PHYS 101

Course Syllabus

Description

PHYS 101 is an introduction for non-science majors to the core concepts of physics: motion, force, mass, momentum, energy, rotations and gravity.

The laws governing these concepts are formulated in the language of mathematics, but the course will not go beyond high-school level algebra. Many phenomena will be illustrated in video demonstrations, animations and computer simulations. The level of the class assumes no prior knowledge of physics whatsoever, but it will require quantitative reasoning.

It will help you succeed in this course if you come to class with a desire to dig deeper into the causes of things you see around you. Words you’ll be hearing a lot are: "why," "how" and "what if" - because curiosity is what makes scientists tick. Physics provides a set of tools that have given us an unprecedented level of insight about the natural world. Because of this, the course also serves the broader purpose of highlighting the significance of basic science in modern society.

The course focuses on mechanics and its manifestations extending from everyday phenomena to the cosmos. Newton's laws of motion and of gravity provide an early example of the changes in western thought embodied by the Enlightenment. Physics unifies our understanding of 'heavenly' and 'earthly' forces, and in the process provides a framework that extends all the way into the microscopic world of atoms, too.

Required materials

You’ll need a calculator to be used in homework. We will not be using any trigonometric functions, so a simple calculator is fine (a scientific calculator is good to have, but not required)

Textbook:

Paul G. Hewitt, Conceptual Physics (10th edition or above, 12th edition preferred)

The book should be available at the Duck store, but the digital version is equivalent. You do not need a digital access key for the Pearson web offerings (Mastering Physics).

The book is required because I refer to specific sections in the reading quizzes. The table of contents for the 12th edition is posted on the Canvas home page for the course; sections in the reading assignments refer to that table of contents. All other assignments are written independently of the textbook, so I won’t be referring to specific problem numbers in the textbook.

I chose this book because it offers the best combination of simplicity and scientific correctness that I’ve seen in any introductory text, and at the same time you’ll also feel with every page that the author is really enthusiastic about physics. This aligns with my main goal in this course: I’m not trying to reproduce a high school AP science course, but give you an insight into why some people actually enjoy doing physics!

The reading will be approximately in sync with the lectures - but not completely: there are some topics that I present
in a slightly different order from the textbook. The main reason is that I spend more time exploring the really fundamental concepts, such as force. For example, Hewitt starts by saying that "a force is a pull or a push." That's short and sweet, but what's a push? I'm going to answer that question - and no, the answer is not "a push is a force"... You should view the book and the lectures as equally important but complementary sources of information.

### Schedule

Below I'm listing the planned modules, numbered 1-7. Each module contains a list of lectures, numbered 1.1, 1.2 etc. Each lecture entry lists the textbook sections that you should read before that lecture. The readings for each lecture are assigned as quizzes on Canvas. The lectures themselves are assigned as separate quizzes.

The main chapters we'll cover are 2 - 9. I will also assign some sections of other chapters (Ch 12) and appendices to read.

**Lecture Table of Contents, by Module:**

1. **Module: Velocity, acceleration, force**
   1. Sections 1.2-1.6
   2. Sections 2.1-2.2
   3. Sections 2.3, 12.3
   4. Section 12.4
   5. Sections 2.4, 2.5

2. **Module: Relative motion, free fall**
   1. Sections 2.6-2.8 and 5.4
   2. Sections 3.1 - 3.3 and Appendix C, first page
   3. Section 3.4
   4. Section 3.5, 3.6

3. **Module: Interplay of force and inertia**
   1. Sections 4.1 and 4.3 - 4.5
   2. Sections 5.1 - 5.3
   3. Sections 4.2 and 4.6

4. **Module: Action, reaction and momentum**
   1. Sections 6.1 - 6.3
   2. Sections 6.4-6.5
   3. Sections 6.6-6.7

5. **Module: Energy**
   1. Sections 7.1 - 7.3
   2. Sections 7.4 - 7.5
   3. Section 7.6
   4. Section 7.7
   5. Section 7.8

6. **Module: Rotational motion**
   1. Section 8.1
   2. Section 8.3
   3. Section 8.4
   4. Sections 8.2 and 8.5
   5. Sections 8.6-8.8

   1. Section 1.1
   2. Sections 9.1-9.3
   3. Sections 9.4- 9.6
Logistics

Instructor: Prof. Jens Noeckel (noeckel@uoregon.edu)

Video lectures

All the lectures that are relevant for the grade will be posted as videos via the video delivery platform Panopto.

I will post each lecture as an assignment with a corresponding video link and deadline. It’s important not to fall behind. The deadline for each lecture is midnight on the day of the following lecture. For example, a lecture posted for Monday has to be completed any time on Monday, Tuesday or Wednesday. You can always re-watch the lectures later. You can also set bookmarks in the Panopto viewer to remind yourself of specific points in the lecture you may want to revisit.

To access the video lectures, follow the link from the corresponding Canvas assignment! Don’t try to find the lecture video on the Panopto homepage or from the Panopto app. If you don’t follow the link from Canvas, your in-lecture quiz results won’t get transferred to the Canvas grade book and you’ll have to re-do the lecture quizzes. This is a limitation of the Panopto integration with Canvas.

Together with the videos, each course module also contains a page where I post the lecture slides as PDF. If you have a note-taking app, I recommend importing the PDFs so you can annotate them. Many people find that taking notes helps them absorb the material better.

Interactive class sessions

Times:

The scheduled class times are MWF 12:30 - 1:30 pm, but I will be available for an extended time:
MWF 12:30 - 2:00 pm.

The class sessions don’t count toward the grade. I expect that there will be students who take this class from many different time zones, all the way from Hawaii to China (typically, at least half of the students in PHYS 101 are foreign students). That’s why I won’t use Zoom and won’t take attendance (Zoom may also be blocked in some countries).

How I’ll run the classes:

For each scheduled lecture time, I’ll post a link to the corresponding lecture video as an ungraded assignment.

If you want to reproduce at least part of a real-time classroom experience, do the following:

• Right before each scheduled lecture time, open the lecture via the link I posted.
• In a second window, open the Canvas Chat for this course.
• Start playing the lecture video at 12:30pm. I will do the same.
• I will be monitoring the Canvas Chat, so you can ask questions via chat at any time while watching the video. If there’s an issue that warrants pausing the video for everybody, I’ll notify you via chat.
You don’t have to worry about getting out of sync with others watching the video because I’ll be available for another half hour after each official lecture period.

I’ve previously tried using Panopto Discussions instead of Canvas Chat, but Panopto discussions don’t update in real time with web browsers, so if you post there it won’t usually be seen by anyone until they refresh the page. On the other hand, Canvas Chat updates automatically. That’s why I’d like you to interact via Canvas Chat as explained above.

Even if you don’t have a chance to attend the live session, do read the chat afterwards. In particular, make sure to look through my posts before you get started on the quantitative quizzes. The interactive sessions might contain important hints or corrections (for corrections relevant to the assignments, I also send out announcements).

Getting help

This is a course for non-scientists, so if you have a question about the material it’s very likely that you’re not alone. So don’t be shy about asking questions, including about the assignments.

Asking questions or participating in discussions on Canvas is a good thing, but it has no effect on your grade in this course.

Lecture questions:

If you have questions about something in the lecture, there are three options:

• Ask in real time during the lecture via Chat (see above).
• Open a discussion in Canvas at any time. I will look for questions regularly. To see discussion replies, you may have to refresh the page manually if you’re logged into Canvas from a web browser.
• Post a discussion in Panopto directly. For this course I don’t recommend using this because it’s difficult for me to find your questions in Panopto (there are no notifications).

If you have a question that you’d prefer to ask in private, it’s best to email me (noeckel@uoregon.edu). For example, if you have a math problem you may want to take a screenshot and attach it to your email.

Questions about the quantitative and reading questions:

Each quantitative quiz (not the reading quizzes) will include a link to a Discussion thread for that homework. I’ll monitor that discussion for questions. In that thread, I may also post a short video with hints on how to do the problems.

If you have questions about the reading, please let me know by email or open a new thread in the Discussion section on Canvas.

If you see a question in the discussions that you feel you can answer or add to, please don’t hesitate to post your contributions.

Office hours

I’m available in Canvas Chat for a half hour after each lecture, MWF 1:30 pm - 2:00 pm.

Grading

Grades for the course will be based on quizzes in the lectures and in separate assignments. There will be no midterms or final exam because I don’t see an equitable and cheat-proof way of having such exams online. The
relative weights will be as follows:

In-lecture quizzes: 10%

Reading quizzes: 50%

Quantitative quizzes: 40%

I will drop your lowest 3 reading quiz scores and your lowest quantitative quiz score in computing your final grade (missed quizzes count as zero scores).

You're allowed to work together or use external resources to answer any of the quiz questions.

The score for all quizzes is based on the number of correct answers. You don't get points for incorrect answers, but you don't get penalized for them either.

In-lecture quizzes will appear at certain times during the lecture video. The deadline for answering the lecture quizzes is posted under "Assignments". You have two attempts to answer each in-lecture question. This is because I will sometimes make you take a guess between two alternatives. So if you get it wrong the first time, it will not hurt your score because you can then re-do the question and pick the other choice.

Reading quizzes go along with the reading assignments for each module. They are multiple choice. You have only one attempt to answer the reading quiz questions. This is intended to make you read carefully before answering the questions. The questions are designed to be conceptual and simple, provided that you have read the material.

Quantitative quizzes will be posted separately on Canvas with their own deadlines. You have two attempts to answer each question on a quantitative quiz.

The quantitative quizzes can be multiple choice or may require numerical calculations. This means you will need a calculator! The quantitative quizzes will also have a link to the Canvas Discussion board where you can ask questions about the assignment.

Late policy for all quizzes:

For a submission that's up to 24 hours late, you get a score that's reduced to 80% (i.e. 20% subtraction). For submissions later than 24 hours, there are no points. This is done automatically in Canvas. I can override this on a case-by-case basis if you have a valid excuse.

Pass/fail grading option: a passing grade requires the equivalent of a C grade on all course work (quizzes, homework, midterms, and final).

Grading scale: the nominal grading scale for this course is below. If the final class average is excessively low, I may apply a curve for a higher average final grade. However, you are guaranteed at least the grade listed below based on your final average; you are not competing with others in the class for your grade.


Note that the total score listed in Canvas for the in-lecture quizzes is not always accurate: it doesn't show missing scores as zero points. That seems to be a bug in the system. If you have no missing lecture scores, then your Canvas total does give the correct score.

Academic Honesty

Students are expected to abide by university policies on academic honesty, avoiding plagiarism, fabrication,
cheating, and academic misconduct. The Student Conduct Code (https://dos.uoregon.edu/conduct) provides definitions of these terms and explanations of the university policy on the subject. Academic dishonesty will be dealt with severely, as it is disrespectful to your fellow students and your instructor, as well as being against both university regulations and state laws.

**Other resources**

Lastly, the University’s Tutoring and Academic Engagement Center may also be able to assist UO students. I’d suggest contacting them only after touching base with me first. For more information see https://engage.uoregon.edu/

**Students with disabilities**

If there are aspects of the instruction or course design that result in barriers to your inclusion, please notify Prof. Noeckel (noeckel@uoregon.edu) as soon as possible. You are also welcome to contact Disability Services in 164 Oregon Hall, 346-1155.