Course Syllabus

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.

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 has 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). A web-based scientific calculator can be found at this link.

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", because that would be circular... 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.

I will assign readings from chapters 1 to 9, and from chapter 12.

The graphic below shows an overview of the concepts and their relationships among each other:

![Concept Map of Classical Mechanics](image)

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

The section numbers refer to the textbook:

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. Section 8.6-8.8

7. **Module:** Universal Law of Gravitation, Satellites
   1. Section 1.1
   2. Sections 9.1-9.4
   3. Sections 9.6 - 9.8

**Logistics**

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

**In-person lectures**

Lectures are in room 100, Willamette Hall, 12 noon - 13:50pm Tuesdays and Thursdays. **Attendance is optional** and doesn't affect your grade. All lecture materials, including videos and assignments, are available online through Canvas.

During in-person lectures, I'll cover the same material as the videos, except that some demonstrations will receive more emphasis. I'll also open the floor for discussions and questions (including homework-related issues).

The plan is to take a 10-minute break roughly in the middle of the two-hour class period.
Video lectures

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

I will post each lecture as an assignment with a corresponding link and deadline on Canvas. It's important not to fall behind.

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.

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.

All the videos have captions - but my advice is to read the text on the slides instead, because formulas and symbols can't be rendered in captions.

Office hour

In person: 456 Willamette Hall, Tuesdays 2-3pm.

Canvas messages: anytime.

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.

Each problem set (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, you're welcome to bring it up in class, or open a new thread in the Discussion section on Canvas.

If you see a question in the discussions or in class that you feel you can answer or add to, please don't hesitate to contribute. Participation doesn't affect your grade.

If you have a question that you'd prefer to ask in private, it's best to contact me via Canvas message because that gets sent to my email with a subject line identifying it as course-related.
If you have a math problem or other issue that is best discussed with a screenshot, you can email me at noeckel@uoregon.edu and attach your work to the email. That's the easiest way for me to give you personalized feedback.

Don't use the discussion feature within Panopto's video player to contact me - the system doesn't notify me of new messages posted there.

Grading

Grades for the course will be based on quizzes in the videos and in separate assignments, as well as a final exam that will also be held online through Canvas. There will be no midterms. The relative weights will be as follows:

- In-video quizzes: 10%
- Reading quizzes: 30%
- Quantitative quizzes: 40%
- Final exam: 20%

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. I call them "Problem Sets" to distinguish them from the other assignments. You have two attempts to answer each question on a problem set. These problem sets can be multiple choice or may require numerical calculations. The numerical questions can change from one attempt to the next, so you can't copy the answers from the first to the second attempt!

Late policy for all quizzes:

For any late submission, you get a score that's reduced to 80% (i.e. 20% subtraction). 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.

\[ \geq 97: A+, \geq 93: A, \geq 90: A-, \geq 87: B+, \geq 83: B, \geq 80: B-, \geq 77: C+, \geq 73: C, \geq 70: C-, \geq 67: D+, \geq 63: D, \geq 60: D-, <60: F \]

Note that the total score listed in Canvas for the in-video 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. If you have missing assignments at the end of the term, your total score will go down when I force Canvas to I count missing assignments as zero points.

**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](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/](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.

**Course Summary:**

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<thead>
<tr>
<th>Date</th>
<th>Details</th>
<th>Due</th>
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<td>Fri Sep 30, 2022</td>
<td><a href="https://canvas.uoregon.edu/courses/205625/assignments/1295885">Lecture 1</a></td>
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