.6111).

Disclosure to University faculty or instructors of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is not confidential under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer.

For more information, see the Sexual Misconduct Resource Guide here <http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure>.

Schedule and Content

The primary content is on-line on the class website, that you may supplement with weekly suggested reading assignments from the textbook. The website includes interactive components, the discussion forum, and self-assessment activities that may help you judge your progress and problem-solving skills.

Please check the class website and participate in the on-line discussions to see what other students find helpful and interesting. Weekly quizzes for credit are on Blackboard from Saturday morning through Monday midnight.

January 9 - 15 What is Physics?

January 16 - 22 Distance, Time, and Motion

January 23 - 29 The Concept of Force and Newton's Second Law

January 30 - February 5 Energy

February 6 - 12 Momentum

February 13 - 19 Angular Momentum

February 20 - 26 Review for First Exam

Saturday, February 25, through Monday, February 27 First exam.

February 27 - March 5 Temperature and Heat

March 6 - 12 Gases, Liquids, and Solids

March 13 - 19 Spring Break

March 20 - 26 Atoms, Molecules, and Entropy

March 27 - April 2 Waves

April 3 - April 9 Vibrations and Sound

April 10 - April 16 Physics of Music

April 17 - 23 Review for Second Exam

Saturday, April 22, through Monday, April 24 Second exam.

Saturday, April 29, through Monday, April 30 Final exam.